On various equations inherent the works concerning JT Gravity, open strings on the Rindler Horizon, Gauge Theory and integrability and Topological Gravity. New mathematical connections with some sectors of Ramanujan's mathematics.

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Abstract

In this research paper we have obtained some interesting mathematical connections between various equations inherent the works concerning JT Gravity, open strings on the Rindler Horizon, Gauge Theory and integrability and Topological Gravity of Witten et al. and some sectors of Ramanujan's mathematics, principally the Mock Theta Functions and ζ(2) and some expressions concerning the mass of some particles.

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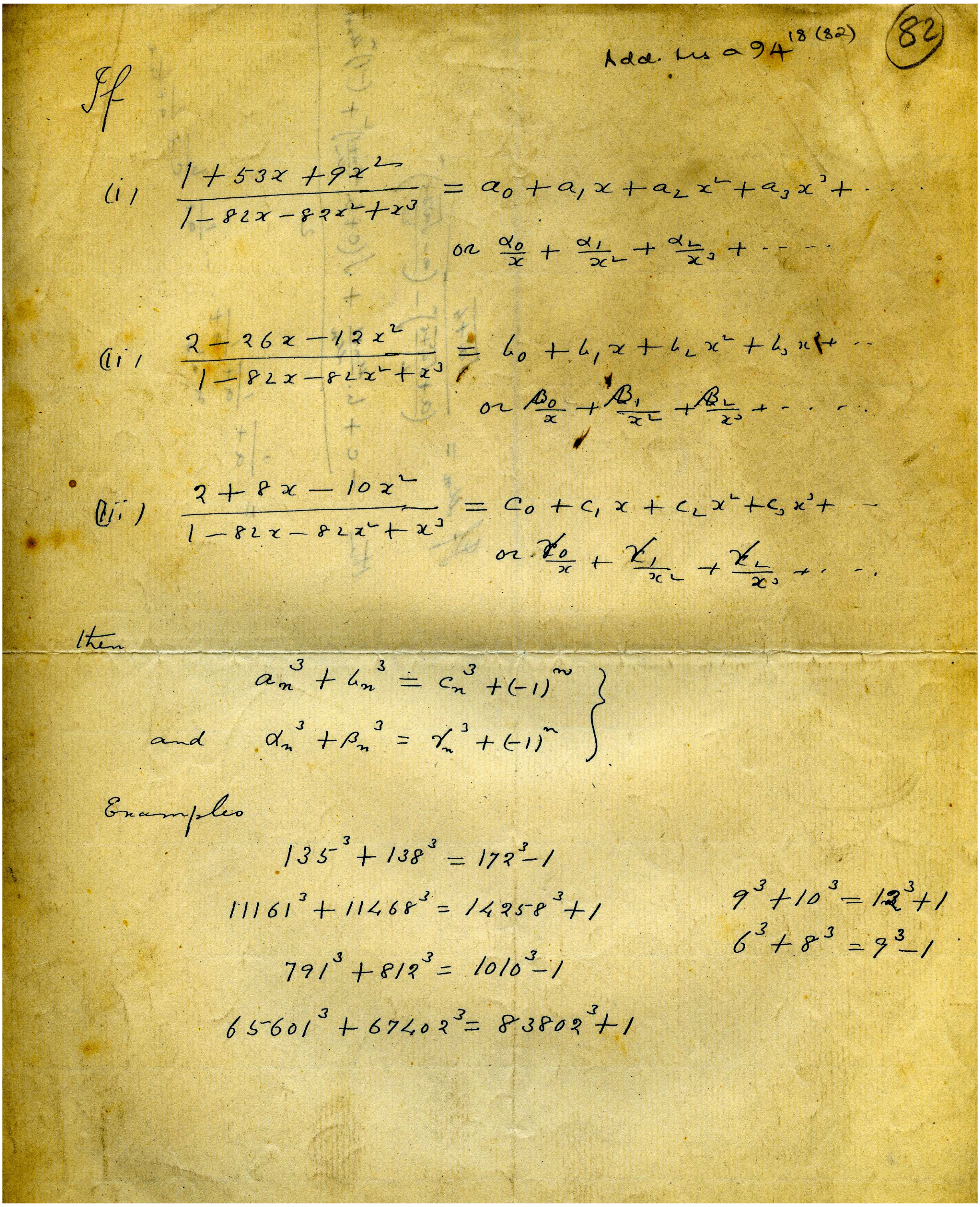
Ramanujan original paper with the Hardy-Ramanujan number 1729 and 728



Add. ms a94 18 (82) (82)

If

(i) $$\frac{1+53x+9x^2}{1-82x-82x^2+x^3} = a_0 + a_1 x + a_2 x^2 + a_3 x^3 + \cdots$$
or $$\frac{\alpha_0}{x} + \frac{\alpha_1}{x^2} + \frac{\alpha_2}{x^3} + \cdots$$

(ii) $$\frac{2-26x-12x^2}{1-82x-82x^2+x^3} = b_0 + b_1 x + b_2 x^2 + b_3 x^3 + \cdots$$
or $$\frac{\beta_0}{x} + \frac{\beta_1}{x^2} + \frac{\beta_2}{x^3} + \cdots$$

(iii) $$\frac{2+8x-10x^2}{1-82x-82x^2+x^3} = c_0 + c_1 x + c_2 x^2 + c_3 x^3 + \cdots$$
or $$\frac{\gamma_0}{x} + \frac{\gamma_1}{x^2} + \frac{\gamma_2}{x^3} + \cdots$$

then

$$a_n^3 + b_n^3 = c_n^3 + (-1)^n$$
and
$$\alpha_n^3 + \beta_n^3 = \gamma_n^3 + (-1)^n$$

Examples

$$135^3 + 138^3 = 172^3 - 1$$
$$11161^3 + 11468^3 = 14258^3 + 1$$
$$791^3 + 812^3 = 1010^3 - 1$$
$$65601^3 + 67402^3 = 83802^3 + 1$$

$$9^3 + 10^3 = 12^3 + 1$$
$$6^3 + 8^3 = 9^3 - 1$$

https://randomkey.pro/ramanujan-notebook-2-34/

83802^3 + 1 = 588522607645609; $(588522607645609)^{1/68}$ =
1,6489306826945520407253966174834 ≈ ζ (2)

1,6489306826945520407253966174834 × 6 =

9,8935840961673122443523797049003

√(9,8935840961673122443523797049003) =
3,1454068252242526480341840128661 ≈ π

https://i.pinimg.com/736x/8a/d3/25/8ad325cae710bdb8eeb9adb649cd9766--family-circle-mathematics.jpg

From:

Douglas Stanford and Edward Witten - **JT Gravity and the Ensembles of Random Matrix Theory** - arXiv:1907.03363v2 [hep-th] 22 Jul 2019

EQUATION (D.47)

$$\widetilde{T}(b,b',b'') = \frac{1}{16\pi}\left(-\frac{1}{\cosh\frac{b-b'+b''}{4}} + \frac{1}{\cosh\frac{b-b'-b''}{4}} - \frac{1}{\cosh\frac{b+b'+b''}{4}} + \frac{1}{\cosh\frac{b+b'-b''}{4}}\right), \qquad \text{(D.47)}$$

1/(16*pi) * (((((-1/(cosh(4Pi)) + 1/(cosh(-8Pi)) - 1/(cosh(10Pi)) + 1/(cosh(-2Pi)))))

Input:

$$\frac{1}{16\pi}\left(-\frac{1}{\cosh(4\pi)}+\frac{1}{\cosh(-8\pi)}-\frac{1}{\cosh(10\pi)}+\frac{1}{\cosh(-2\pi)}\right)$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function

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Exact result:

$$\frac{\operatorname{sech}(2\pi)-\operatorname{sech}(4\pi)+\operatorname{sech}(8\pi)-\operatorname{sech}(10\pi)}{16\pi}$$

- $\operatorname{sech}(x)$ is the hyperbolic secant function

Decimal approximation:

- More digits

0.000074164169842777456255176550603437610088007649371067880...

Open code

Continued fraction:

- Linear form

$$\cfrac{1}{13483+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{6028+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{11+\cfrac{1}{1+\cfrac{1}{40+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}$$

Open code

Series representations:

- More

$$\frac{-\frac{1}{\cosh(4\pi)}+\frac{1}{\cosh(-8\pi)}-\frac{1}{\cosh(10\pi)}+\frac{1}{\cosh(-2\pi)}}{16\pi}=\sum_{k=0}^{\infty}\frac{(-1)^k e^{-10(\pi+2k\pi)}\left(-1-e^{6(\pi+2k\pi)}+e^{8(\pi+2k\pi)}+e^{2\pi+4k\pi}\right)}{8\pi}$$

Open code

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$$\frac{-\frac{1}{\cosh(4\pi)}+\frac{1}{\cosh(-8\pi)}-\frac{1}{\cosh(10\pi)}+\frac{1}{\cosh(-2\pi)}}{16\pi}=\sum_{k=0}^{\infty}\frac{48(-1)^k(1+2k)\left(26593+904k+920k^2+32k^3+16k^4\right)}{\left(17+4k+4k^2\right)\left(65+4k+4k^2\right)\left(257+4k+4k^2\right)\left(401+4k+4k^2\right)\pi^2}$$

Open code

Note that 26593 is a value very near to the rest mass of charmed Xi 2645.9

$$\frac{-\frac{1}{\cosh(4\pi)}+\frac{1}{\cosh(-8\pi)}-\frac{1}{\cosh(10\pi)}+\frac{1}{\cosh(-2\pi)}}{16\pi} = \sum_{k=0}^{\infty} \frac{i\left(\text{Li}_{-k}(-i e^{z_0})-\text{Li}_{-k}(i e^{z_0})\right)\left((2\pi-z_0)^k-(4\pi-z_0)^k+(8\pi-z_0)^k-(10\pi-z_0)^k\right)}{16\pi k!}$$

for $\frac{1}{2}+\frac{i z_0}{\pi} \notin \mathbb{Z}$

Open code

- $n!$ is the factorial function
- $\text{Li}_n(x)$ is the polylogarithm function
- $\mathbb{Z}$ is the set of integers

- Integral representation:

$$\frac{-\frac{1}{\cosh(4\pi)}+\frac{1}{\cosh(-8\pi)}-\frac{1}{\cosh(10\pi)}+\frac{1}{\cosh(-2\pi)}}{16\pi} = \int_0^{\infty} -\frac{\left(-1+t^{4i}-t^{12i}+t^{16i}\right)t^{4i}}{8\pi^2(1+t^2)}\,dt$$

- Open code

10^3* 22* [1/(16*pi) * (((((-1/(cosh(4Pi)) + 1/(cosh(-8Pi)) - 1/(cosh(10Pi)) + 1/(cosh(-2Pi))))))]

Input:

$$10^3 \times 22\left(\frac{1}{16\pi}\left(-\frac{1}{\cosh(4\pi)}+\frac{1}{\cosh(-8\pi)}-\frac{1}{\cosh(10\pi)}+\frac{1}{\cosh(-2\pi)}\right)\right)$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function

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Exact result:

$$\frac{1375(\text{sech}(2\pi)-\text{sech}(4\pi)+\text{sech}(8\pi)-\text{sech}(10\pi))}{\pi}$$

- $\text{sech}(x)$ is the hyperbolic secant function

Decimal approximation:

- More digits

1.631611736541104037613884113275627421936168286163493373359...

Open code

1.6316117…

This result is a golden number

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{83+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{10+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{3+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{(10^3 \times 22)\left(-\frac{1}{\cosh(4\pi)}+\frac{1}{\cosh(-8\pi)}-\frac{1}{\cosh(10\pi)}+\frac{1}{\cosh(-2\pi)}\right)}{16\pi} = \sum_{k=0}^{\infty} \frac{2750\,(-1)^k\, e^{-10(\pi+2k\pi)}\left(-1-e^{6(\pi+2k\pi)}+e^{8(\pi+2k\pi)}+e^{2\pi+4k\pi}\right)}{\pi}$$

Open code

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$$\frac{(10^3 \times 22)\left(-\frac{1}{\cosh(4\pi)}+\frac{1}{\cosh(-8\pi)}-\frac{1}{\cosh(10\pi)}+\frac{1}{\cosh(-2\pi)}\right)}{16\pi} = \sum_{k=0}^{\infty} \frac{1\,056\,000\,(-1)^k\,(1+2k)\left(26\,593+904k+920k^2+32k^3+16k^4\right)}{(17+4k+4k^2)(65+4k+4k^2)(257+4k+4k^2)(401+4k+4k^2)\,\pi^2}$$

Open code

$$\frac{(10^3 \times 22)\left(-\frac{1}{\cosh(4\pi)}+\frac{1}{\cosh(-8\pi)}-\frac{1}{\cosh(10\pi)}+\frac{1}{\cosh(-2\pi)}\right)}{16\pi} = \sum_{k=0}^{\infty} \frac{1375\, i\left(\mathrm{Li}_{-k}(-i e^{z_0})-\mathrm{Li}_{-k}(i e^{z_0})\right)\left((2\pi-z_0)^k-(4\pi-z_0)^k+(8\pi-z_0)^k-(10\pi-z_0)^k\right)}{\pi\, k!} \quad \text{for } \frac{1}{2}+\frac{i z_0}{\pi} \notin \mathbb{Z}$$

Open code

- $n!$ is the factorial function
- $\mathrm{Li}_n(x)$ is the polylogarithm function
- $\mathbb{Z}$ is the set of integers
- More information

Integral representation:

$$\frac{(10^3 \times 22)\left(-\frac{1}{\cosh(4\pi)} + \frac{1}{\cosh(-8\pi)} - \frac{1}{\cosh(10\pi)} + \frac{1}{\cosh(-2\pi)}\right)}{16\pi} = \int_0^\infty -\frac{2750\left(-1+t^{4i}-t^{12i}+t^{16i}\right)t^{4i}}{\pi^2\left(1+t^2\right)}\,dt$$

Note that 2750 is a value very near to the rest mass of charmed Omega baryon 2765.9

EQUATION (5.56)

$$V_{\frac{1}{2}}(b) = -\frac{\gamma}{\sqrt{2}}\int \frac{dz}{2\pi i}e^{bz}\int_0^\infty \frac{\sqrt{x'}dx'}{x'+z^2}\left[\left(1-\frac{2}{\beta}\right)\frac{\tanh(2\pi\sqrt{x'})}{\sqrt{x'}} + \frac{\alpha-\frac{\beta}{2}}{\pi\beta x'}\right] \quad (5.54)$$

$$= -\frac{\gamma}{\sqrt{2}}\int_0^\infty dx' \sin(b\sqrt{x'})\left[\left(1-\frac{2}{\beta}\right)\frac{\tanh(2\pi\sqrt{x'})}{\sqrt{x'}} + \frac{\alpha-\frac{\beta}{2}}{\pi\beta x'}\right] \quad (5.55)$$

$$= -\frac{\gamma}{\sqrt{2}}\left[\frac{1-\frac{2}{\beta}}{2\sinh(\frac{b}{4})} + \frac{\alpha-\frac{\beta}{2}}{\beta}\right]. \quad (5.56)$$

((((((-4/(sqrt2)*(((0.5/(2(sinh(36Pi/4)))+0.25))))))

Input:

$$-\frac{4}{\sqrt{2}}\left(\frac{0.5}{2\sinh\left(36\times\frac{\pi}{4}\right)}+0.25\right)$$

Open code

- $\sinh(x)$ is the hyperbolic sine function

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Result:

- More digits

−0.707107...

This result is equal to -1/√2

Series representations:

- More

$$\frac{\left(\frac{0.5}{2\sinh\left(\frac{36\pi}{4}\right)}+0.25\right)(-4)}{\sqrt{2}} = -\frac{0.5+\sum_{k=0}^{\infty} I_{1+2k}(9\pi)}{\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\left(\sqrt{x}\left(\sum_{k=0}^{\infty} I_{1+2k}(9\pi)\right)\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)}$$

for $(x \in \mathbb{R}$ and $x < 0)$

Open code

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$$\frac{\left(\frac{0.5}{2\sinh\left(\frac{36\pi}{4}\right)}+0.25\right)(-4)}{\sqrt{2}} = -\frac{1+\sum_{k=0}^{\infty}\frac{9^{1+2k}\pi^{1+2k}}{(1+2k)!}}{\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\left(\sqrt{x}\left(\sum_{k=0}^{\infty}\frac{9^{1+2k}\pi^{1+2k}}{(1+2k)!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)}$$

for $(x \in \mathbb{R}$ and $x < 0)$

Open code

$$\frac{\left(\frac{0.5}{2\sinh\left(\frac{36\pi}{4}\right)}+0.25\right)(-4)}{\sqrt{2}} = -\frac{\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}\left(z_0^{-1/2-1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}\left(0.5+\sum_{k=0}^{\infty}I_{1+2k}(9\pi)\right)\right)}{\left(\sum_{k=0}^{\infty}I_{1+2k}(9\pi)\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}$$

Open code

- $\arg(z)$ is the complex argument
- $\lfloor x\rfloor$ is the floor function
- $I_n(z)$ is the modified Bessel function of the first kind
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
-
- $\mathbb{R}$ is the set of real numbers
-

Integral representations:

$$\frac{\left(\frac{0.5}{2\sinh\left(\frac{36\pi}{4}\right)}+0.25\right)(-4)}{\sqrt{2}} = -\frac{1}{\sqrt{2}} - \frac{0.111111}{\pi\sqrt{2}\int_0^1\cosh(9\pi t)\,dt}$$

Open code

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$$\frac{\left(\frac{0.5}{2\sinh\left(\frac{36\pi}{4}\right)}+0.25\right)(-4)}{\sqrt{2}} = -\frac{1}{\sqrt{2}} - \frac{0.444444\,i}{\sqrt{2}\sqrt{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(81\pi^2)/(4s)+s}}{s^{3/2}}\,ds} \quad \text{for } \gamma > 0$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function
-

(((((((-4/(sqrt2)*(((0.5/(2(sinh(36Pi/4)))+0.25)))))^2

Input:

$$\left(-\frac{4}{\sqrt{2}}\left(\frac{0.5}{2\sinh\left(36\times\frac{\pi}{4}\right)}+0.25\right)\right)^2$$

Open code

- $\sinh(x)$ is the hyperbolic sine function

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Result:

- More digits

0.500000...

This result is equal to 1/2

((((((((((sqrt(3)*(((((((-4/(sqrt2)*(((0.5/(2(sinh(36Pi/4)))+0.25))))))))))))))))))^2

Input:

$$\left(\sqrt{3}\left(-\frac{4}{\sqrt{2}}\left(\frac{0.5}{2\sinh\left(36\times\frac{\pi}{4}\right)}+0.25\right)\right)\right)^2$$

Open code

- $\sinh(x)$ is the hyperbolic sine function

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Result:

- More digits

1.50000...

This result is equal to 3/2

From Wikipedia:

Those particles with half-integer spins, such as 1/2, 3/2, 5/2, are known as fermions

((((((-4/(sqrt2)*(((0.5/(2(sinh(24Pi/4)))+0.25))))))

Input:

$$-\frac{4}{\sqrt{2}}\left(\frac{0.5}{2\sinh\left(24\times\frac{\pi}{4}\right)}+0.25\right)$$

Open code

- $\sinh(x)$ is the hyperbolic sine function

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Result:

- More digits

−0.707107...

This result is equal to -1/√2

From Wikipedia:

Each of the (Hermitian) Pauli matrices has two eigenvalues, +1 and −1. The corresponding normalized eigenvectors are:

$$\psi_{x+} = \left|\frac{1}{2}, \frac{+1}{2}\right\rangle_x = \frac{1}{\sqrt{2}}\begin{pmatrix}1\\1\end{pmatrix}, \quad \psi_{x-} = \left|\frac{1}{2}, \frac{-1}{2}\right\rangle_x = \frac{1}{\sqrt{2}}\begin{pmatrix}-1\\1\end{pmatrix},$$
$$\psi_{y+} = \left|\frac{1}{2}, \frac{+1}{2}\right\rangle_y = \frac{1}{\sqrt{2}}\begin{pmatrix}1\\i\end{pmatrix}, \quad \psi_{y-} = \left|\frac{1}{2}, \frac{-1}{2}\right\rangle_y = \frac{1}{\sqrt{2}}\begin{pmatrix}1\\-i\end{pmatrix},$$
$$\psi_{z+} = \left|\frac{1}{2}, \frac{+1}{2}\right\rangle_z = \begin{pmatrix}1\\0\end{pmatrix}, \quad \psi_{z-} = \left|\frac{1}{2}, \frac{-1}{2}\right\rangle_z = \begin{pmatrix}0\\1\end{pmatrix}.$$

Series representations:

- More

$$\frac{\left(\frac{0.5}{2\sinh\left(\frac{24\pi}{4}\right)} + 0.25\right)(-4)}{\sqrt{2}} = -\frac{0.5 + \sum_{k=0}^{\infty} I_{1+2k}(6\pi)}{\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\left(\sqrt{x}\left(\sum_{k=0}^{\infty} I_{1+2k}(6\pi)\right)\sum_{k=0}^{\infty}\frac{(-1)^k (2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)} \text{ for } (x \in \mathbb{R} \text{ and } x < 0)$$

Open code

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$$\frac{\left(\frac{0.5}{2\sinh\left(\frac{24\pi}{4}\right)} + 0.25\right)(-4)}{\sqrt{2}} = -\frac{1 + \sum_{k=0}^{\infty}\frac{6^{1+2k}\pi^{1+2k}}{(1+2k)!}}{\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\left(\sqrt{x}\left(\sum_{k=0}^{\infty}\frac{6^{1+2k}\pi^{1+2k}}{(1+2k)!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k (2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)} \text{ for } (x \in \mathbb{R} \text{ and } x < 0)$$

Open code

$$\frac{\left(\frac{0.5}{2\sinh\left(\frac{24\pi}{4}\right)} + 0.25\right)(-4)}{\sqrt{2}} = -\frac{\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor} \left(z_0^{-1/2-1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}\left(0.5 + \sum_{k=0}^{\infty} I_{1+2k}(6\pi)\right)\right)}{\left(\sum_{k=0}^{\infty} I_{1+2k}(6\pi)\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (2-z_0)^k z_0^{-k}}{k!}}$$

- $\arg(z)$ is the complex argument
- $\lfloor x \rfloor$ is the floor function
- $I_n(z)$ is the modified Bessel function of the first kind
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\mathbb{R}$ is the set of real numbers
- More information

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Integral representations:

$$\frac{\left(\frac{0.5}{2\sinh\left(\frac{24\pi}{4}\right)}+0.25\right)(-4)}{\sqrt{2}} = -\frac{1}{\sqrt{2}} - \frac{0.166667}{\pi\sqrt{2}\int_0^1 \cosh(6\pi t)\,dt}$$

Open code

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$$\frac{\left(\frac{0.5}{2\sinh\left(\frac{24\pi}{4}\right)}+0.25\right)(-4)}{\sqrt{2}} = -\frac{1}{\sqrt{2}} - \frac{0.666667\,i}{\sqrt{2}\sqrt{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(9\pi^2)/s+s}}{s^{3/2}}\,ds} \quad \text{for } \gamma > 0$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function
- More information

1/6 (((((((ln((((((-4/(sqrt2)*(((0.5/(2(sinh(24Pi/4)))+0.25)))))))))))))^2

Input:

$$\frac{1}{6}\log^2\left(-\frac{4}{\sqrt{2}}\left(\frac{0.5}{2\sinh\left(24\times\frac{\pi}{4}\right)}+0.25\right)\right)$$

Open code

- $\sinh(x)$ is the hyperbolic sine function
- $\log(x)$ is the natural logarithm

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Result:

- More digits

$-1.62492\ldots - 0.362931\ldots\,i$

Polar coordinates:

$r = 1.66495$ (radius), $\theta = -167.409°$ (angle)

Open code

1.66495

This result is a golden number

Series representation:

$$\frac{1}{6}\log^2\left(-\frac{4\left(\frac{0.5}{2\sinh\left(\frac{24\pi}{4}\right)}+0.25\right)}{\sqrt{2}}\right)=$$

$$\frac{1}{6}\left(\log\left(-1-\frac{1+\frac{1}{\sinh(6\pi)}}{\sqrt{2}}\right)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1-\frac{1+\frac{1}{\sinh(6\pi)}}{\sqrt{2}}\right)^{-k}}{k}\right)^2$$

Integral representations:

$$\frac{1}{6}\log^2\left(-\frac{4\left(\frac{0.5}{2\sinh\left(\frac{24\pi}{4}\right)}+0.25\right)}{\sqrt{2}}\right)=\frac{1}{6}\left(\int_1^{-\frac{1+\frac{1}{\sinh(6\pi)}}{\sqrt{2}}}\frac{1}{t}\,dt\right)^2$$

Open code

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$$\frac{1}{6}\log^2\left(-\frac{4\left(\frac{0.5}{2\sinh\left(\frac{24\pi}{4}\right)}+0.25\right)}{\sqrt{2}}\right)=\frac{1}{6}\log^2\left(-\frac{1+\frac{0.166667}{\pi\int_0^1\cosh(6\pi t)\,dt}}{\sqrt{2}}\right)$$

Open code

$$\frac{1}{6}\log^2\left(-\frac{4\left(\frac{0.5}{2\sinh\left(\frac{24\pi}{4}\right)}+0.25\right)}{\sqrt{2}}\right)=\frac{1}{6}\log^2\left(-\frac{1+\frac{0.666667\,i}{\sqrt{\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{(9\pi^2)/s+s}}{s^{3/2}}\,ds}}{\sqrt{2}}\right)\quad\text{for }\gamma>0$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function
- i is the imaginary unit
- More information

((((((ln((((((-4/(sqrt2)*(((0.5/(2(sinh(24Pi/4)))+0.25)))))))))))))

Input:

$$\log\left(-\frac{4}{\sqrt{2}}\left(\frac{0.5}{2\sinh\left(24\times\frac{\pi}{4}\right)}+0.25\right)\right)$$

Open code

- $\sinh(x)$ is the hyperbolic sine function
- $\log(x)$ is the natural logarithm

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Result:

- More digits

$-0.346574\ldots + 3.14159\ldots\, i$

Polar coordinates:

$r = 3.16065$ (radius), $\theta = 96.2953°$ (angle)

Series representation:

$$\log\left(\frac{\left(\frac{0.5}{2\sinh\left(\frac{24\pi}{4}\right)} + 0.25\right)(-4)}{\sqrt{2}}\right) = \log\left(-1 - \frac{1 + \frac{1}{\sinh(6\pi)}}{\sqrt{2}}\right) - \sum_{k=1}^{\infty} \frac{(-1)^k \left(-1 - \frac{1+\frac{1}{\sinh(6\pi)}}{\sqrt{2}}\right)^{-k}}{k}$$

Open code

- More information

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Integral representations:

$$\log\left(\frac{\left(\frac{0.5}{2\sinh\left(\frac{24\pi}{4}\right)} + 0.25\right)(-4)}{\sqrt{2}}\right) = \int_1^{-\frac{1+\frac{1}{\sinh(6\pi)}}{\sqrt{2}}} \frac{1}{t}\, dt$$

Open code

$$\log\left(\frac{\left(\frac{0.5}{2\sinh\left(\frac{24\pi}{4}\right)} + 0.25\right)(-4)}{\sqrt{2}}\right) = \log\left(-\frac{1 + \frac{0.166667}{\pi \int_0^1 \cosh(6\pi t)\, dt}}{\sqrt{2}}\right)$$

Open code

$$\log\left(\frac{\left(\frac{0.5}{2\sinh\left(\frac{24\pi}{4}\right)} + 0.25\right)(-4)}{\sqrt{2}}\right) = \log\left(-\frac{1 + \frac{0.666667\, i}{\sqrt{\pi} \int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{e^{(9\pi^2)/s+s}}{s^{3/2}}\, ds}}{\sqrt{2}}\right) \text{ for } \gamma > 0$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function
- i is the imaginary unit
- More information

EQUATION (3.93)

$$F(a,b,\kappa|\xi,\psi) = \frac{2\sinh\frac{a}{2}\sinh\frac{b}{2}}{(\delta_a e^{a/2}-1)(\delta_b e^{b/2}-1)}. \qquad (3.93)$$

((((2*sinh(48Pi/2) sinh(72Pi/2))) / (((-e^(48Pi/2))-1) * (((-e^(72Pi/2))-1)))

Input:

$$\frac{2\sinh\left(48\times\frac{\pi}{2}\right)\sinh\left(72\times\frac{\pi}{2}\right)}{\left(-e^{48\times\pi/2}-1\right)\left(-e^{72\times\pi/2}-1\right)}$$

Open code

- $\sinh(x)$ is the hyperbolic sine function

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Exact result:

$$\frac{2\sinh(24\pi)\sinh(36\pi)}{\left(-1-e^{24\pi}\right)\left(-1-e^{36\pi}\right)}$$

Decimal approximation:

- More digits

0.49999999999999999999999999999999999100631832140066257923483...

This result is equal to ½ (spin)

Open code

Continued fraction:

- Linear form

$$\cfrac{1}{2+\cfrac{1}{277972924697657997793899111942635+\cfrac{1}{10+\cfrac{1}{13+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{\dots}}}}}}}}}$$

Series representations:

- More

$$\frac{2\left(\sinh\left(\frac{48\pi}{2}\right)\sinh\left(\frac{72\pi}{2}\right)\right)}{\left(-e^{(48\pi)/2}-1\right)\left(-e^{(72\pi)/2}-1\right)} = \frac{8\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty} I_{1+2k_1}(24\pi)\,I_{1+2k_2}(36\pi)}{\left(1+e^{4\pi}\right)\left(1+e^{8\pi}\right)\left(1-e^{4\pi}+e^{8\pi}\right)\left(1-e^{8\pi}+e^{16\pi}\right)\left(1-e^{12\pi}+e^{24\pi}\right)}$$

Open code

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$$\frac{2\left(\sinh\left(\frac{48\pi}{2}\right)\sinh\left(\frac{72\pi}{2}\right)\right)}{\left(-e^{(48\pi)/2}-1\right)\left(-e^{(72\pi)/2}-1\right)} = \frac{2\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{2^{5+6k_1+4k_2}\times 3^{3+2k_1+4k_2}\pi^{2+2k_1+2k_2}}{(1+2k_1)!(1+2k_2)!}}{\left(1+e^{4\pi}\right)\left(1+e^{8\pi}\right)\left(1-e^{4\pi}+e^{8\pi}\right)\left(1-e^{8\pi}+e^{16\pi}\right)\left(1-e^{12\pi}+e^{24\pi}\right)}$$

Open code

$$\frac{2\left(\sinh\left(\frac{48\pi}{2}\right)\sinh\left(\frac{72\pi}{2}\right)\right)}{\left(-e^{(48\pi)/2}-1\right)\left(-e^{(72\pi)/2}-1\right)} = -\frac{2\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{2^{-2k_1-2k_2}(48-i)^{2k_1}(72-i)^{2k_2}\pi^{2k_1+2k_2}}{(2k_1)!(2k_2)!}}{\left(1+e^{4\pi}\right)\left(1+e^{8\pi}\right)\left(1-e^{4\pi}+e^{8\pi}\right)\left(1-e^{8\pi}+e^{16\pi}\right)\left(1-e^{12\pi}+e^{24\pi}\right)}$$

Open code

- $I_n(z)$ is the modified Bessel function of the first kind
- $n!$ is the factorial function
- More information

Integral representations:

$$\frac{2\left(\sinh\left(\frac{48\pi}{2}\right)\sinh\left(\frac{72\pi}{2}\right)\right)}{\left(-e^{(48\pi)/2}-1\right)\left(-e^{(72\pi)/2}-1\right)} = \int_0^1\int_0^1 \cosh(24\pi t_1)\cosh(36\pi t_2)\,dt_2\,dt_1$$

Open code

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$$\frac{2\left(\sinh\left(\frac{48\pi}{2}\right)\sinh\left(\frac{72\pi}{2}\right)\right)}{\left(-e^{(48\pi)/2}-1\right)\left(-e^{(72\pi)/2}-1\right)} = -\frac{108\pi\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(144\pi^2)/s+s}}{s^{3/2}}\,ds\right)\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(324\pi^2)/s+s}}{s^{3/2}}\,ds}{\left(1+e^{4\pi}\right)\left(1+e^{8\pi}\right)\left(1-e^{4\pi}+e^{8\pi}\right)\left(1-e^{8\pi}+e^{16\pi}\right)\left(1-e^{12\pi}+e^{24\pi}\right)} \quad \text{for } \gamma > 0$$

((((2*sinh(24Pi/2) sinh(36Pi/2))) / (((-e^(24Pi/2))-1) * (((-e^(36Pi/2))-1)))

Input:

$$\frac{2\sinh\left(24\times\frac{\pi}{2}\right)\sinh\left(36\times\frac{\pi}{2}\right)}{\left(-e^{24\times\pi/2}-1\right)\left(-e^{36\times\pi/2}-1\right)}$$

Open code

- $\sinh(x)$ is the hyperbolic sine function

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Exact result:

$$\frac{2\sinh(12\pi)\sinh(18\pi)}{\left(-1-e^{12\pi}\right)\left(-1-e^{18\pi}\right)}$$

Decimal approximation:

- More digits

$0.4999999999999999787942439468189901037950260834833501569\,80\ldots$

Open code

This result is equal to ½ (spin)

Continued fraction:

- Linear form

$$\cfrac{1}{2+\cfrac{1}{11789251907502645+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{30+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{7+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{2\left(\sinh\left(\frac{24\pi}{2}\right)\sinh\left(\frac{36\pi}{2}\right)\right)}{\left(-e^{(24\pi)/2}-1\right)\left(-e^{(36\pi)/2}-1\right)}=\frac{8\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}I_{1+2k_1}(12\pi)\,I_{1+2k_2}(18\pi)}{\left(1+e^{2\pi}\right)\left(1+e^{4\pi}\right)\left(1-e^{2\pi}+e^{4\pi}\right)\left(1-e^{4\pi}+e^{8\pi}\right)\left(1-e^{6\pi}+e^{12\pi}\right)}$$

Open code

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$$\frac{2\left(\sinh\left(\frac{24\pi}{2}\right)\sinh\left(\frac{36\pi}{2}\right)\right)}{\left(-e^{(24\pi)/2}-1\right)\left(-e^{(36\pi)/2}-1\right)}=\frac{2\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{2^{3+4k_1+2k_2}\times 3^{3+2k_1+4k_2}\,\pi^{2+2k_1+2k_2}}{(1+2k_1)!\,(1+2k_2)!}}{\left(1+e^{2\pi}\right)\left(1+e^{4\pi}\right)\left(1-e^{2\pi}+e^{4\pi}\right)\left(1-e^{4\pi}+e^{8\pi}\right)\left(1-e^{6\pi}+e^{12\pi}\right)}$$

Open code

$$\frac{2\left(\sinh\left(\frac{24\pi}{2}\right)\sinh\left(\frac{36\pi}{2}\right)\right)}{\left(-e^{(24\pi)/2}-1\right)\left(-e^{(36\pi)/2}-1\right)}=-\frac{2\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{2^{-2k_1-2k_2}\,(24-i)^{2k_1}\,(36-i)^{2k_2}\,\pi^{2k_1+2k_2}}{(2k_1)!\,(2k_2)!}}{\left(1+e^{2\pi}\right)\left(1+e^{4\pi}\right)\left(1-e^{2\pi}+e^{4\pi}\right)\left(1-e^{4\pi}+e^{8\pi}\right)\left(1-e^{6\pi}+e^{12\pi}\right)}$$

Open code

- $I_n(z)$ is the modified Bessel function of the first kind
- $n!$ is the factorial function
- More information

Integral representations:

$$\frac{2\left(\sinh\left(\frac{24\pi}{2}\right)\sinh\left(\frac{36\pi}{2}\right)\right)}{\left(-e^{(24\pi)/2}-1\right)\left(-e^{(36\pi)/2}-1\right)} = \int_0^1\int_0^1 \cosh(12\pi t_1)\cosh(18\pi t_2)\,dt_2\,dt_1$$

Open code

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$$\frac{2\left(\sinh\left(\frac{24\pi}{2}\right)\sinh\left(\frac{36\pi}{2}\right)\right)}{\left(-e^{(24\pi)/2}-1\right)\left(-e^{(36\pi)/2}-1\right)} = -\frac{27\pi\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(36\pi^2)/s+s}}{s^{3/2}}\,ds\right)\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(81\pi^2)/s+s}}{s^{3/2}}\,ds}{\left(1+e^{2\pi}\right)\left(1+e^{4\pi}\right)\left(1-e^{2\pi}+e^{4\pi}\right)\left(1-e^{4\pi}+e^{8\pi}\right)\left(1-e^{6\pi}+e^{12\pi}\right)} \quad \text{for } \gamma > 0$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function

EQUATION (E.15)

$$\langle\psi(x)\rangle \approx (\text{const.})\frac{\cos\left(-\frac{\pi}{4}\alpha+\pi e^{S_0}\int_0^x \mathrm{d}x\rho_0(x)\right)}{x^{\frac{\alpha}{4}}}+\ldots \qquad \text{(E.15)}$$

((((((cos(-Pi/2+ Pi*e^1.2337 * integrate ((1/(Pi*(i))))))/ i

Input interpretation:

$$\frac{\cos\left(-\frac{\pi}{2}+\pi e^{1.2337}\int\frac{1}{\pi i}\,di\right)}{i}$$

Open code

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Result:

$$\frac{\sin(3.43391\log(i))}{i}$$

Values:

More

i	1	2	3	4	5
$\frac{\sin(3.43391\log(i))}{i}$	0	0.344963	−0.196636	−0.249712	−0.137279

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Alternate forms:

$$\frac{\sin((3.43391 + 0\,i)\log(i))}{i}$$

Open code

$$\frac{1}{2}\,i\,i^{-1-3.43391\,i} - \frac{1}{2}\,i\,i^{-1+3.43391\,i}$$

Open code

12*((((((cos(-Pi/2+ Pi*e^1.2337 * integrate ((1/(Pi*(i))))))/ i

Input interpretation:

$$12\times\frac{\cos\left(-\frac{\pi}{2}+\pi\,e^{1.2337}\int\frac{1}{\pi\,i}\,di\right)}{i}$$

Open code

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Result:

$$\frac{12\sin(3.43391\log(i))}{i}$$

•

Values:

• More

i	1	2	3	4	5
$\frac{12\sin(3.43391\log(i))}{i}$	0	4.13955	−2.35963	−2.99654	−1.64734

Where -1.64734 is very near to the value of ζ (2) = $\pi^2/6$ = 1.6449...

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Alternate forms:

$$\frac{12\sin((3.43391 + 0\,i)\log(i))}{i}$$

Open code

$$6\,i\,i^{-1-3.43391\,i} - 6\,i\,i^{-1+3.43391\,i}$$

Open code

((((((((6*12*((((((cos(-Pi/2+ Pi*e^1.2337 * integrate ((1/(Pi*(i))))))/ i)))))))))^0.5

Input interpretation:

$$\sqrt{6\times 12\times\frac{\cos\left(-\frac{\pi}{2}+\pi\,e^{1.2337}\int\frac{1}{\pi\,i}\,di\right)}{i}}$$

Open code

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Result:

$$6\sqrt{2}\sqrt{\frac{\sin(3.43391\log(i))}{i}}$$

- $\log(x)$ is the natural logarithm

Values:

- More

i	1	2	3	4	5
$6\sqrt{2}\sqrt{\frac{\sin(3.43391\log(i))}{i}}$	0	4.98371	3.76268 i	4.24019 i	3.14389 i

Where 3.14389 is a good approximation to π (in the imaginary form)

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Alternate forms:

$$6\sqrt{2}\sqrt{\frac{\sin((3.43391+0\,i)\log(i))}{i}}$$

Open code

$$6\sqrt{\frac{i\left(i^{-3.43391\,i}-i^{3.43391\,i}\right)}{i}}$$

Open code

Alternate form assuming i>0:

$$\frac{6\sqrt{2}\sqrt{\sin(3.43391\log(i))}}{\sqrt{i}}$$

EQUATION (D.42)

$$\begin{aligned}\mathcal{T}(b,b',b'') &= \int_{\mathcal{M}_{b,b',b''}} \mathrm{d}\mu\,\hat{\mathsf{T}}(b,b',b''|\xi,\psi)\\ &= -\frac{\delta_b\delta_{b'}}{16\pi}\,\frac{(e^{(b+b')/4}+\delta_b\delta_{b'}e^{-(b+b')/4})(e^{b''/4}-\delta_{b''}e^{-b''/4})}{\cosh\frac{b''}{2}+\cosh\frac{b+b'}{2}}\\ &\quad -\frac{\delta_b\delta_{b'}}{16\pi}\,\frac{(e^{(b-b')/4}\delta_{b'}+e^{-(b-b')/4}\delta_b)(e^{b''/4}-\delta_{b''}e^{-b''/4})}{\cosh\frac{b''}{2}+\cosh\frac{b-b'}{2}}.\end{aligned} \tag{D.42}$$

((((([(((((e^(9Pi) - e^(-9Pi)))*(((e^(9Pi) + e^(-9Pi)))))))))* 1/ (((((((cosh (18Pi) + cosh (18Pi))))])))) * [(((1/(-16Pi))))]

Input:

$$\left(\left(e^{9\pi}-e^{-9\pi}\right)\left(e^{9\pi}+e^{-9\pi}\right)\right)\times\frac{1}{\cosh(18\pi)+\cosh(18\pi)}\left(-\frac{1}{16\pi}\right)$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function
- $\operatorname{sech}(x)$ is the hyperbolic secant function

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Exact result:

$$-\frac{\left(e^{9\pi}-e^{-9\pi}\right)\left(e^{-9\pi}+e^{9\pi}\right)\operatorname{sech}(18\pi)}{32\pi}$$

Decimal approximation:

- More digits

$$-0.019894367886486916971110470421564295254307455717554020 72\ldots$$

Open code

Continued fraction:

- Linear form

$$\cfrac{1}{-50+\cfrac{1}{-3+\cfrac{1}{-1+\cfrac{1}{-3+\cfrac{1}{-3+\cfrac{1}{-2+\cfrac{1}{-17+\cfrac{1}{-1+\cfrac{1}{-10+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-4+\cfrac{1}{-1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{\left(e^{9\pi}-e^{-9\pi}\right)\left(e^{9\pi}+e^{-9\pi}\right)}{(\cosh(18\pi)+\cosh(18\pi))(-16\pi)}=\sum_{k=0}^{\infty}-\frac{e^{(-36-(36-i)k)\pi}\left(-1+e^{36\pi}\right)}{16\pi}$$

Open code

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$$\frac{\left(e^{9\pi}-e^{-9\pi}\right)\left(e^{9\pi}+e^{-9\pi}\right)}{(\cosh(18\pi)+\cosh(18\pi))(-16\pi)}=\sum_{k=1}^{\infty}\frac{(-1)^k e^{-18\pi}\left(-1+e^{36\pi}\right)q^{-1+2k}}{16\pi}\quad\text{for } q=e^{18\pi}$$

Open code

$$\frac{\left(e^{9\pi}-e^{-9\pi}\right)\left(e^{9\pi}+e^{-9\pi}\right)}{(\cosh(18\pi)+\cosh(18\pi))(-16\pi)} = \sum_{k=0}^{\infty} -\frac{(-1)^k e^{-18\pi}\left(-1+e^{36\pi}\right)(1+2k)}{8\left(1297+4k+4k^2\right)\pi^2}$$

Open code

- More information

Integral representation:

$$\frac{\left(e^{9\pi}-e^{-9\pi}\right)\left(e^{9\pi}+e^{-9\pi}\right)}{(\cosh(18\pi)+\cosh(18\pi))(-16\pi)} = \int_0^{\infty} -\frac{e^{-18\pi}\left(-1+e^{36\pi}\right)t^{36i}}{16\pi^2\left(1+t^2\right)}\,dt$$

((((([(((((-e^(-3Pi) - e^(3Pi)))*(((e^(9Pi) + e^(-9Pi)))))))))* 1/ (((((((cosh (18Pi) + cosh (-6Pi))))])))) * [(((1/(-16Pi))))]

Input:

$$\left(\left(-e^{-3\pi}-e^{3\pi}\right)\left(e^{9\pi}+e^{-9\pi}\right)\right)\times\frac{1}{\cosh(18\pi)+\cosh(-6\pi)}\left(-\frac{1}{16\pi}\right)$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function

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Exact result:

$$-\frac{\left(-e^{-3\pi}-e^{3\pi}\right)\left(e^{-9\pi}+e^{9\pi}\right)}{16\pi(\cosh(6\pi)+\cosh(18\pi))}$$

Decimal approximation:

- More digits

$2.5912064741469171289159301247781471909220619090613524\ldots \times 10^{-10}$

Open code

Continued fraction:

- Linear form

$$\cfrac{1}{3859206165+\cfrac{1}{14+\cfrac{1}{16+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{7+\cfrac{1}{17+\cfrac{1}{1+\cfrac{1}{13+\cfrac{1}{1+\cfrac{1}{2789+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{17+\cfrac{1}{\ldots}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{\left(-e^{-3\pi}-e^{3\pi}\right)\left(e^{9\pi}+e^{-9\pi}\right)}{(\cosh(18\pi)+\cosh(-6\pi))(-16\pi)} = \frac{e^{-12\pi}\left(1+e^{6\pi}+e^{18\pi}+e^{24\pi}\right)}{16\pi\sum_{k=0}^{\infty}\frac{36^k\left(1+9^k\right)\pi^{2k}}{(2k)!}}$$

Open code

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$$\frac{(-e^{-3\pi}-e^{3\pi})(e^{9\pi}+e^{-9\pi})}{(\cosh(18\pi)+\cosh(-6\pi))(-16\pi)} = -\frac{(-e^{-3\pi}-e^{3\pi})(e^{-9\pi}+e^{9\pi})}{16\pi\sum_{k=0}^{\infty}-(I_{2k}(6)+I_{2k}(18))\,T_{2k}(\pi)(-2+\delta_k)}$$

Open code

$$\frac{(-e^{-3\pi}-e^{3\pi})(e^{9\pi}+e^{-9\pi})}{(\cosh(18\pi)+\cosh(-6\pi))(-16\pi)} = \frac{i(-e^{-3\pi}-e^{3\pi})(e^{-9\pi}+e^{9\pi})}{16\pi\sum_{k=0}^{\infty}\left(\frac{\left(\left(6-\frac{i}{2}\right)\pi\right)^{1+2k}}{(1+2k)!}+\frac{\left(\left(18-\frac{i}{2}\right)\pi\right)^{1+2k}}{(1+2k)!}\right)}$$

Open code

- $n!$ is the factorial function
- $I_n(z)$ is the modified Bessel function of the first kind
- $T_n(x)$ is the Chebyshev polynomial of the first kind
- δ_{n_1,n_2} is the Kronecker delta function
- More information

Integral representations:

$$\frac{(-e^{-3\pi}-e^{3\pi})(e^{9\pi}+e^{-9\pi})}{(\cosh(18\pi)+\cosh(-6\pi))(-16\pi)} = \frac{e^{-12\pi}(1+e^{6\pi}+e^{18\pi}+e^{24\pi})}{32\pi\left(1+\int_0^1 3\pi(\sinh(6\pi t)+3\sinh(18\pi t))\,dt\right)}$$

Open code

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$$\frac{(-e^{-3\pi}-e^{3\pi})(e^{9\pi}+e^{-9\pi})}{(\cosh(18\pi)+\cosh(-6\pi))(-16\pi)} = \frac{i\,e^{-12\pi}(1+e^{6\pi})^2(1-e^{6\pi}+e^{12\pi})}{8\sqrt{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(9\pi^2)/s+s}\left(1+e^{(72\pi^2)/s}\right)}{\sqrt{s}}\,ds} \quad \text{for } \gamma>0$$

Open code

$$\frac{(-e^{-3\pi}-e^{3\pi})(e^{9\pi}+e^{-9\pi})}{(\cosh(18\pi)+\cosh(-6\pi))(-16\pi)} = \frac{e^{-12\pi}(1+e^{2\pi})^2(1-e^{2\pi}+e^{4\pi})^2(1-e^{6\pi}+e^{12\pi})}{\int_{\frac{i\pi}{2}}^{6\pi}\left(\left(\frac{384}{145}-\frac{6928i}{145}\right)\pi\sin\left(\left(\frac{12}{145}+\frac{i}{145}\right)(12\pi+(1+36i)t)\right)+16\pi\sinh(t)\right)dt}$$

Open code

- $\sinh(x)$ is the hyperbolic sine function

sqrt(-0.01989436788648691697111 + 2.59120647414691712891593)

Input interpretation:

$$\sqrt{-0.01989436788648691697111+2.59120647414691712891593}$$

Open code

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Result:
- More digits

1.60353113666695920879830...

This result is a golden number very near to the electric charge of positron

EQUATION (D.44)

$$\mathcal{D}(b,b',b'') = -\mathcal{T}(b,b',b'') - \mathcal{T}(b,b'',b') = -\frac{1}{8\pi}\left(\frac{1}{\cosh\frac{b'+b''-b}{4}} - \frac{1}{\cosh\frac{b'+b''+b}{4}}\right). \qquad \text{(D.44)}$$

1/(-8pi) * (((((1/(cosh(12Pi)) - 1/(cosh(18Pi)))

Input:

$$-\frac{1}{8\pi}\left(\frac{1}{\cosh(12\pi)} - \frac{1}{\cosh(18\pi)}\right)$$

Open code

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Exact result:

$$-\frac{\operatorname{sech}(12\pi) - \operatorname{sech}(18\pi)}{8\pi}$$

- $\cosh(x)$ is the hyperbolic cosine function
- $\operatorname{sech}(x)$ is the hyperbolic secant function

Decimal approximation:
- More digits

$-3.37500085390584534466235806301466484223972543591351 1... \times 10^{-18}$

Open code

Continued fraction:
- Linear form

$$\cfrac{1}{-296296221330644341 + \cfrac{1}{-2 + \cfrac{1}{-2 + \cfrac{1}{-68 + \cfrac{1}{-3 + \cfrac{1}{-3 + \cfrac{1}{-1 + \cfrac{1}{-1 + \cfrac{1}{-5 + \cfrac{1}{-1 + \cfrac{1}{\cdots}}}}}}}}}}}$$

Series representations:
- More

$$-\frac{\frac{1}{\cosh(12\pi)} - \frac{1}{\cosh(18\pi)}}{8\pi} = \sum_{k=0}^{\infty} -\frac{360(-1)^k(1+2k)}{(577+4k+4k^2)(1297+4k+4k^2)\pi^2}$$

Open code

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$$-\frac{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}{8\pi}=\sum_{k=0}^{\infty}-\frac{e^{(-18-(36-i)k)\pi}\left(-1+e^{6(\pi+2k\pi)}\right)}{4\pi}$$

Open code

$$-\frac{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}{8\pi}=\sum_{k=0}^{\infty}-\frac{i\left(\mathrm{Li}_{-k}(-i e^{z_0})-\mathrm{Li}_{-k}(i e^{z_0})\right)\left((12\pi-z_0)^k-(18\pi-z_0)^k\right)}{8\pi k!}$$

$$\text{for } \frac{1}{2}+\frac{i z_0}{\pi}\notin\mathbb{Z}$$

Open code

- $n!$ is the factorial function
- $\mathrm{Li}_n(x)$ is the polylogarithm function
- $\mathbb{Z}$ is the set of integers
- More information

Integral representation:

$$-\frac{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}{8\pi}=\int_0^{\infty}\frac{\left(-1+t^{12i}\right)t^{24i}}{4\pi^2\left(1+t^2\right)}\,dt$$

Open code

-0.48 * 1/(-8pi) * (((((1/(cosh(12Pi)) - 1/(cosh(18Pi)))

Input:

$$-0.48\left(-\frac{1}{8\pi}\right)\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function

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Result:

- More digits

$1.62000\ldots\times10^{-18}$

This result is a sub-multiple of a golden number

Series representations:

- More

$$\frac{-0.48\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)}{-8\pi}=-\frac{0.06\left(\sum_{k=0}^{\infty}\frac{144^k\pi^{2k}}{(2k)!}-\sum_{k=0}^{\infty}\frac{324^k\pi^{2k}}{(2k)!}\right)}{\pi\left(\sum_{k=0}^{\infty}\frac{144^k\pi^{2k}}{(2k)!}\right)\sum_{k=0}^{\infty}\frac{324^k\pi^{2k}}{(2k)!}}$$

Open code

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$$\frac{-0.48\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)}{-8\pi}=\frac{0.06\left(\sum_{k=0}^{\infty} I_{2k}(12)\,T_{2k}(\pi)\,(-2+\delta_k)-\sum_{k=0}^{\infty} I_{2k}(18)\,T_{2k}(\pi)\,(-2+\delta_k)\right)}{\pi\left(\sum_{k=0}^{\infty} I_{2k}(12)\,T_{2k}(\pi)\,(-2+\delta_k)\right)\sum_{k=0}^{\infty} I_{2k}(18)\,T_{2k}(\pi)\,(-2+\delta_k)}$$

Open code

$$\frac{-0.48\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)}{-8\pi}=-\frac{0.06\left(\sum_{k=0}^{\infty}\frac{\left(12\pi-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}-\sum_{k=0}^{\infty}\frac{\left(18\pi-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}\right)}{i\pi\left(\sum_{k=0}^{\infty}\frac{\left(12\pi-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}\right)\sum_{k=0}^{\infty}\frac{\left(18\pi-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}}$$

Open code

- $n!$ is the factorial function
- $I_n(z)$ is the modified Bessel function of the first kind
- $T_n(x)$ is the Chebyshev polynomial of the first kind
- δ_{n_1,n_2} is the Kronecker delta function
- More information

Integral representations:

$$\frac{-0.48\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)}{-8\pi}=-\frac{0.06\left(\int_{\frac{i\pi}{2}}^{12\pi}\sinh(t)\,dt-\int_{\frac{i\pi}{2}}^{18\pi}\sinh(t)\,dt\right)}{\pi\left(\int_{\frac{i\pi}{2}}^{12\pi}\sinh(t)\,dt\right)\int_{\frac{i\pi}{2}}^{18\pi}\sinh(t)\,dt}$$

Open code

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$$\frac{-0.48\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)}{-8\pi}=-\frac{0.12\,i\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{(36\pi^2)/s+s}}{\sqrt{s}}\,ds-\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{(81\pi^2)/s+s}}{\sqrt{s}}\,ds\right)}{\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{(36\pi^2)/s+s}}{\sqrt{s}}\,ds\right)\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{(81\pi^2)/s+s}}{\sqrt{s}}\,ds\right)\sqrt{\pi}}\quad\text{for }\gamma>0$$

Open code

- $\sinh(x)$ is the hyperbolic sine function

-0.0198943676 * 1/(-8pi) * (((((1/(cosh(12Pi)) - 1/(cosh(18Pi)))

Input interpretation:

$$-0.0198943676\left(-\frac{1}{8\pi}\right)\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function

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Result:

- More digits

$$6.71435076\ldots\times 10^{-20}$$

Series representations:

- More

$$-\frac{\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)(-1)\,0.0198944}{8\pi}=-\frac{0.0024868\left(\sum_{k=0}^{\infty}\frac{144^k\pi^{2k}}{(2k)!}-\sum_{k=0}^{\infty}\frac{324^k\pi^{2k}}{(2k)!}\right)}{\pi\left(\sum_{k=0}^{\infty}\frac{144^k\pi^{2k}}{(2k)!}\right)\sum_{k=0}^{\infty}\frac{324^k\pi^{2k}}{(2k)!}}$$

Open code

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$$-\frac{\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)(-1)\,0.0198944}{8\pi}=\frac{0.0024868\left(\sum_{k=0}^{\infty}I_{2k}(12)\,T_{2k}(\pi)\,(-2+\delta_k)-\sum_{k=0}^{\infty}I_{2k}(18)\,T_{2k}(\pi)\,(-2+\delta_k)\right)}{\pi\left(\sum_{k=0}^{\infty}I_{2k}(12)\,T_{2k}(\pi)\,(-2+\delta_k)\right)\sum_{k=0}^{\infty}I_{2k}(18)\,T_{2k}(\pi)\,(-2+\delta_k)}$$

Open code

$$-\frac{\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)(-1)\,0.0198944}{8\pi}=-\frac{0.0024868\left(\sum_{k=0}^{\infty}\frac{\left(12\pi-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}-\sum_{k=0}^{\infty}\frac{\left(18\pi-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}\right)}{i\pi\left(\sum_{k=0}^{\infty}\frac{\left(12\pi-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}\right)\sum_{k=0}^{\infty}\frac{\left(18\pi-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}}$$

Open code

- $n!$ is the factorial function
- $I_n(z)$ is the modified Bessel function of the first kind
- $T_n(x)$ is the Chebyshev polynomial of the first kind
- δ_{n_1,n_2} is the Kronecker delta function
- More information

Integral representations:

$$-\frac{\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)(-1)\,0.0198944}{8\pi} = -\frac{0.0024868\left(\int_{\frac{i\pi}{2}}^{12\pi}\sinh(t)\,dt-\int_{\frac{i\pi}{2}}^{18\pi}\sinh(t)\,dt\right)}{\pi\left(\int_{\frac{i\pi}{2}}^{12\pi}\sinh(t)\,dt\right)\int_{\frac{i\pi}{2}}^{18\pi}\sinh(t)\,dt}$$

Open code

Note that the value 24868, in the integral, is a multiple very near to the rest mass of charmed Xi baryon 2470.88

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$$-\frac{\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)(-1)\,0.0198944}{8\pi} = -\frac{0.00497359\,i\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(36\pi^2)/s+s}}{\sqrt{s}}\,ds-\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(81\pi^2)/s+s}}{\sqrt{s}}\,ds\right)}{\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(36\pi^2)/s+s}}{\sqrt{s}}\,ds\right)\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(81\pi^2)/s+s}}{\sqrt{s}}\,ds\right)\sqrt{\pi}} \quad \text{for } \gamma > 0$$

Open code

- $\sinh(x)$ is the hyperbolic sine function

Pi*colog((((((((((-0.0198943676 * 1/(-8pi) * (((((1/(cosh(12Pi)) - 1/(cosh(18Pi)))))))))))

Input interpretation:

$$\pi\left(-\log\left(-0.0198943676\left(-\frac{1}{8\pi}\right)\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)\right)\right)$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function
- $\log(x)$ is the natural logarithm

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Result:

- More digits

138.69331942...

This result is very near to the mass of Pion meson $\pi^{\pm}$: 139.57018(35) MeV/c^2

Series representations:

- More

$$\pi(-1)\log\left(\frac{-0.0198944\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)}{-8\pi}\right)=$$

$$-\pi\log\left(\frac{0.0024868\left(\frac{1}{\sum_{k=0}^{\infty}\frac{144^k\pi^{2k}}{(2k)!}}-\frac{1}{\sum_{k=0}^{\infty}\frac{324^k\pi^{2k}}{(2k)!}}\right)}{\pi}\right)$$

Open code

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$$\pi(-1)\log\left(\frac{-0.0198944\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)}{-8\pi}\right)=$$

$$-2i\pi^2\left\lfloor\frac{\arg\left(-x+\frac{0.0024868\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)}{\pi}\right)}{2\pi}\right\rfloor-\pi\log(x)+$$

$$\pi\sum_{k=1}^{\infty}\frac{(-1)^k x^{-k}\left(-x+\frac{0.0024868\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)}{\pi}\right)^k}{k} \quad \text{for } x<0$$

Open code

$$\pi(-1)\log\left(\frac{-0.0198944\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)}{-8\pi}\right)=$$

$$-\pi\log\left(\frac{0.0024868\left(\frac{1}{\sum_{k=0}^{\infty}\frac{\left(12\pi-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}}-\frac{1}{\sum_{k=0}^{\infty}\frac{\left(18\pi-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}}\right)}{i\pi}\right)$$

Integral representations:

$$\pi(-1)\log\left(\frac{-0.0198944\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)}{-8\pi}\right)=-\pi\int_1^{\frac{0.0024868\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)}{\pi}}\frac{1}{t}\,dt$$

Open code

Note that 0.0198944 is a sub-multiple very near to the rest mass of strange D meson 1968.49

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$$\pi(-1)\log\left(\frac{-0.0198944\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)}{-8\pi}\right)=-\pi\log\left(\frac{0.0024868\left(\frac{1}{\frac{\int_{i\pi}^{12\pi}\sinh(t)\,dt}{2}}-\frac{1}{\frac{\int_{i\pi}^{18\pi}\sinh(t)\,dt}{2}}\right)}{\pi}\right)$$

Open code

$$\pi(-1)\log\left(\frac{-0.0198944\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)}{-8\pi}\right)=-\pi\log\left(\frac{0.0024868\left(\frac{1}{1+12\pi\int_0^1\sinh(12\pi t)\,dt}+\frac{1}{-1-18\pi\int_0^1\sinh(18\pi t)\,dt}\right)}{\pi}\right)$$

Open code

$$\pi(-1)\log\left(\frac{-0.0198944\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)}{-8\pi}\right)=-\pi\log\left(\frac{i\left(\frac{0.00497359}{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(36\pi^2)/s+s}}{\sqrt{s}}\,ds}-\frac{0.00497359}{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(81\pi^2)/s+s}}{\sqrt{s}}\,ds}\right)}{\sqrt{\pi}}\right)\quad\text{for } \gamma>0$$

10^2*ln[(((((((((-0.0198943676))) / ((((((((1/(-8pi) * (((((1/(cosh(12Pi)) - 1/(cosh(18Pi))))))))]

Input interpretation:

$$10^2\log\left(-\frac{0.0198943676}{-\frac{1}{8\pi}\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)}\right)$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function
- $\log(x)$ is the natural logarithm

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Result:

- More digits

3631.2817474...

This result is very near to the rest mass of double charmed Xi 3621.40±0.78

Series representations:

- More

$$10^2 \log\left(-\frac{0.0198944}{-\frac{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}{8\pi}}\right) = 100\log\left(-1+\frac{0.159155\,\pi}{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}\right) - 100\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{0.159155\,\pi}{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}\right)^{-k}}{k}$$

Open code

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$$10^2 \log\left(-\frac{0.0198944}{-\frac{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}{8\pi}}\right) = 100\log\left(\frac{0.159155\,\pi}{\frac{1}{\sum_{k=0}^{\infty}\frac{144^k\pi^{2k}}{(2k)!}}-\frac{1}{\sum_{k=0}^{\infty}\frac{324^k\pi^{2k}}{(2k)!}}}\right)$$

Open code

$$10^2 \log\left(-\frac{0.0198944}{-\frac{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}{8\pi}}\right) = 200\,i\,\pi\left\lfloor\frac{\arg\left(-x+\frac{0.159155\,\pi}{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}\right)}{2\pi}\right\rfloor + 100\log(x) - 100\sum_{k=1}^{\infty}\frac{(-1)^k x^{-k}\left(-x+\frac{0.159155\,\pi}{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}\right)^k}{k} \quad \text{for } x<0$$

Open code

- $n!$ is the factorial function
- $\arg(z)$ is the complex argument
- $\lfloor x \rfloor$ is the floor function
- More information

Integral representations:

- More

$$10^2 \log\left(-\frac{0.0198944}{-\frac{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}{8\pi}}\right) = 100 \int_1^{\frac{0.159155\pi}{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}} \frac{1}{t}\,dt$$

Open code

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$$10^2 \log\left(-\frac{0.0198944}{-\frac{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}{8\pi}}\right) = 100 \log\left(\frac{0.159155\pi}{\frac{1}{\frac{\int_{i\pi}^{12\pi}\sinh(t)\,dt}{2}} - \frac{1}{\frac{\int_{i\pi}^{18\pi}\sinh(t)\,dt}{2}}}\right)$$

Open code

$$10^2 \log\left(-\frac{0.0198944}{-\frac{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}{8\pi}}\right) = 100 \log\left(\frac{0.159155\pi}{\frac{1}{1+12\pi\int_0^1 \sinh(12\pi t)\,dt} + \frac{1}{-1-18\pi\int_0^1 \sinh(18\pi t)\,dt}}\right)$$

Open code

- sinh(x) is the hyperbolic sine function

(((((((((-0.0198943676))) / ((((((((1/(-8pi) * (((((1/(cosh(12Pi)) - 1/(cosh(18Pi))))))))

Input interpretation:

$$-\frac{0.0198943676}{-\frac{1}{8\pi}\left(\frac{1}{\cosh(12\pi)} - \frac{1}{\cosh(18\pi)}\right)}$$

Open code

- cosh(x) is the hyperbolic cosine function

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Result:

- More digits

$5.89462595... \times 10^{15}$

Series representations:

- More

$$-\frac{0.0198944}{-\frac{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}{8\pi}} = -\frac{0.159155\pi \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty} \frac{4^{2k_1+k_2} \times 9^{k_1+2k_2}\pi^{2k_1+2k_2}}{(2k_1)!(2k_2)!}}{\sum_{k=0}^{\infty}\frac{144^k \pi^{2k}}{(2k)!} - \sum_{k=0}^{\infty}\frac{324^k\pi^{2k}}{(2k)!}}$$

Open code

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$$-\frac{0.0198944}{-\frac{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}{8\pi}} = -\frac{0.159155\,\pi\left(I_0(12\pi)+2\sum_{k=1}^{\infty} I_{2k}(12\pi)\right)\left(I_0(18\pi)+2\sum_{k=1}^{\infty} I_{2k}(18\pi)\right)}{I_0(12\pi)-I_0(18\pi)+2\sum_{k=1}^{\infty} I_{2k}(12\pi)-2\sum_{k=1}^{\infty} I_{2k}(18\pi)}$$

Open code

$$-\frac{0.0198944}{-\frac{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}{8\pi}} = -\frac{0.159155\,i\,\pi\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{\left(12\pi-\frac{i\pi}{2}\right)^{1+2k_1}\left(18\pi-\frac{i\pi}{2}\right)^{1+2k_2}}{(1+2k_1)!\,(1+2k_2)!}}{\sum_{k=0}^{\infty}\frac{\left(12\pi-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}-\sum_{k=0}^{\infty}\frac{\left(18\pi-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}}$$

Open code

- $n!$ is the factorial function
- $I_n(z)$ is the modified Bessel function of the first kind
- More information

Integral representations:

$$-\frac{0.0198944}{-\frac{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}{8\pi}} = \int_0^1\int_0^1 \sinh\left(\frac{1}{2}\pi\left(i-(-24+i)t_1\right)\right)\sinh\left(\frac{1}{2}\pi\left(i-(-36+i)t_2\right)\right)dt_2\,dt_1$$

Open code

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$$-\frac{0.0198944}{-\frac{\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}}{8\pi}} = -\frac{0.0795775\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(36\pi^2)/s+s}}{\sqrt{s}}ds\right)\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(81\pi^2)/s+s}}{\sqrt{s}}ds\right)\sqrt{\pi}}{i\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(36\pi^2)/s+s}}{\sqrt{s}}ds-\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(81\pi^2)/s+s}}{\sqrt{s}}ds\right)} \quad \text{for } \gamma > 0$$

Open code

- $\sinh(x)$ is the hyperbolic sine function
- More information

1/(10^15 * 1.0814135^2 * Pi) (((((((((((((-0.0198943676))) / ((((((((1/(-8pi) * (((((1/(cosh(12Pi)) - 1/(cosh(18Pi))))))))))

Input interpretation:

$$\frac{1}{10^{15} \times 1.0814135^2 \pi}\left(-\frac{0.0198943676}{-\frac{1}{8\pi}\left(\frac{1}{\cosh(12\pi)} - \frac{1}{\cosh(18\pi)}\right)}\right)$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function

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Result:

- More digits

1.6044375...

1.6044375...

Series representations:

- More

$$-\frac{0.0198944}{-\frac{\left(\frac{1}{\cosh(12\pi)} - \frac{1}{\cosh(18\pi)}\right)(10^{15} \times 1.08141^2 \pi)}{8\pi}} = -\frac{1.36093 \times 10^{-16} \sum_{k_1=0}^{\infty} \sum_{k_2=0}^{\infty} \frac{4^{2k_1+k_2} \times 9^{k_1+2k_2} \pi^{2k_1+2k_2}}{(2k_1)!(2k_2)!}}{\sum_{k=0}^{\infty} \frac{144^k \pi^{2k}}{(2k)!} - \sum_{k=0}^{\infty} \frac{324^k \pi^{2k}}{(2k)!}}$$

Open code

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$$-\frac{0.0198944}{-\frac{\left(\frac{1}{\cosh(12\pi)} - \frac{1}{\cosh(18\pi)}\right)(10^{15} \times 1.08141^2 \pi)}{8\pi}} = -\frac{1.36093 \times 10^{-16} \left(I_0(12\pi) + 2\sum_{k=1}^{\infty} I_{2k}(12\pi)\right)\left(I_0(18\pi) + 2\sum_{k=1}^{\infty} I_{2k}(18\pi)\right)}{I_0(12\pi) - I_0(18\pi) + 2\sum_{k=1}^{\infty} I_{2k}(12\pi) - 2\sum_{k=1}^{\infty} I_{2k}(18\pi)}$$

Open code

$$-\frac{0.0198944}{-\frac{\left(\frac{1}{\cosh(12\pi)} - \frac{1}{\cosh(18\pi)}\right)(10^{15} \times 1.08141^2 \pi)}{8\pi}} = -\frac{1.36093 \times 10^{-16}\, i \sum_{k_1=0}^{\infty} \sum_{k_2=0}^{\infty} \frac{\left(12\pi - \frac{i\pi}{2}\right)^{1+2k_1} \left(18\pi - \frac{i\pi}{2}\right)^{1+2k_2}}{(1+2k_1)!(1+2k_2)!}}{\sum_{k=0}^{\infty} \frac{\left(12\pi - \frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!} - \sum_{k=0}^{\infty} \frac{\left(18\pi - \frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}}$$

Open code

- $n!$ is the factorial function

- $I_n(z)$ is the modified Bessel function of the first kind
  - More information

Integral representations:

$$-\frac{0.0198944}{-\frac{\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)(10^{15}\times 1.08141^2\,\pi)}{8\pi}} = \int_0^1\int_0^1 \sinh\left(\frac{1}{2}\pi\,(i-(-24+i)\,t_1)\right)\sinh\left(\frac{1}{2}\pi\,(i-(-36+i)\,t_2)\right)dt_2\,dt_1$$

Open code

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$$-\frac{0.0198944}{-\frac{\left(\frac{1}{\cosh(12\pi)}-\frac{1}{\cosh(18\pi)}\right)(10^{15}\times 1.08141^2\,\pi)}{8\pi}} = -\frac{6.80466\times 10^{-17}\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{(36\pi^2)/s+s}}{\sqrt{s}}\,ds\right)\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{(81\pi^2)/s+s}}{\sqrt{s}}\,ds\right)\sqrt{\pi}}{i\,\pi\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{(36\pi^2)/s+s}}{\sqrt{s}}\,ds-\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{(81\pi^2)/s+s}}{\sqrt{s}}\,ds\right)} \quad \text{for } \gamma>0$$

Open code

- $\sinh(x)$ is the hyperbolic sine function
  - More information

sqrt((((3631.2817474/138.69331942*1/10))))

Input interpretation:

$$\sqrt{\frac{3631.2817474}{138.69331942}\times\frac{1}{10}}$$

Open code

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Result:

- More digits

1.6180882422...

This result is a very good approximation to the value of the golden ratio 1,618033988749...

EQUATION (D.43)

$$\mathcal{T}(b,b',b'') = \frac{1}{16\pi}\left(\frac{1}{\cosh\frac{b-b'+b''}{4}} + \frac{1}{\cosh\frac{b-b'-b''}{4}} - \frac{1}{\cosh\frac{b+b'+b''}{4}} - \frac{1}{\cosh\frac{b+b'-b''}{4}}\right). \qquad \text{(D.43)}$$

1/(16*pi) * (((((1/(cosh(6Pi)) + 1/(cosh(-16Pi)) - 1/(cosh(72Pi)) - 1/(cosh(0)))))

Input:

$$\frac{1}{16\pi}\left(\frac{1}{\cosh(6\pi)} + \frac{1}{\cosh(-16\pi)} - \frac{1}{\cosh(72\pi)} - \frac{1}{\cosh(0)}\right)$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function
- $\operatorname{sech}(x)$ is the hyperbolic secant function

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Exact result:

$$\frac{-1 + \operatorname{sech}(6\pi) + \operatorname{sech}(16\pi) - \operatorname{sech}(72\pi)}{16\pi}$$

Decimal approximation:

- More digits

$-0.019894367627366271243913310580838928273635276413086178 57\ldots$

Open code

Continued fraction:

- Linear form

$$\cfrac{1}{-50+\cfrac{1}{-3+\cfrac{1}{-1+\cfrac{1}{-3+\cfrac{1}{-3+\cfrac{1}{-2+\cfrac{1}{-21+\cfrac{1}{-4+\cfrac{1}{-5+\cfrac{1}{-2+\cfrac{1}{-3+\cfrac{1}{-3+\cfrac{1}{-36+\cfrac{1}{-76+\cfrac{1}{-2+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{\frac{1}{\cosh(6\pi)} + \frac{1}{\cosh(-16\pi)} - \frac{1}{\cosh(72\pi)} - \frac{1}{\cosh(0)}}{16\pi} = -\frac{1}{16\pi} + \sum_{k=0}^{\infty} \frac{(-1)^k e^{-72(\pi+2k\pi)}\left(-1 + e^{56(\pi+2k\pi)} + e^{66(\pi+2k\pi)}\right)}{8\pi}$$

Open code

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$$\frac{\frac{1}{\cosh(6\pi)}+\frac{1}{\cosh(-16\pi)}-\frac{1}{\cosh(72\pi)}-\frac{1}{\cosh(0)}}{16\pi} = -\frac{1}{16\pi}+\sum_{k=0}^{\infty}\frac{(-1)^k(1+2k)(24113665+165896k+165912k^2+32k^3+16k^4)}{4(145+4k+4k^2)(1025+4k+4k^2)(20737+4k+4k^2)\pi^2}$$

Open code

Note that the value 1025 in the above series, is very near to the rest mass of Phi meson 1019.445

$$\frac{\frac{1}{\cosh(6\pi)}+\frac{1}{\cosh(-16\pi)}-\frac{1}{\cosh(72\pi)}-\frac{1}{\cosh(0)}}{16\pi} = -\frac{1}{16\pi}+\sum_{k=0}^{\infty}\frac{i(\mathrm{Li}_{-k}(-ie^{z_0})-\mathrm{Li}_{-k}(ie^{z_0}))\left((6\pi-z_0)^k+(16\pi-z_0)^k-(72\pi-z_0)^k\right)}{16\pi k!}$$

$$\text{for } \frac{1}{2}+\frac{i z_0}{\pi}\notin\mathbb{Z}$$

Open code

- $n!$ is the factorial function
- $\mathrm{Li}_n(x)$ is the polylogarithm function
- $\mathbb{Z}$ is the set of integers
- More information

Integral representation:

$$\frac{\frac{1}{\cosh(6\pi)}+\frac{1}{\cosh(-16\pi)}-\frac{1}{\cosh(72\pi)}-\frac{1}{\cosh(0)}}{16\pi} = -\frac{1}{16\pi}+\int_0^{\infty}\frac{t^{12i}+t^{32i}-t^{144i}}{8\pi^2(1+t^2)}\,dt$$

Open code

(-21*4) * 1/(16*pi) * (((((1/(cosh(6Pi)) + 1/(cosh(-16Pi)) - 1/(cosh(72Pi)) - 1/(cosh(0)))))

Input:

$$(-21\times4)\times\frac{1}{16\pi}\left(\frac{1}{\cosh(6\pi)}+\frac{1}{\cosh(-16\pi)}-\frac{1}{\cosh(72\pi)}-\frac{1}{\cosh(0)}\right)$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function

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Exact result:

$$-\frac{21(-1+\mathrm{sech}(6\pi)+\mathrm{sech}(16\pi)-\mathrm{sech}(72\pi))}{4\pi}$$

- $\mathrm{sech}(x)$ is the hyperbolic secant function

Decimal approximation:

- More digits

1.6711268806987667844887180887904699749853632186992390004 70...

This result 1.6711268... is very near to the Proton mass $1.672*10^{-27}$

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{24+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{6+\cfrac{1}{8+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{10+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{\left(\frac{1}{\cosh(6\pi)}+\frac{1}{\cosh(-16\pi)}-\frac{1}{\cosh(72\pi)}-\frac{1}{\cosh(0)}\right)(-21)\,4}{16\pi}=\frac{21}{4\pi}+\sum_{k=0}^{\infty}-\frac{21(-1)^k e^{-72(\pi+2k\pi)}\left(-1+e^{56(\pi+2k\pi)}+e^{66(\pi+2k\pi)}\right)}{2\pi}$$

Open code

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$$\frac{\left(\frac{1}{\cosh(6\pi)}+\frac{1}{\cosh(-16\pi)}-\frac{1}{\cosh(72\pi)}-\frac{1}{\cosh(0)}\right)(-21)\,4}{16\pi}=\frac{21}{4\pi}+\sum_{k=0}^{\infty}-\frac{21(-1)^k(1+2k)\left(24113665+165896k+165912k^2+32k^3+16k^4\right)}{\left(145+4k+4k^2\right)\left(1025+4k+4k^2\right)\left(20737+4k+4k^2\right)\pi^2}$$

Open code

Note that the value 1025 is very near to the rest mass of Phi meson 1019.445

$$\frac{\left(\frac{1}{\cosh(6\pi)}+\frac{1}{\cosh(-16\pi)}-\frac{1}{\cosh(72\pi)}-\frac{1}{\cosh(0)}\right)(-21)4}{16\pi}=$$

$$\frac{21}{4\pi}+\sum_{k=0}^{\infty}-\frac{21\,i\left(\mathrm{Li}_{-k}(-i\,e^{z_0})-\mathrm{Li}_{-k}(i\,e^{z_0})\right)\left((6\pi-z_0)^k+(16\pi-z_0)^k-(72\pi-z_0)^k\right)}{4\pi\,k!}$$

$$\text{for }\frac{1}{2}+\frac{i\,z_0}{\pi}\notin\mathbb{Z}$$

Open code

- $n!$ is the factorial function
- $\mathrm{Li}_n(x)$ is the polylogarithm function
- $\mathbb{Z}$ is the set of integers
- More information

Integral representation:

$$\frac{\left(\frac{1}{\cosh(6\pi)}+\frac{1}{\cosh(-16\pi)}-\frac{1}{\cosh(72\pi)}-\frac{1}{\cosh(0)}\right)(-21)4}{16\pi}=$$

$$\frac{21}{4\pi}+\int_0^{\infty}\frac{21\left(-1-t^{20\,i}+t^{132\,i}\right)t^{12\,i}}{2\pi^2\left(1+t^2\right)}\,dt$$

EQUATION (D.20)

$$\mathrm{T}(b,b',b'')=\log\frac{x_0-x_2}{x_0-x_1}=\log\frac{\cosh\frac{b''}{2}+\cosh\frac{b+b'}{2}}{\cosh\frac{b''}{2}+\cosh\frac{b-b'}{2}},\qquad\text{(D.20)}$$

ln ((cosh (18Pi) + cosh (18Pi))/((cosh (18Pi) + cosh (-6Pi))

Input:

$$\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right)$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function
- $\log(x)$ is the natural logarithm

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Exact result:

$$\log\left(\frac{2\cosh(18\pi)}{\cosh(6\pi)+\cosh(18\pi)}\right)$$

Decimal approximation:

- More digits

0.693147180559945267005720291297400228532688214853679407886...

Continued fraction:

- Linear form

$$\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{10+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right) = -\sum_{k=1}^{\infty}\frac{(-2\operatorname{sech}(12\pi))^k \sinh^{2k}(6\pi)}{k}$$

Open code

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$$\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right) = -\sum_{k=1}^{\infty}\frac{\left(1-\frac{2\cosh(18\pi)}{\cosh(6\pi)+\cosh(18\pi)}\right)^k}{k}$$

Open code

$$\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right) = \log\left(\frac{2\sum_{k=0}^{\infty}\frac{(18\pi)^{2k}}{(2k)!}}{\sum_{k=0}^{\infty}\frac{36^k\left(1+9^k\right)\pi^{2k}}{(2k)!}}\right)$$

Integral representations:

- More

$$\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right) = \int_1^{2-\operatorname{sech}(12\pi)}\frac{1}{t}\,dt$$

Open code

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$$\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right)=\log\left(\frac{1+18\pi\int_0^1\sinh(18\pi t)\,dt}{1+\int_0^1 3\pi(\sinh(6\pi t)+3\sinh(18\pi t))\,dt}\right)$$

Open code

$$\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right)=\log\left(\frac{2\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(81\pi^2)/s+s}}{\sqrt{s}}\,ds}{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(9\pi^2)/s+s}\left(1+e^{(72\pi^2)/s}\right)}{\sqrt{s}}\,ds}\right)\quad \text{for } \gamma>0$$

12/5 ln ((cosh (18Pi) + cosh (18Pi))/((cosh (18Pi) + cosh (-6Pi))

Input:

$$\frac{12}{5}\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right)$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function
- $\log(x)$ is the natural logarithm

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Exact result:

$$\frac{12}{5}\log\left(\frac{2\cosh(18\pi)}{\cosh(6\pi)+\cosh(18\pi)}\right)$$

Decimal approximation:

- More digits

1.663553233343868640813728699113760548478451715648830578927...

Open code

1.6635532…

This result is a golden number

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{35+\cfrac{1}{47+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{25+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{12+\cfrac{1}{1+\cfrac{1}{11+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{1}{5}\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right)12 = -\frac{12}{5}\sum_{k=1}^{\infty}\frac{(-2\operatorname{sech}(12\pi))^k \sinh^{2k}(6\pi)}{k}$$

Open code

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$$\frac{1}{5}\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right)12 = -\frac{12}{5}\sum_{k=1}^{\infty}\frac{\left(1-\frac{2\cosh(18\pi)}{\cosh(6\pi)+\cosh(18\pi)}\right)^k}{k}$$

Open code

$$\frac{1}{5}\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right)12 = \frac{12}{5}\log\left(\frac{2\sum_{k=0}^{\infty}\frac{(18\pi)^{2k}}{(2k)!}}{\sum_{k=0}^{\infty}\frac{36^k\left(1+9^k\right)\pi^{2k}}{(2k)!}}\right)$$

Open code

Integral representations:

- More

$$\frac{1}{5}\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right)12 = \frac{12}{5}\int_1^{2-\operatorname{sech}(12\pi)}\frac{1}{t}\,dt$$

Open code

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$$\frac{1}{5}\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right)12 = \frac{12}{5}\log\left(\frac{1+18\pi\int_0^1\sinh(18\pi t)\,dt}{1+\int_0^1 3\pi(\sinh(6\pi t)+3\sinh(18\pi t))\,dt}\right)$$

Open code

$$\frac{1}{5}\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right)12 = \frac{12}{5}\log\left(\frac{2\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(81\pi^2)/s+s}}{\sqrt{s}}\,ds}{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(9\pi^2)/s+s}\left(1+e^{(72\pi^2)/s}\right)}{\sqrt{s}}\,ds}\right) \quad \text{for } \gamma > 0$$

(34)^(1/4) ln ((cosh (18Pi) + cosh (18Pi))/((cosh (18Pi) + cosh (-6Pi))

Input:

$$\sqrt[4]{34}\,\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right)$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function
- $\log(x)$ is the natural logarithm

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Exact result:

$$\sqrt[4]{34}\,\log\left(\frac{2\cosh(18\pi)}{\cosh(6\pi)+\cosh(18\pi)}\right)$$

Decimal approximation:

- More digits

1.6737677293730070521526601819688406476427242194242039542 45…

Open code

1.6737677…

This result is very near to the Neutron mass

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{15+\cfrac{1}{3+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{12+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\sqrt[4]{34}\,\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right) = -\sqrt[4]{34}\sum_{k=1}^{\infty}\frac{(-2\operatorname{sech}(12\pi))^k\sinh^{2k}(6\pi)}{k}$$

Open code

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$$\sqrt[4]{34}\,\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right) = -\sqrt[4]{34}\sum_{k=1}^{\infty}\frac{\left(1-\frac{2\cosh(18\pi)}{\cosh(6\pi)+\cosh(18\pi)}\right)^k}{k}$$

Open code

$$\sqrt[4]{34}\,\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right) = \sqrt[4]{34}\,\log\left(\frac{2\sum_{k=0}^{\infty}\frac{(18\pi)^{2k}}{(2k)!}}{\sum_{k=0}^{\infty}\frac{36^k\left(1+9^k\right)\pi^{2k}}{(2k)!}}\right)$$

Integral representations:

- More

$$\sqrt[4]{34}\,\log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right) = \sqrt[4]{34}\int_1^{2-\operatorname{sech}(12\pi)}\frac{1}{t}\,dt$$

Open code

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$$\sqrt[4]{34}\ \log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right)=$$
$$\sqrt[4]{34}\ \log\left(\frac{1+18\pi\int_0^1 \sinh(18\pi t)\,dt}{1+\int_0^1 3\pi(\sinh(6\pi t)+3\sinh(18\pi t))\,dt}\right)$$

Open code

$$\sqrt[4]{34}\ \log\left(\frac{\cosh(18\pi)+\cosh(18\pi)}{\cosh(18\pi)+\cosh(-6\pi)}\right)=$$
$$\sqrt[4]{34}\ \log\left(\frac{2\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(81\pi^2)/s+s}}{\sqrt{s}}\,ds}{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(9\pi^2)/s+s}\left(1+e^{(72\pi^2)/s}\right)}{\sqrt{s}}\,ds}\right)\quad \text{for } \gamma>0$$

1/4 ln ((cosh (36Pi) + cosh (30Pi))/((cosh (36Pi) + cosh (-6Pi))

Input:

$$\frac{1}{4}\log\left(\frac{\cosh(36\pi)+\cosh(30\pi)}{\cosh(36\pi)+\cosh(-6\pi)}\right)$$

Open code

- $\cosh(x)$ is the hyperbolic cosine function
- $\log(x)$ is the natural logarithm

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Decimal approximation:

- More digits

$1.628103028718536226299714149422681744471090537549935 4\ldots\times10^{-9}$

Open code

1.62810302…

This result is a sub-multiple of a golden number

Continued fraction:

- Linear form

$$\cfrac{1}{614211743+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{1}{4}\log\left(\frac{\cosh(36\pi)+\cosh(30\pi)}{\cosh(36\pi)+\cosh(-6\pi)}\right)=-\frac{1}{4}\sum_{k=1}^{\infty}\frac{\left(\frac{\cosh(6\pi)-\cosh(30\pi)}{\cosh(6\pi)+\cosh(36\pi)}\right)^k}{k}$$

Open code

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$$\frac{1}{4}\log\left(\frac{\cosh(36\pi)+\cosh(30\pi)}{\cosh(36\pi)+\cosh(-6\pi)}\right)=\frac{1}{4}\log\left(\frac{\sum_{k=0}^{\infty}\frac{(30\pi)^{2k}+(36\pi)^{2k}}{(2k)!}}{\sum_{k=0}^{\infty}\frac{36^k\left(1+36^k\right)\pi^{2k}}{(2k)!}}\right)$$

Open code

$$\frac{1}{4}\log\left(\frac{\cosh(36\pi)+\cosh(30\pi)}{\cosh(36\pi)+\cosh(-6\pi)}\right)=\frac{1}{4}\log\left(\frac{\sum_{k=0}^{\infty}\frac{\left(\left(30-\frac{i}{2}\right)\pi\right)^{1+2k}+\left(\left(36-\frac{i}{2}\right)\pi\right)^{1+2k}}{(1+2k)!}}{\sum_{k=0}^{\infty}\frac{\left(\left(6-\frac{i}{2}\right)\pi\right)^{1+2k}+\left(\left(36-\frac{i}{2}\right)\pi\right)^{1+2k}}{(1+2k)!}}\right)$$

Integral representations:

- More

$$\frac{1}{4}\log\left(\frac{\cosh(36\pi)+\cosh(30\pi)}{\cosh(36\pi)+\cosh(-6\pi)}\right)=\frac{1}{4}\int_1^{\frac{\cosh(30\pi)+\cosh(36\pi)}{\cosh(6\pi)+\cosh(36\pi)}}\frac{1}{t}\,dt$$

Open code

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$$\frac{1}{4}\log\left(\frac{\cosh(36\pi)+\cosh(30\pi)}{\cosh(36\pi)+\cosh(-6\pi)}\right)=\frac{1}{4}\log\left(\frac{1+\int_0^1 3\pi\,(5\sinh(30\pi t)+6\sinh(36\pi t))\,dt}{1+\int_0^1 3\pi\,(\sinh(6\pi t)+6\sinh(36\pi t))\,dt}\right)$$

Open code

$$\frac{1}{4}\log\left(\frac{\cosh(36\pi)+\cosh(30\pi)}{\cosh(36\pi)+\cosh(-6\pi)}\right)=\frac{1}{4}\log\left(\frac{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(225\pi^2)/s+s}\left(1+e^{(99\pi^2)/s}\right)}{\sqrt{s}}\,ds}{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{s}\left(e^{(9\pi^2)/s}+e^{(324\pi^2)/s}\right)}{\sqrt{s}}\,ds}\right) \quad \text{for } \gamma>0$$

EQUATION (4.57)

$$y(x)=-\frac{1}{2}\sqrt{\frac{x-4}{x}} \qquad \Longrightarrow \qquad \rho_0(x)=\frac{1}{2\pi}\sqrt{\frac{4-x}{x}}. \qquad (4.57)$$

From the right equation, we obtain:

1/(2*Pi) * ((sqrt((4-5)/5))

Input:

$$\frac{1}{2\pi}\sqrt{\frac{4-5}{5}}$$

Open code

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Result:

$$\frac{i}{2\sqrt{5}\,\pi}$$

Decimal approximation:

- More digits

$0.07117625434171770584767626764038030650355550238499163953\ldots\, i$

Open code

Property:

$\frac{i}{2\sqrt{5}\,\pi}$ is a transcendental number

Open code

Polar coordinates:

- Exact form

$r \approx 0.0711763$ (radius), $\theta = 90°$ (angle)

Open code

Continued fraction:

- Linear form

$$\cfrac{1}{-14 i+\cfrac{1}{20 i+\cfrac{1}{-7 i+\cfrac{1}{-3 i+\cfrac{1}{3 i+\cfrac{1}{-3 i+\cfrac{1}{-42 i+\cfrac{1}{4 i+\cfrac{1}{4 i+\cfrac{1}{3 i+\cfrac{1}{28 i+\cfrac{1}{21 i+\cfrac{1}{2 i+\cfrac{1}{-3 i+\cfrac{1}{\cdots}}}}}}}}}}}}}}}$$

(using the Hurwitz expansion)

Series representations:

- More

$$\frac{\sqrt{\frac{4-5}{5}}}{2\pi} = \frac{\sqrt{-\frac{6}{5}}\sum_{k=0}^{\infty}\left(-\frac{6}{5}\right)^{-k}\binom{\frac{1}{2}}{k}}{2\pi}$$

Open code

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$$\frac{\sqrt{\frac{4-5}{5}}}{2\pi} = \frac{\sqrt{-\frac{6}{5}}\sum_{k=0}^{\infty}\frac{\left(\frac{5}{6}\right)^{k}\left(-\frac{1}{2}\right)_k}{k!}}{2\pi}$$

Open code

$$\frac{\sqrt{\frac{4-5}{5}}}{2\pi} = \frac{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{5}-z_0\right)^k z_0^{-k}}{k!}}{2\pi} \quad \text{for not } ((z_0 \in \mathbb{R} \text{ and } -\infty < z_0 \le 0))$$

Open code

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\mathbb{R}$ is the set of real numbers

sqrt((((((ln(1/((1/(2*Pi) * ((sqrt(-(4-5)/5))))))))))

Input:

$$\sqrt{\log\left(\frac{1}{\frac{1}{2\pi}\sqrt{-\frac{1}{5}(4-5)}}\right)}$$

Open code

- $\log(x)$ is the natural logarithm

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Exact result:

$$\sqrt{\log\left(2\sqrt{5}\,\pi\right)}$$

Decimal approximation:

- More digits

1.6256063553721717874689679408999611277493950411284597162\53...

Open code

1.6256063...

This result is a golden number

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{25+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{6+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\sqrt{\log\left(\frac{1}{\frac{\sqrt{-\frac{1}{5}(4-5)}}{2\pi}}\right)} = \sqrt{\log\left(-1+2\sqrt{5}\,\pi\right)-\sum_{k=1}^{\infty}\frac{\left(\frac{1}{1-2\sqrt{5}\,\pi}\right)^k}{k}}$$

Open code

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$$\sqrt{\log\left(\frac{1}{\frac{\sqrt{-\frac{1}{5}(4-5)}}{2\pi}}\right)} = \sqrt{2 i \pi \left\lfloor \frac{\arg(2\sqrt{5}\pi - x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (2\sqrt{5}\pi - x)^k x^{-k}}{k}}$$

for $x < 0$

Open code

$$\sqrt{\log\left(\frac{1}{\frac{\sqrt{-\frac{1}{5}(4-5)}}{2\pi}}\right)} = \sqrt{\log(z_0) + \left\lfloor \frac{\arg(2\sqrt{5}\pi - z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k (2\sqrt{5}\pi - z_0)^k z_0^{-k}}{k}}$$

Open code

- $\arg(z)$ is the complex argument
- $\lfloor x \rfloor$ is the floor function

Integral representations:

$$\sqrt{\log\left(\frac{1}{\frac{\sqrt{-\frac{1}{5}(4-5)}}{2\pi}}\right)} = \sqrt{\int_1^{2\sqrt{5}\pi} \frac{1}{t}\, dt}$$

Open code

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$$\sqrt{\log\left(\frac{1}{\frac{\sqrt{-\frac{1}{5}(4-5)}}{2\pi}}\right)} = \frac{\sqrt{-i \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{(-1+2\sqrt{5}\pi)^{-s}\, \Gamma(-s)^2\, \Gamma(1+s)}{\Gamma(1-s)}\, ds}}{\sqrt{2\pi}} \quad \text{for } -1 < \gamma < 0$$

Open code

- $\Gamma(x)$ is the gamma function

EQUATION (5.4-5.5)

$$Z^{D}_{\mathrm{JT}}(\beta) = \frac{1}{4\pi^{1/2}\beta^{3/2}}e^{\frac{\pi^2}{\beta}} \qquad Z^{T}_{\mathrm{JT}}(\beta, b) = \frac{1}{2\sqrt{\pi\beta}}e^{-\frac{b^2}{4\beta}} \tag{5.4}$$

$$Z^{D}_{\mathrm{SJT}}(\beta) = \sqrt{\frac{2}{\pi\beta}}e^{\frac{\pi^2}{\beta}} \qquad Z^{T}_{\mathrm{SJT}}(\beta, b) = \frac{1}{\sqrt{2\pi\beta}}e^{-\frac{b^2}{4\beta}}. \tag{5.5}$$

(((exp(Pi^2/2)))/(((sqrt(4Pi))*2^(1.5)

Input:

$$\frac{\exp\left(\frac{\pi^2}{2}\right)}{\sqrt{4\pi}\times 2^{1.5}}$$

Open code

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Result:

- More digits

13.8678...

Series representations:

- More

$$\frac{\exp\left(\frac{\pi^2}{2}\right)}{\sqrt{4\pi}\ 2^{1.5}} = \frac{0.353553\exp\left(\frac{\pi^2}{2}\right)}{\sqrt{-1+4\pi}\ \sum_{k=0}^{\infty}(-1+4\pi)^{-k}\binom{\frac{1}{2}}{k}}$$

Open code

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$$\frac{\exp\left(\frac{\pi^2}{2}\right)}{\sqrt{4\pi}\ 2^{1.5}} = \frac{0.353553\exp\left(\frac{\pi^2}{2}\right)}{\sqrt{-1+4\pi}\ \sum_{k=0}^{\infty}\frac{(-1)^k(-1+4\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

Open code

$$\frac{\exp\left(\frac{\pi^2}{2}\right)}{\sqrt{4\pi}\ 2^{1.5}} = \frac{0.353553\exp\left(\frac{\pi^2}{2}\right)}{\sqrt{z_0}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(4\pi-z_0)^k z_0^{-k}}{k!}} \quad \text{for not } ((z_0 \in \mathbb{R} \text{ and } -\infty < z_0 \le 0))$$

Open code

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)

- ℝ is the set of real numbers
-

(((exp(Pi^2/2)))*(((sqrt(2/(2Pi)))

Input:

$$\exp\left(\frac{\pi^2}{2}\right)\sqrt{\frac{2}{2\pi}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\frac{e^{\pi^2/2}}{\sqrt{\pi}}$$

Decimal approximation:

- More digits

78.44809984170404766548489317441279878301728348734299323174...

Open code

Continued fraction:

- Linear form

$$78+\cfrac{1}{2+\cfrac{1}{4+\cfrac{1}{3+\cfrac{1}{6+\cfrac{1}{2+\cfrac{1}{4+\cfrac{1}{26+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\exp\left(\frac{\pi^2}{2}\right)\sqrt{\frac{2}{2\pi}} = \exp\left(\frac{\pi^2}{2}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+\frac{1}{\pi}\right)^k\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

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$$\exp\left(\frac{\pi^2}{2}\right)\sqrt{\frac{2}{2\pi}} = \exp\left(\frac{\pi^2}{2}\right)\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1}{\pi}-z_0\right)^k z_0^{-k}}{k!}$$

for not $((z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0))$

Open code

$$\exp\left(\frac{\pi^2}{2}\right)\sqrt{\frac{2}{2\pi}} = -\frac{\exp\left(\frac{\pi^2}{2}\right)\sum_{j=0}^{\infty}\text{Res}_{s=-j}\left(-1+\frac{1}{\pi}\right)^{-s}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}$$

(((e^(-(36Pi)^2/8)))/(((sqrt(4Pi))))

Input:

$$\frac{e^{-1/8(36\pi)^2}}{\sqrt{4\pi}}$$

Open code

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Exact result:

$$\frac{e^{-162\pi^2}}{2\sqrt{\pi}}$$

Decimal approximation:

- More digits

$1.167908486691370029004855757175636894911365394983707... \times 10^{-695}$

Open code

Continued fraction:

- Linear form

$$1\Big/\left(85623146967015635159900167953536646054899242542498035353302602935948720186179886983179596162583006641376359610206183161720965548293612178839435604143429300207401077243739617125689761659208586467923228078503858409205259433239585802019784128151721053541528754193297351407911117456868278485789441609040416609043979683096517922414217170608573143614164606107850482961557828672047880395404049290236669535163588514582301563464596348890969939604623939267045480537078773740118004730164519807288071041104482644593766972462114938035467826458180197434579625869560254445365329054877033172518882668383864454710704424518936404256709470481140194958457704529428341654033576170451537346210679710058555550533672494+\frac{1}{\ldots}\right)$$

Series representations:

- More

$$\frac{e^{-1/8(36\pi)^2}}{\sqrt{4\pi}} = \frac{e^{-162\pi^2}}{\sqrt{-1+4\pi}\sum_{k=0}^{\infty}(-1+4\pi)^{-k}\binom{\frac{1}{2}}{k}}$$

Open code

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$$\frac{e^{-1/8(36\pi)^2}}{\sqrt{4\pi}} = \frac{e^{-162\pi^2}}{\sqrt{-1+4\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+4\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

Open code

$$\frac{e^{-1/8(36\pi)^2}}{\sqrt{4\pi}} = \frac{e^{-162\pi^2}}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(4\pi-z_0)^k z_0^{-k}}{k!}} \quad \text{for not } ((z_0 \in \mathbb{R} \text{ and } -\infty < z_0 \leq 0))$$

Open code

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\mathbb{R}$ is the set of real numbers

(((e^(-(36Pi)^2/8)))/(((2sqrt(2Pi))))

Input:

$$\frac{e^{-1/8(36\pi)^2}}{2\sqrt{2\pi}}$$

Open code

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Exact result:

$$\frac{e^{-162\pi^2}}{2\sqrt{2\pi}}$$

Decimal approximation:

- More digits

$8.2583601074478643860851175124908807484844080759320 61\ldots \times 10^{-696}$

Open code

Continued fraction:

- Linear form

$1 / (121089415693818250105387720357508995592126830488152339745 \cdot$
$675051682082100329528768802123777486224714405360716731496 \cdot$
$185404798077207643898227206597830135098085825095555993921 \cdot$
$384334067131001081749401372166718219877161399336605834438 \cdot$
$528838598763970216395498698469580077326699253311906761678 \cdot$
$275324208828423669263069118243871544729825219907354651747 \cdot$
$454508478513862291948908447422874473342834146326453348459 \cdot$
$546114920116636975582442563051348067993628383813284598888 \cdot$
$954258740484923006357124211820612974245231064676306227552 \cdot$
$435714462617958840231743914292442069166340804409614878215 \cdot$
$866246961076297108636326614227448328622397245884502893344 \cdot$
$858731238307728972861045771627438735289838678048006370511 \cdot$
$714252872932 + \frac{1}{\ldots})$

Open code

Series representations:

- More

$$\frac{e^{-1/8 (36\pi)^2}}{2\sqrt{2\pi}} = \frac{e^{-162\pi^2}}{2\sqrt{-1+2\pi}\sum_{k=0}^{\infty}(-1+2\pi)^{-k}\binom{\frac{1}{2}}{k}}$$

Open code

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$$\frac{e^{-1/8 (36\pi)^2}}{2\sqrt{2\pi}} = \frac{e^{-162\pi^2}}{2\sqrt{-1+2\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+2\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

Open code

$$\frac{e^{-1/8 (36\pi)^2}}{2\sqrt{2\pi}} = \frac{e^{-162\pi^2}\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}(-1+2\pi)^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}$$

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\Gamma(x)$ is the gamma function
- $\operatorname{Res}_{z=z_0} f$ is a complex residue

(8.258360107447864386085117512490880748484408075932061 × 10^-696) / (((e^(-(36Pi)^2/8)))/(((sqrt(4Pi)))))

Input interpretation:

$$\frac{\frac{8.258360107447864386085117512490880748484408075932061}{10^{696}}}{\frac{e^{-1/8(36\pi)^2}}{\sqrt{4\pi}}}$$

Open code

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Result:

- More digits

0.7071067811865475244008443621048490392848359376884740...

This result is equal to $1/\sqrt{2}$

Series representations:

- More

$$\frac{8.2583601074478643860851175124908807484844080759320610000}{\frac{e^{-1/8(36\pi)^2}\,10^{696}}{\sqrt{4\pi}}} = \frac{8.2583601074478643860851175124908807484844080759320610000\times 10^{-696}}{e^{162\pi^2}\sqrt{-1+4\pi}\sum_{k=0}^{\infty}(-1+4\pi)^{-k}\binom{\frac{1}{2}}{k}}$$

Open code

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$$\frac{8.2583601074478643860851175124908807484844080759320610000}{\frac{e^{-1/8(36\pi)^2}\,10^{696}}{\sqrt{4\pi}}} = \frac{8.2583601074478643860851175124908807484844080759320610000\times 10^{-696}}{e^{162\pi^2}\sqrt{-1+4\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+4\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

Open code

$$\frac{8.2583601074478643860851175124908807484844080759320610000}{\frac{e^{-1/8(36\pi)^2}\,10^{696}}{\sqrt{4\pi}}} = \frac{8.2583601074478643860851175124908807484844080759320610000\times 10^{-696}}{e^{162\pi^2}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(4\pi-z_0)^k z_0^{-k}}{k!}} \text{ for not } ((z_0\in\mathbb{R} \text{ and } -\infty < z_0 \le 0))$$

Open code

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\mathbb{R}$ is the set of real numbers

0.70710678118654752440084436210484903928483593768847 39

Continued fraction:

- Linear form

$$\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}}}$$

Possible closed forms:

- More

$e^{b_4(2)/8} \approx 0.7071067811865475244008443621048490392848359376884740365$

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$\frac{1}{\sqrt{2}} \approx 0.7071067811865475244008443621048490392848359376884740365$

$\frac{1}{35}\sqrt{\frac{10902937}{175686}}\,\pi \approx 0.70710678118654755 1971$

- $b_4(2)$ is the Madelung constant $b_4(2)$

(((exp(Pi^2/2)))*(((sqrt(2/(2Pi)))*1/((((13.867795842317064379707937047211865168790929396136096))))

Input interpretation:

$$\exp\left(\frac{\pi^2}{2}\right)\left(\sqrt{\frac{2}{2\pi}} \times \frac{1}{13.867795842317064379707937047211865168790929396136096}\right)$$

Open code

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Result:

- More digits

5.6568542494923801952067548968387923142786875015077926...

Series representations:

- More

$$\frac{\exp\left(\frac{\pi^2}{2}\right)\sqrt{\frac{2}{2\pi}}}{13.8677958423170643797079370472118651687909293961360960000} = 0.0721095126702498107120724669603948417889520228720861643995 \exp\left(\frac{\pi^2}{2}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+\frac{1}{\pi}\right)^k\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

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$$\frac{\exp\left(\frac{\pi^2}{2}\right)\sqrt{\frac{2}{2\pi}}}{13.8677958423170643797079370472118651687909293961360960000} = 0.0721095126702498107120724669603948417889520228720861643995 \exp\left(\frac{\pi^2}{2}\right)\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1}{\pi}-z_0\right)^k z_0^{-k}}{k!} \quad \text{for not } ((z_0 \in \mathbb{R} \text{ and } -\infty < z_0 \leq 0))$$

Open code

$$\frac{\exp\left(\frac{\pi^2}{2}\right)\sqrt{\frac{2}{2\pi}}}{13.8677958423170643797079370472118651687909293961360960000} = -\frac{1}{\sqrt{\pi}} 0.0360547563351249053560362334801974208944760114360430821997 \exp\left(\frac{\pi^2}{2}\right)\sum_{j=0}^{\infty}\text{Res}_{s=-j}\left(-1+\frac{1}{\pi}\right)^{-s}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)$$

- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\mathbb{R}$ is the set of real numbers
- $\Gamma(x)$ is the gamma function
- $\text{Res}_{z=z_0} f$ is a complex residue
- More information

(5.6568542494923801952067548968387923142786875015077926 / 0.7071067811865475244008443621048490392848359376884740)

Input interpretation:

$$\frac{5.6568542494923801952067548968387923142786875015077926}{0.7071067811865475244008443621048490392848359376884740}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

  8.000000000000000000000000000000000000000000000000848528...

Open code

(0.7071067811865475244008443621048490392848359376884740/ 5.6568542494923801952067548968387923142786875015077926)

Input interpretation:

$$\frac{0.7071067811865475244008443621048490392848359376884740}{5.6568542494923801952067548968387923142786875015077926}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

  0.12499999999999999999999999999999999999999999999986741...

Open code

Rational form:

$$\frac{1}{8}$$

Open code

(0.7071067811865475244008443621048490392848359376884740/5.656854249492 3801952067548968387923142786875015077926)^2

Input interpretation:

$$\left(\frac{0.7071067811865475244008443621048490392848359376884740}{5.6568542494923801952067548968387923142786875015077926}\right)^2$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

  0.015624999999999999999999999999999999999999999999996685...

Open code

Rational form:

$\frac{1}{64}$

Open code

EQUATION (5.9)

In (super) JT gravity, the path integrals on other topologies Z_g are given by a combination of the Schwarizan trumpet path integral and the volumes of moduli space. There are two cases that have to be treated individually. One of them is the "double trumpet," for which the path integral gives

$$Z_0(\beta_1, \beta_2) = c \int_0^{\infty} b\, \mathrm{d}b\, Z^T_{(\mathrm{S})\mathrm{JT}}(\beta_1, b) Z^T_{(\mathrm{S})\mathrm{JT}}(\beta_2, b). \quad (5.9)$$

(((((((72Pi * integrate [36Pi * (((e^(-(36Pi)^2/8)))/(((sqrt(4Pi)))) * (((e^(-(36Pi)^2/8)))/(((sqrt(4Pi))))]b))))))

Indefinite integral:

- Approximate form
- Step-by-step solution

$$72\pi \int \frac{36\pi \left(e^{-1/8\,(36\pi)^2} \left(e^{-1/8\,(36\pi)^2}\, b\right)\right)}{\sqrt{4\pi}\,\sqrt{4\pi}}\, db = 324\, e^{-324\pi^2}\, \pi\, b^2 + \text{constant}$$

Open code

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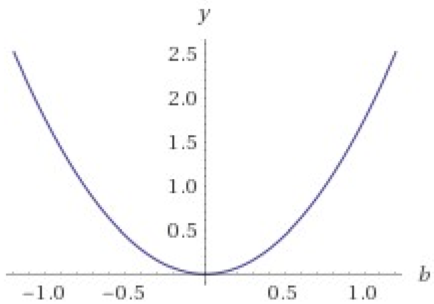
Plot:



(b from −1.2 to 1.2)

ln (((((((72Pi * integrate [36Pi * (((e^(-(36Pi)^2/8)))/(((sqrt(4Pi)))) * (((e^(-(36Pi)^2/8)))/(((sqrt(4Pi))))]b))))))

Input:

$$\log\left(72\pi \int 36\pi \left(\frac{e^{-1/8\,(36\pi)^2}}{\sqrt{4\pi}} \left(\frac{e^{-1/8\,(36\pi)^2}}{\sqrt{4\pi}}\, b\right)\right) db\right)$$

Open code

- $\log(x)$ is the natural logarithm

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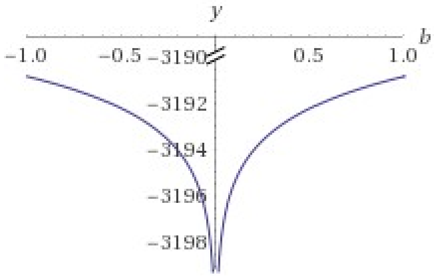
Exact result:

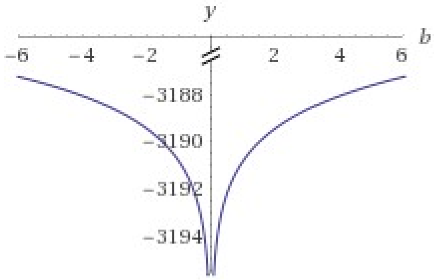
$$\log\left(324\, e^{-324\pi^2}\, \pi\, b^2\right)$$

Plots:



(b from −1 to 1)

Open code



(b from −6 to 6)

Open code

Series expansion of the integral at b = 0:

$$\left(\log(324\,\pi\,b^2) - 324\,\pi^2\right) + O(b^4)$$

(generalized Puiseux series)

Open code

- Big-O notation

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Series expansion of the integral at b = ∞:

$$\left(2\log(b) - 324\,\pi^2 + \log(324\,\pi)\right) + O\left(\left(\frac{1}{b}\right)^4\right)$$

(generalized Puiseux series)

Open code

- Big-O notation

Indefinite integral:

$$\log\left(72\,\pi\int\frac{36\,\pi\left(e^{-1/8\,(36\,\pi)^2}\left(e^{-1/8\,(36\,\pi)^2}\,b\right)\right)}{\sqrt{4\,\pi}\,\sqrt{4\,\pi}}\,db\right) = \log\left(324\,e^{-324\,\pi^2}\,\pi\,b^2 + \text{constant}\right)$$

(assuming a complex-valued logarithm)

Open code

Now, from:

$$\log\left(324\, e^{-324\pi^2}\, \pi\, b^2\right)$$

we obtain:

log(324 * (36Pi)^2 e^(-324 π^2) π)

Input:

$$\log\left(\left(324\,(36\,\pi)^2\right) e^{-324\pi^2}\, \pi\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Exact result:

$$\log\left(419\,904\, e^{-324\pi^2}\, \pi^3\right)$$

Decimal approximation:

- More digits

$-3181.369854902699442592279447281684526661063798238526701 10\ldots$

Open code

3181.3698549…

Continued fraction:

- Linear form

$$-3181 + \cfrac{1}{-2 + \cfrac{1}{-1 + \cfrac{1}{-2 + \cfrac{1}{-2 + \cfrac{1}{-1 + \cfrac{1}{-1 + \cfrac{1}{-1 + \cfrac{1}{-22 + \cfrac{1}{-1 + \cfrac{1}{-1 + \cfrac{1}{-45 + \cfrac{1}{-1 + \cfrac{1}{-1 + \cfrac{1}{-1 + \cfrac{1}{\cdots}}}}}}}}}}}}}}}$$

Open code

Series representations:

- More

$$\log\left(\left(e^{-324\pi^2}\, \pi\right) 324\,(36\,\pi)^2\right) = -\sum_{k=1}^{\infty} \frac{(-1)^k \left(-1 + 419\,904\, e^{-324\pi^2}\, \pi^3\right)^k}{k}$$

Open code

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$$\log\left(\left(e^{-324\pi^2}\pi\right)324(36\pi)^2\right) = 2i\pi\left\lfloor\frac{\arg\left(419904\,e^{-324\pi^2}\pi^3 - x\right)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k\left(419904\,e^{-324\pi^2}\pi^3 - x\right)^k x^{-k}}{k} \quad \text{for } x < 0$$

Open code

$$\log\left(\left(e^{-324\pi^2}\pi\right)324(36\pi)^2\right) = 2i\pi\left\lfloor\frac{\pi - \arg\left(\frac{1}{z_0}\right) - \arg(z_0)}{2\pi}\right\rfloor + \log(z_0) - \sum_{k=1}^{\infty}\frac{(-1)^k\left(419904\,e^{-324\pi^2}\pi^3 - z_0\right)^k z_0^{-k}}{k}$$

Open code

- $\arg(z)$ is the complex argument
- $\lfloor x\rfloor$ is the floor function
- More information

Integral representation:

$$\log\left(\left(e^{-324\pi^2}\pi\right)324(36\pi)^2\right) = \int_1^{419904\,e^{-324\pi^2}\pi^3}\frac{1}{t}\,dt$$

(3181.3698549)^1/16

Input interpretation:

$\sqrt[16]{3181.3698549}$

Open code

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Result:

- More digits

1.65543977265...

1.65543977265

We note that, the result 1,6554397... is practically equal to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164{,}2696$ i.e. 1,65578...

Indeed:

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots \Rightarrow$$

$$\Rightarrow \sqrt[16]{3181.3698549} = 1.6554397\ldots$$

(3181.3698549)^1/17

Input interpretation:

$\sqrt[17]{3181.3698549}$

Open code

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Result:

- More digits

1.60707493334...

1.60707493334

This result is a golden number very near to the electric charge of positron

1/4(((2*(3181.3698549)^1/19 +(3181.3698549)^1/16 + (3181.3698549)^1/13)))))

Input interpretation:

$\frac{1}{4}\left(2\sqrt[19]{3181.3698549}+\sqrt[16]{3181.3698549}+\sqrt[13]{3181.3698549}\right)$

Open code

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Result:

- More digits

1.64316862639...

1.64316862639…

2*(((((6/4(((2*(3181.3698549)^1/19 +(3181.3698549)^1/16 + (3181.3698549)^1/13))))))))^0.5

Input interpretation:

$2\sqrt{\frac{6}{4}\left(2\sqrt[19]{3181.3698549}+\sqrt[16]{3181.3698549}+\sqrt[13]{3181.3698549}\right)}$

Open code

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Result:

- More digits

6.279812659094...

6.279812659094... ≈ 2π

From the result

log(324 * (36Pi)^2 e^(-324 π^2) π)

we obtain:

8*(((((sqrt(5)+1)))/2)))))^5 + log(324 * (36Pi)^2 e^(-324 π^2) π)

Input:

$$8\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)^5+\log\left(\left(324\,(36\,\pi)^2\right)e^{-324\,\pi^2}\,\pi\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Exact result:

$$\frac{1}{4}\left(1+\sqrt{5}\right)^5+\log\left(419\,904\,e^{-324\,\pi^2}\,\pi^3\right)$$

Decimal approximation:

- More digits

-3092.64849535270364866409597390705900195225143104629618661...

Open code

Continued fraction:

- Linear form

$$-3092+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-5+\cfrac{1}{-2+\cfrac{1}{-4+\cfrac{1}{-3+\cfrac{1}{-3+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-43+\cfrac{1}{-3+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}$$

Open code

Series representations:

- More

$$8\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)^5+\log\left(\left(e^{-324\pi^2}\pi\right)324\,(36\pi)^2\right)=$$
$$44+20\sqrt{5}-\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+419\,904\,e^{-324\pi^2}\pi^3\right)^k}{k}$$

Open code

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$$8\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)^5+\log\left(\left(e^{-324\pi^2}\pi\right)324\,(36\pi)^2\right)=$$
$$44+20\sqrt{5}+2\,i\,\pi\left\lfloor\frac{\arg\left(419\,904\,e^{-324\pi^2}\pi^3-x\right)}{2\pi}\right\rfloor+$$
$$\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(419\,904\,e^{-324\pi^2}\pi^3-x\right)^k x^{-k}}{k}\quad\text{for } x<0$$

Open code

$$8\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)^5+\log\left(\left(e^{-324\pi^2}\pi\right)324\,(36\pi)^2\right)=44+20\sqrt{5}+$$
$$2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(419\,904\,e^{-324\pi^2}\pi^3-z_0\right)^k z_0^{-k}}{k}$$

Open code

- $\arg(z)$ is the complex argument
- $\lfloor x\rfloor$ is the floor function
- More information

Integral representation:

$$8\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)^5+\log\left(\left(e^{-324\pi^2}\pi\right)324\,(36\pi)^2\right)=44+20\sqrt{5}+\int_1^{419904\,e^{-324\pi^2}\pi^3}\frac{1}{t}\,dt$$

Note that 3092.648 is very near to the rest mass of J/Psi meson 3096.916

((((((((8*(((((sqrt(5)+1)))/2)))))^5 + log(324 * (36Pi)^2 e^(-324 π^2) π))))))))^1/27

Input:

$$\sqrt[27]{\left(8\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)\right)^5+\log\left(\left(324\left(36\pi\right)^2\right)e^{-324\pi^2}\pi\right)}$$

Open code

- $\log(x)$ is the natural logarithm

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Exact result:

$$\sqrt[27]{1024\left(1+\sqrt{5}\right)^5+\log\left(419904\,e^{-324\pi^2}\pi^3\right)}$$

Decimal approximation:

- More digits

1.6061972096940594478942826527514246930080491584429046657 78...

1.6061972096940594478 9...

This result is a golden number very near to the electric charge of positron

Open code

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{11+\cfrac{1}{16+\cfrac{1}{4+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{18+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\sqrt[27]{\left(\frac{8}{2}\left(\sqrt{5}+1\right)\right)^5+\log\left(\left(e^{-324\pi^2}\pi\right)324\left(36\pi\right)^2\right)}=\sqrt[27]{1024\left(1+\sqrt{5}\right)^5-\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+419904\,e^{-324\pi^2}\pi^3\right)^k}{k}}$$

Open code

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$$\sqrt[27]{\left(\frac{8}{2}\left(\sqrt{5}+1\right)\right)^5+\log\left(\left(e^{-324\pi^2}\pi\right)324\left(36\pi\right)^2\right)} = \left(1024\left(1+\sqrt{5}\right)^5+2i\pi\left\lfloor\frac{\arg\left(419904\,e^{-324\pi^2}\pi^3-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(419904\,e^{-324\pi^2}\pi^3-x\right)^k x^{-k}}{k}\right)^{\wedge}(1/27) \text{ for } x<0$$

Open code

$$\sqrt[27]{\left(\frac{8}{2}\left(\sqrt{5}+1\right)\right)^5+\log\left(\left(e^{-324\pi^2}\pi\right)324\left(36\pi\right)^2\right)} = \left(1024\left(1+\sqrt{5}\right)^5+2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(419904\,e^{-324\pi^2}\pi^3-z_0\right)^k z_0^{-k}}{k}\right)^{\wedge}(1/27)$$

Open code

- $\arg(z)$ is the complex argument

- Integral representation:

$$\sqrt[27]{\left(\frac{8}{2}\left(\sqrt{5}+1\right)\right)^5+\log\left(\left(e^{-324\pi^2}\pi\right)324\left(36\pi\right)^2\right)} = \sqrt[27]{1024\left(1+\sqrt{5}\right)^5+\int_1^{419904\,e^{-324\pi^2}\pi^3}\frac{1}{t}\,dt}$$

Note that the value 1024 is very near to the rest mass of the Phi meson 1019.445

((((((((8*(((((sqrt(5)+1)))/2)))))^5 + log(324 * (36Pi)^2 e^(-324 π^2) π))))))))^1/25

Input:

$$\sqrt[25]{\left(8\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)\right)^5+\log\left(\left(324\left(36\pi\right)^2\right)e^{-324\pi^2}\pi\right)}$$

Open code

- $\log(x)$ is the natural logarithm

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Exact result:

$$\sqrt[25]{1024\left(1+\sqrt{5}\right)^5+\log\left(419\,904\,e^{-324\,\pi^2}\,\pi^3\right)}$$

Decimal approximation:

- More digits

1.6682563110759350076474124136834527568475605527175227467 36...

Open code

1.668256311075935007 64

This result is a golden number very near to the Proton mass

((((((((8*(((((sqrt(5)+1)))/2)))))^5 + log(324 * (36Pi)^2 e^(-324 π^2) π))))))))^1/24

Input:

$$\sqrt[24]{\left(8\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)\right)^5+\log\left(\left(324\,(36\,\pi)^2\right)e^{-324\,\pi^2}\,\pi\right)}$$

Open code

- $\log(x)$ is the natural logarithm

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Exact result:

$$\sqrt[24]{1024\left(1+\sqrt{5}\right)^5+\log\left(419\,904\,e^{-324\,\pi^2}\,\pi^3\right)}$$

Decimal approximation:

- More digits

1.7042124178597934549758756895557140902919104880567159826 40...

Open code

1/2 * (((((((((((((((((((8*(((((sqrt(5)+1)))/2)))))^5 + log(324 * (36Pi)^2 e^(-324 π^2) π))))))))^1/27)))))) + 1.704212417859793454975875689555714)))))))))

Input interpretation:

$$\frac{1}{2}\left(\sqrt[27]{\left(8\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)\right)^5+\log\left(\left(324\,(36\,\pi)^2\right)e^{-324\,\pi^2}\,\pi\right)}+1.704212417859793454975875689555714\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

1.655204813776926451435079171153569...

We note that, the result 1,6552048... is practically equal to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164{,}2696$ i.e. 1,65578...

Indeed:

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots \Rightarrow$$

$$\frac{1}{2}\left(\sqrt[27]{\left(8\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)\right)^5+\log\left(\left(324\,(36\,\pi)^2\right)e^{-324\,\pi^2}\,\pi\right)}+1.704212417859793454975875689555714\right)$$

$\Rightarrow$

$= 1.6552048\ldots$

((((1.6552048137769264514 3 + 1.6061972096940594478 9)/2 + 1.6682563110759350076 4)))/2

Input interpretation:

$$\frac{1}{2}\left(\frac{1.6552048137769264514 3+1.6061972096940594478 9}{2}+1.6682563110759350076 4\right)$$

Open code

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Result:

1.6494786614057139786 5

Open code

1.6494786614057139786 5 $\approx \frac{\pi^2}{6}$ that is equal to ζ (2)

Indeed:

sqrt[6*((((1.6552048137769264514 3 + 1.6061972096940594478 9)/2 + 1.6682563110759350076 4)))/2]

Input interpretation:

$$\sqrt{6\left(\frac{1}{2}\left(\frac{1.6552048137769264514 3+1.6061972096940594478 9}{2}+1.6682563110759350076 4\right)\right)}$$

Open code

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Result:

- More digits

3.14592942839382267537...

3.14592942839382267537

that is a good approximation to π

EQUATION (5.20-5.22)

$$V_{\frac{1}{2}}(b) = \int \frac{dz}{2\pi i} e^{bz} \int_0^\infty \frac{dx'}{x' + z^2} \coth(2\pi\sqrt{x'}) \quad (5.20)$$

$$= \int_0^\infty \frac{dx'}{\sqrt{x'}} \sin(b\sqrt{x'}) \coth(2\pi\sqrt{x'}) \quad (5.21)$$

$$= \tfrac{1}{2} \coth(\tfrac{b}{4}). \quad (5.22)$$

1/2 * coth (36Pi/4)

Input:

$\frac{1}{2} \coth\left(36 \times \frac{\pi}{4}\right)$

Open code

- $\coth(x)$ is the hyperbolic cotangent function

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Exact result:

$\frac{1}{2} \coth(9\pi)$

Decimal approximation:

- More digits

0.500000000000000000000000276201244352235315487572795551755...

Open code

This result is equal to ½ (spin)

Property:

$\frac{1}{2} \coth(9\pi)$ is a transcendental number

Open code

Continued fraction:

- Linear form

$$\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{905137124151326195746761+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{24+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{2+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{1}{2}\coth\left(\frac{36\pi}{4}\right)=\frac{1}{2}+\sum_{k=0}^{\infty}e^{-18(1+k)\pi}$$

Open code

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$$\frac{1}{2}\coth\left(\frac{36\pi}{4}\right)=-\frac{1}{2}-\sum_{k=1}^{\infty}q^{2k}\quad\text{for } q=e^{9\pi}$$

Open code

$$\frac{1}{2}\coth\left(\frac{36\pi}{4}\right)=\frac{1}{18\pi}+\frac{9\sum_{k=1}^{\infty}\frac{1}{81+k^2}}{\pi}$$

Open code

- More information

Integral representation:

$$\frac{1}{2}\coth\left(\frac{36\pi}{4}\right)=-\frac{1}{2}\int_{\frac{i\pi}{2}}^{9\pi}\operatorname{csch}^2(t)\,dt$$

Open code

EQUATION (5.10)

In this expression, two trumpets have been glued together by integrating over the length of their shared geodesic b and the relative twist. The integral over the relative twist gives the factor of b in the measure. In a theory where we sum over neither spin structures nor orientation reversal, the constant c should be one. In a theory where we sum over one but not the other, we have $c = 2$. Finally, in a theory where we sum over both spin structures and orientation reversal, we have $c = 4$.

Another special case is the crosscap spacetime:

$$Z_{\frac{1}{2}}(\beta) = \int_0^\infty \mathrm{d}b\, V_{\frac{1}{2}}(b) Z^T_{(\mathrm{S})\mathrm{JT}}(\beta, b). \tag{5.10}$$

This case is special because when we glue the trumpet to the crosscap, there is only a single modulus involved in the gluing, the size. There is no twist modulus because of the rotational symmetry of the crosscap. The result of this is that the measure factor is simply $\mathrm{d}b$ rather than $b\mathrm{d}b$ as we have in other cases.

(((((((integrate [(((e^(-(36Pi)^2/8)))/(((sqrt(4Pi)))) * 0.500000000000000000000000276201244352235315487572795551755]b))))))

Indefinite integral:

$$\int \frac{1}{\sqrt{4\pi}} e^{-1/8(36\pi)^2}\, 0.500000000000000000000000276201244352235315487572795551755\, b\, db = 2.91977121672842507251214100582797880574071521648765962271 \times 10^{-696} b^2 + \text{constant}$$

Open code

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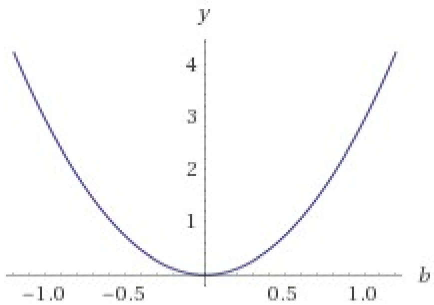
Plot of the integral:



(b from −1.2 to 1.2)

We note that for the precedent equation, we obtain:

(((e^(-(36Pi)^2/8)))/(((2sqrt(2Pi)))) / 2.91977121672842507251214100582797880574071521648765962271×10^-696

Input interpretation:

$$\frac{\frac{e^{-1/8(36\pi)^2}}{2\sqrt{2\pi}}}{\frac{2.91977121672842507251214100582797880574071521648765962271}{10^{696}}}$$

Open code

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Result:

- More digits

2.828427124746190097603377588598921332811372407652085091447...

Series representations:

- More

$$\frac{e^{-1/8(36\pi)^2}}{2.919771216728425072512141005827978805740715216487659622710000\,(2\sqrt{2\pi})} = \frac{1.712462939340312703198002413101943415336321507645311434787146\times 10^{695}\, e^{-162\pi^2}}{10^{696}} \Big/ \left(\sqrt{-1+2\pi}\sum_{k=0}^{\infty}(-1+2\pi)^{-k}\binom{\frac{1}{2}}{k}\right)$$

Open code

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$$\frac{e^{-1/8(36\pi)^2}}{2.919771216728425072512141005827978805740715216487659622710000\,(2\sqrt{2\pi})} = \frac{1.712462939340312703198002413101943415336321507645311434787146\times 10^{695}\, e^{-162\pi^2}}{10^{696}} \Big/ \left(\sqrt{-1+2\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+2\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

Open code

$$\frac{e^{-1/8(36\pi)^2}}{2.919771216728425072512141005827978805740715216487659622710000\,(2\sqrt{2\pi})} = \frac{1.712462939340312703198002413101943415336321507645311434787146\times 10^{695}\, e^{-162\pi^2}}{10^{696}} \Big/ \left(\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2\pi-z_0)^k z_0^{-k}}{k!}\right)$$

for not $((z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0))$

Open code

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\mathbb{R}$ is the set of real numbers
- More information

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(1.1679084866913700290048557571756368949113653949837 07 * 10^-695 / 2.9197712167284250725121410058279788057407152164876596 2271*10^-696)

Input interpretation:

$$1.16790848669137002900485575717563689491136539498370 7\times\frac{1}{\frac{10^{695}\times 2.91977121672842507251214100582797880574071521648765962271}{10^{696}}}$$

Open code

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Result:

- More digits
  3.999999999999999999999999779039004518211747609941885276 0184...

Note that:

(3.9999999999999999999999997790390045182117476099418852760184 / 2.8284271247461900976033758859892133281137240765208509 1447)

Input interpretation:

$$\frac{3.9999999999999999999999997790390045182117476099418852760184}{2.82842712474619009760337588598921332811372407652085091447}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits
  1.4142135623730950488016887242096980785696718753769468640 90...
  Open code
  1.414213562373095048801688724209698078569671875376946864090

Possible closed forms:

- More
  $\sqrt{2}\approx 1.41421356237309504880168872420969807856967187537694 80731$
  Enlarge Data Customize A Plaintext Interactive
  $e^{-1/8\, b_4(2)}\approx 1.41421356237309504880168872420969807856967187537694 80731$
  $1+\frac{1}{1+\sqrt{2}}\approx 1.41421356237309504880168872420969807856967187537694 80731$
- $b_4(2)$ is the Madelung constant $b_4(2)$

And:

(2.8284271247461900976033758859892133281137240765208509 1447 / 3.9999999999999999999999997790390045182117476099418852760184)

Input interpretation:

$$\frac{2.828427124746190097603375885989213328113724076520850914 47}{3.9999999999999999999999779039004518211747609941885276018 4}$$

Open code

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Result:

- More digits

0.707106781186547524400844362104849039284835937688474641131...

Open code

0.707106781186547524400844362104849039284835937688474641131

Possible closed forms:

- More

$e^{b_4(2)/8} \approx 0.70710678118654752440084436210484903928483593768847403658$

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$\frac{1}{\sqrt{2}} \approx 0.70710678118654752440084436210484903928483593768847403658$

$\frac{1}{35}\sqrt{\frac{10902937}{175686}}\,\pi \approx 0.70710678118654755 1971$

- $b_4(2)$ is the Madelung constant $b_4(2)$

This result, as showed above, is equal to 1/√2

((((((((((e^(-(36Pi)^2/8)))/(((2sqrt(2Pi)))) / 2.91977121672842507251214100582797880574071521648765962271×10^-696))))))^(1/(1.4649+0.6942)

Where 1.4649 and 0.6942 are Hausdorff dimensions

Input interpretation:

$$\sqrt[1.4649+0.6942]{\frac{\frac{e^{-1/8(36\pi)^2}}{2\sqrt{2\pi}}}{\frac{2.91977121672842507251214100582797880574071521648765962271}{10^{696}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1.61858588209167252408547464785088764791019539010448994978 3...

This result is a very good approximation to the value of the golden ratio 1,618033988749...

((((((((((e^(-(36Pi)^2/8)))/(((2sqrt(2Pi)))) / 2.919771216728425072512141005827978805740715216487659622271×10^-696))))))^1/(((248-3*13)/100)))

Input interpretation:

$$\sqrt[\frac{1}{100}(248-3\times 13)]{\frac{\frac{e^{-1/8(36\pi)^2}}{2\sqrt{2\pi}}}{\frac{2.919771216728425072512141005827978805740715216487659622271}{10^{696}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.64456194353915197206536108730994798031651081079422607802...

1.644561943539... ≈ ζ (2)

Or:

((((((((((e^(-(36Pi)^2/8)))/(((2sqrt(2Pi)))) / 2.919771216728425072512141005827978805740715216487659622271×10^-696))))))^1/(((233-21-3)/(55+2*21+3)))

Input interpretation:

$$\sqrt[\frac{233-21-3}{55+2\times 21+3}]{\frac{\frac{e^{-1/8(36\pi)^2}}{2\sqrt{2\pi}}}{\frac{2.919771216728425072512141005827978805740715216487659622271}{10^{696}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.64456194353915197206536108730994798031651081079422607802...

1.644561943539... ≈ ζ (2)

((((((((((e^(-(36Pi)^2/8)))/(((2sqrt(2Pi)))) / 2.919771216728425072512141005827978805740715216487659622271×10^-696))))))^1/(2.06)

Where 2.06 is a Hausdorff dimension

Input interpretation:

$$\sqrt[2.06]{\frac{\frac{e^{-1/8(36\pi)^2}}{2\sqrt{2\pi}}}{\frac{2.919771216728425072512141005827978805740715216487659622271}{10^{696}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- Fewer digits
- More digits

1.656519676087239386887005176220310492132554239362666239607...

We note that, the result 1,656519... is practically equal to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164{,}2696$ i.e. 1,65578...

Indeed:

$$\sqrt[14]{\left(\sqrt{\frac{113+\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots \Rightarrow$$

$$\Rightarrow \sqrt[2.06]{\frac{\frac{e^{-1/8(36\pi)^2}}{2\sqrt{2\pi}}}{\frac{2.91977121672842507251214100582797880574071521648765962271}{10^{696}}}}$$

$= 1.656519...$

Note that:

sqrt((((((((((((6*((((((((((e^(-(36Pi)^2/8)))/(((2sqrt(2Pi)))) / 2.91977121672842507251214100582797880574071521648765962271×10^-696))))))^1/(((248-3*13)/100))))))

Input interpretation:

$$\sqrt{6\,\frac{1}{100}(248-3\times13)\sqrt{\frac{\frac{e^{-1/8(36\pi)^2}}{2\sqrt{2\pi}}}{\frac{2.91977121672842507251214100582797880574071521648765962271}{10^{696}}}}}$$

Open code

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Result:
- More digits

3.141237281905795767959322865079460454045876598244757952952...

And

2 * sqrt(((((((((((((6*((((((((((e^(-(36Pi)^2/8)))/(((2sqrt(2Pi)))) / 2.91977121672842507251214100582797880574071521648765962271×10^-696))))))^1/(((248-3*13)/100))))))

Input interpretation:

$$2\sqrt{6^{\frac{1}{100}(248-3\times 13)}\sqrt{\frac{\frac{e^{-1/8(36\pi)^2}}{2\sqrt{2\pi}}}{\frac{2.91977121672842507251214100582797880574071521648765962271}{10^{696}}}}}$$

Open code

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Result:

- More digits

6.282474563811591535918645730158920908091753196489515905904...

6.28247456381159... ≈ 2π

Series representations:

- More

$$2\sqrt{\left(6\left(\frac{e^{-1/8(36\pi)^2}}{\frac{2.91977121672842507251214100582797880574071521648765962271 0000\left(2\sqrt{2\pi}\right)}{10^{696}}}\right)^{\wedge}\left(\frac{1}{\frac{1}{100}(248-3\times 13)}\right)\right)}=2$$

$$\sqrt{\left(-1.000000000000000000000000000000000000000000000000000000000000000000000 + 2.665734467723278774575677912716736930138179273047811753706666\times 10^{333}\left(\frac{e^{-162\pi^2}}{\sqrt{2\pi}}\right)^{100/209}\right)\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}}$$

$$\left(-1.0000000000000000000000000000000000000000000000000000000000000000000000 + 2.66573446772327877457567791271673693013817927304781175370666 6\times 10^{333}\left(\frac{e^{-162\pi^2}}{\sqrt{2\pi}}\right)^{100/209}\right)^{-k}$$

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$$2\sqrt{\left(6\left(\frac{e^{-1/8(36\pi)^2}}{\frac{2.91977121672842507251214100582797880574071521648765962271000\,(2\sqrt{2\pi})}{10^{696}}}\right)^{\wedge}\left(\frac{1}{\frac{1}{100}(248-3\times 13)}\right)\right)} = 2$$

$$\sqrt{\left(-1.00000000000000000000000000000000000000000000000000000000\cdot.\;000 + 2.665734467723278774575677912716736930138179273047811753706\cdot.\;666\times 10^{333}\left(\frac{e^{-162\pi^2}}{\sqrt{2\pi}}\right)^{100/209}\right)}\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^k\left(-\frac{1}{2}\right)_k$$

$$\left(-1.00000000000000000000000000000000000000000000000000000000\cdot.\;0000 + 2.665734467723278774575677912716736930138179273047811 7\cdot.\;53706666\times 10^{333}\left(\frac{e^{-162\pi^2}}{\sqrt{2\pi}}\right)^{100/209}\right)^{-k}$$

$$2\sqrt{\left(6\left(\frac{e^{-1/8(36\pi)^2}}{\frac{2.91977121672842507251214100582797880574071521648765962271000\,(2\sqrt{2\pi})}{10^{696}}}\right)^{\wedge}\left(\frac{1}{\frac{1}{100}(248-3\times 13)}\right)\right)} = 2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^k\left(-\frac{1}{2}\right)_k$$

$$\left(2.665734467723278774575677912716736930138179273047811 75370\cdot.\;6666\times 10^{333}\left(\frac{e^{-162\pi^2}}{\sqrt{2\pi}}\right)^{100/209} - 1.0000000000000000000000000000000000000000000000000000\cdot.\;00000000000\,z_0\right)^k z_0^{-k}$$

for not $((z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0))$

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\mathbb{R}$ is the set of real numbers

For b = 36π, from the eq. (5.10), we obtain:

(((2.9197712167284250725121410058279788057407152164876596227 1×10^-696 (36Pi)^2))

Input interpretation:

$$\frac{2.9197712167284250725121410058279788057407152164876596 2271}{10^{696}}(36\,\pi)^2$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$3.734681495863277675035254515099808631087129273782780\ldots \times 10^{-692}$

27*9+27+ln(((2.9197712167284250725121410058279788057407152164876596227 1×10^-696 (36Pi)^2))

Input interpretation:

$$27\times9+27+\log\left(\frac{2.9197712167284250725121410058279788057407152164876596 2271}{10^{696}}(36\,\pi)^2\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

$-1322.071221812469611914974187331356127762212268412838 42253\ldots$

This result is very near to the rest mass of Xi baryion 1321.71±0.07 with minus sign

Series representations:

- More

$$27\times9+27+\log\left(\frac{1}{10^{696}}(36\,\pi)^2\,2.91977121672842507251214100582797880574071521648765962 2710000\right)=270-\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1+3.78402349688003889397573474355306053223996692056800 68\ldots 71032160\times10^{-693}\,\pi^2\right)^k$$

Open code

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$$27\times 9+27+\log\left(\frac{1}{10^{696}}(36\pi)^2\ 2.91977121672842507251214100582797880574071521648765962271000\right) = 270+2i\pi\left\lfloor\frac{1}{2\pi}\arg\left(3.7840234968800388939757347435530605322399669205680068710\cdot 32160\times 10^{-693}\pi^2 - 1.00000000000000000000000000000000000000000000000000000000\cdot 000000\,x\right)\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{1}{k}(-1)^k \left(3.7840234968800388939757347435530605322399669205680068710\cdot 32160\times 10^{-693}\pi^2 - 1.000000000000000000000000000000000000000000000000000000000\cdot 0000000000\,x\right)^k x^{-k} \quad \text{for } x<0$$

Open code

$$27\times 9+27+\log\left(\frac{1}{10^{696}}(36\pi)^2\ 2.91977121672842507251214100582797880574071521648765962271000\right) = 270+\left\lfloor\frac{1}{2\pi}\arg\left(3.78402349688003889397573474355306053223996692056800687103 2\cdot 160\times 10^{-693}\pi^2 - 1.000000000000000000000000000000000000000000000000000000000\cdot 00000\,z_0\right)\right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor\frac{1}{2\pi}\arg\left(3.78402349688003889397573474355306053223996692056800687103 2\cdot 160\times 10^{-693}\pi^2 - 1.000000000000000000000000000000000000000000000000000000000\cdot 00000\,z_0\right)\right\rfloor \log(z_0) - \sum_{k=1}^{\infty}\frac{1}{k}(-1)^k \left(3.784023496880038893975734743553060532239966920568006871032 1\cdot 60\times 10^{-693}\pi^2 - 1.000000000000000000000000000000000000000000000000000000000\cdot 00000000\,z_0\right)^k z_0^{-k}$$

Integral representation:

$$27\times 9+27+\log\left(\frac{1}{10^{696}}(36\pi)^2\ 2.91977121672842507251214100582797880574071521648765962271000 0\right) = 270+\int_1^{3.784023496880038893975734743553060532239966920568006871032160\times 10^{-693}\pi^2}\frac{1}{t}\,dt$$

27*3-ln(((2.91977121672842507251214100582797880574071521648765962271×10^-696 (36Pi)^2))

Input interpretation:

$$27\times 3-\log\left(\frac{2.91977121672842507251214100582797880574071521648765962271}{10^{696}}\,(36\,\pi)^2\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

1673.071221812469611914974187331356127762212268412838422531...

This result is very near to the rest mass of Omega baryion 1672.45±0.29

Series representations:

- More

$$27\times 3-\log\left(\frac{1}{10^{696}}(36\,\pi)^2\ 2.919771216728425072512141005827978805740715216487659622710000\right)=81+\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1+3.784023496880038893975734743553060532239966920568006871032160\times 10^{-693}\,\pi^2\right)^k$$

Open code

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$$27\times 3-\log\left(\frac{1}{10^{696}}(36\,\pi)^2\ 2.919771216728425072512141005827978805740715216487659622710000\right)=81-2\,i\,\pi\left\lfloor\frac{1}{2\,\pi}\arg\left(3.784023496880038893975734743553060532239966920568006871032160\times 10^{-693}\,\pi^2-1.000000000000000000000000000000000000000000000000000000000000\,x\right)\right\rfloor-\log(x)+\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(3.784023496880038893975734743553060532239966920568006871032160\times 10^{-693}\,\pi^2-1.000000000000000000000000000000000000000000000000000000000000\,x\right)^k x^{-k}\quad \text{for } x<0$$

Open code

$$27\times 3-\log\left(\frac{1}{10^{696}}(36\pi)^2\ 2.9197712167284250725121410058279788057407152164876596227100000\right)=81-\left\lfloor\frac{1}{2\pi}\arg\left(3.7840234968800388939757347435530605322399669205680068710321\cdot.160\times 10^{-693}\pi^2-1.00000000000000000000000000000000000000000000000000\cdot.00000\, z_0\right)\right\rfloor\log\left(\frac{1}{z_0}\right)-\log(z_0)-\left\lfloor\frac{1}{2\pi}\arg\left(3.7840234968800388939757347435530605322399669205680068710321\cdot.160\times 10^{-693}\pi^2-1.00000000000000000000000000000000000000000000000000\cdot.00000\, z_0\right)\right\rfloor\log(z_0)+\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(3.78402349688003888939757347435530605322399669205680068710321\cdot.60\times 10^{-693}\pi^2-1.00000000000000000000000000000000000000000000000000\cdot.00000000\, z_0\right)^k z_0^{-k}$$

Integral representation:

$$27\times 3-\log\left(\frac{1}{10^{696}}(36\pi)^2\ 2.9197712167284250725121410058279788057407152164876596227100000\right)=81-\int_1^{3.7840234968800388939757347435530605322399669205680068710321 60\times 10^{-693}\pi^2}\frac{1}{t}\,dt$$

1/10 ((((27*9+ln(((2.9197712167284250725121410058279788057407152164876596227 1×10^-696 (36Pi)^2))))))

Input interpretation:

$$\frac{1}{10}\left(27\times 9+\log\left(\frac{2.919771216728425072512141005827978805740715216487659622 71}{10^{696}}(36\pi)^2\right)\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

$-134.907122181246961191497418733135612776221226841283842253\ldots$

This result is practically equal to the rest mass of Pion 134.9766±0.0006 with minus sign

Series representations:

- More

$$\frac{1}{10}\left(27\times 9+\log\left(\frac{1}{10^{696}}\, 2.9197712167284250725121410058279788057407152164876596227100\cdot 000\,(36\,\pi)^2\right)\right)=\frac{243}{10}-\frac{1}{10}\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1+3.7840234968800388939757347435530605322399669205680006871032160\times 10^{-693}\,\pi^2\right)^k$$

Open code

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$$\frac{1}{10}\left(27\times 9+\log\left(\frac{1}{10^{696}}\, 2.919771216728425072512141005827978805740715216487659622710000\,(36\,\pi)^2\right)\right)=\frac{243}{10}+\frac{1}{5}\,i\,\pi\left\lfloor\frac{1}{2\,\pi}\arg\left(3.7840234968800388939757347435530605322399669205680068710\cdot 32160\times 10^{-693}\,\pi^2-1.0000000000000000000000000000000000000000000000000\cdot 000000\,x\right)\right\rfloor+\frac{\log(x)}{10}-\frac{1}{10}\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(3.7840234968800388939757347435530605322399669205680068710\cdot 32160\times 10^{-693}\,\pi^2-1.000000000000000000000000000000000000000000000000\cdot 00000000000\,x\right)^k x^{-k}\quad \text{for } x<0$$

Open code

$$\frac{1}{10}\left(27\times 9+\log\left(\frac{1}{10^{696}}2.91977121672842507251214100582797880574071521648765962271\text{:}000\,(36\pi)^2\right)\right)=\frac{243}{10}+\frac{1}{10}\left\lfloor\frac{1}{2\pi}\arg\left(3.78402349688003889397573474355306053223996692056800687103\text{:}2160\times 10^{-693}\pi^2-1.0000000000000000000000000000000000000000000000000\text{:}00000\,z_0\right)\right\rfloor\log\left(\frac{1}{z_0}\right)+\frac{\log(z_0)}{10}+\frac{1}{10}\left\lfloor\frac{1}{2\pi}\arg\left(3.78402349688003889397573474355306053223996692056800687103\text{:}2160\times 10^{-693}\pi^2-1.0000000000000000000000000000000000000000000000000\text{:}00000\,z_0\right)\right\rfloor\log(z_0)-\frac{1}{10}\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(3.78402349688003889397573474355306053223996692056800687103\text{:}2160\times 10^{-693}\pi^2-1.0000000000000000000000000000000000000000000000000\text{:}0000000000\,z_0\right)^k z_0^{-k}$$

Integral representation:

$$\frac{1}{10}\left(27\times 9+\log\left(\frac{1}{10^{696}}2.91977121672842507251214100582797880574071521648765962271\text{:}000\,(36\pi)^2\right)\right)=\frac{243}{10}+\frac{1}{10}\int_1^{3.784023496880038893975734743553060532239966920568006871032160\times 10^{-693}\pi^2}\frac{1}{t}\,dt$$

Open code

((((729+27*3+ln(((2.91977121672842507251214100582797880574071521648765962271×10^-696 (36Pi)^2))))))

Input interpretation:

$$729+27\times 3+\log\left(\frac{2.91977121672842507251214100582797880574071521648765962271}{10^{696}}(36\pi)^2\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

−782.071221812469611914974187331356127762212268412838422531...

This result is very near to the rest mass of Omega meson 782.65±0.12 with minus sign

Series representations:

- More

$$729+27\times 3+\log\left(\frac{1}{10^{696}}(36\pi)^2\, 2.919771216728425072512141005827978805740715216487659622710000\right)=810-\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1+3.78402349688003889397573474355306053223996692056800687103216 0\times 10^{-693}\pi^2\right)^k$$

Open code

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$$729+27\times 3+\log\left(\frac{1}{10^{696}}(36\pi)^2\, 2.919771216728425072512141005827978805740715216487659622710000\right)=810+2i\pi\left\lfloor\frac{1}{2\pi}\arg\left(3.784023496880038893975734743553060532239966920568006871032160\times 10^{-693}\pi^2-1.0000000000000000000000000000000000000000000000000000000000\, x\right)\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(3.784023496880038893975734743553060532239966920568006871032160\times 10^{-693}\pi^2-1.0000000000000000000000000000000000000000000000000000000000\, x\right)^k x^{-k}\quad \text{for } x<0$$

Open code

$$729+27\times 3+\log\left(\frac{1}{10^{696}}(36\pi)^2\right.$$
$$2.91977121672842507251214100582797880574071521648765962271 0000$$
$$\left.\right) = 810 + \left\lfloor \frac{1}{2\pi}\arg\left(\right.\right.$$
$$3.7840234968800388939757347435530605322399669205680068710321\cdot\!\cdot$$
$$60\times 10^{-693}\pi^2 -$$
$$1.00000000000000000000000000000000000000000000000000\cdot\!\cdot$$
$$\left.\left.00000\, z_0\right)\right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{1}{2\pi}\arg\left(\right.\right.$$
$$3.7840234968800388939757347435530605322399669205680068710321\cdot\!\cdot$$
$$60\times 10^{-693}\pi^2 -$$
$$1.00000000000000000000000000000000000000000000000000\cdot\!\cdot$$
$$\left.\left.00000\, z_0\right)\right\rfloor \log(z_0) - \sum_{k=1}^{\infty}\frac{1}{k}(-1)^k$$
$$\left(3.7840234968800388939757347435530605322399669205680068710321\cdot\!\cdot\right.$$
$$60\times 10^{-693}\pi^2 -$$
$$1.00000000000000000000000000000000000000000000000000\cdot\!\cdot$$
$$\left.00000000\, z_0\right)^k z_0^{-k}$$

Integral representation:

$$729+27\times 3+\log\left(\frac{1}{10^{696}}(36\pi)^2\right.$$
$$2.91977121672842507251214100582797880574071521648765962271 0000$$
$$\left.\right) = 810 +$$
$$\int_1^{3.78402349688003889397573474355306053223996692056800687103216 0\times 10^{-693}\pi^2}\frac{1}{t}\,dt$$

Open code

((((24^2-3+ln(((2.91977121672842507251214100582797880574071521648765962271×10^-696 (36Pi)^2))))))

Input interpretation:

$$24^2-3+\log\left(\frac{2.91977121672842507251214100582797880574071521648765962271}{10^{696}}(36\pi)^2\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

$$-1019.071221812469611914974187331356127762212268412838 42253\ldots$$

This result is very near to the rest mass of Phi meson 1019.445±0.020

Series representations:

- More

$$24^2 - 3 + \log\left(\frac{1}{10^{696}} (36\pi)^2 \, 2.9197712167284250725121410058279788057407152164876596227100000\right) = 573 - \sum_{k=1}^{\infty} \frac{1}{k} (-1)^k \left(-1 + 3.78402349688003889397573474355306053223996692056800687 10032160 \times 10^{-693} \pi^2\right)^k$$

Open code

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$$24^2 - 3 + \log\left(\frac{1}{10^{696}} (36\pi)^2 \, 2.9197712167284250725121410058279788057407152164876596227100 00\right) = 573 + 2 i \pi \left\lfloor \frac{1}{2\pi} \arg\left(3.7840234968800388939757347435530605322399669205680068710 32160 \times 10^{-693} \pi^2 - 1.000000000000000000000000000000000000000000000000000000 000000 x\right)\right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{1}{k} (-1)^k \left(3.78402349688003889397573474355306053223996692056800687103 2160 \times 10^{-693} \pi^2 - 1.00000000000000000000000000000000000000000000000000 0000000000 x\right)^k x^{-k} \quad \text{for } x < 0$$

Open code

$$24^2 - 3 + \log\left(\frac{1}{10^{696}} (36\pi)^2 \right.$$
$$2.919771216728425072512141005827978805740715216487659622710000$$
$$\left.\right) = 573 + \left\lfloor \frac{1}{2\pi} \arg\left(\right.\right.$$
$$3.784023496880038893975734743553060532239966920568006871032\text{⋱}$$
$$160 \times 10^{-693} \pi^2 -$$
$$1.00000000000000000000000000000000000000000000000000000\text{⋱}$$
$$\left.\left.00000\, z_0\right)\right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{1}{2\pi} \arg\left(\right.\right.$$
$$3.784023496880038893975734743553060532239966920568006871032\text{⋱}$$
$$160 \times 10^{-693} \pi^2 -$$
$$1.00000000000000000000000000000000000000000000000000000\text{⋱}$$
$$\left.\left.00000\, z_0\right)\right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{1}{k} (-1)^k$$
$$\left(3.7840234968800388939757347435530605322399669205680068710321\text{⋱}\right.$$
$$60 \times 10^{-693} \pi^2 -$$
$$1.00000000000000000000000000000000000000000000000000000\text{⋱}$$
$$\left.00000000\, z_0\right)^k z_0^{-k}$$

Integral representation:

$$24^2 - 3 + \log\left(\frac{1}{10^{696}} (36\pi)^2 \right.$$
$$2.919771216728425072512141005827978805740715216487659622710000$$
$$\left.\right) = 573 +$$
$$\int_1^{3.784023496880038893975734743553060532239966920568006871032160\times10^{-693}\pi^2} \frac{1}{t}\, dt$$

In conclusion of eq. (5.10), we obtain:

((((729-27*6-2*351+ln(((2.919771216728425×10^-696 (36Pi)^2))))))

Input interpretation:

$$729 - 27\times6 - 2\times351 + \log\left(\frac{2.919771216728425}{10^{696}} (36\pi)^2\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

−1727.071221812469612...

mass of candidate glueball $f_0(1710)$ meson and very near to the Hardy-Ramanujan number with minus sign

Series representations:

- More

$$729 - 27 \times 6 - 2 \times 351 + \log\left(\frac{(36\pi)^2\ 2.9197712167284250000}{10^{696}}\right) = -135 - \sum_{k=1}^{\infty} \frac{(-1)^k \left(-1 + 3.7840234968800388000 \times 10^{-693}\ \pi^2\right)^k}{k}$$

Open code

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$$729 - 27 \times 6 - 2 \times 351 + \log\left(\frac{(36\pi)^2\ 2.9197712167284250000}{10^{696}}\right) = -135 + 2 i \pi \left\lfloor \frac{\arg(3.7840234968800388000 \times 10^{-693}\ \pi^2 - 1.0000000000000000000\, x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{1}{k} (-1)^k \left(3.7840234968800388000 \times 10^{-693}\ \pi^2 - 1.0000000000000000000\, x\right)^k x^{-k} \quad \text{for } x < 0$$

Open code

$$729 - 27 \times 6 - 2 \times 351 + \log\left(\frac{(36\pi)^2\ 2.9197712167284250000}{10^{696}}\right) = -135 + \left\lfloor \frac{\arg(3.7840234968800388000 \times 10^{-693}\ \pi^2 - 1.0000000000000000000\, z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(3.7840234968800388000 \times 10^{-693}\ \pi^2 - 1.0000000000000000000\, z_0)}{2\pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{1}{k} (-1)^k \left(3.7840234968800388000 \times 10^{-693}\ \pi^2 - 1.0000000000000000000\, z_0\right)^k z_0^{-k}$$

Integral representation:

$$729 - 27 \times 6 - 2 \times 351 + \log\left(\frac{(36\pi)^2\ 2.9197712167284250000}{10^{696}}\right) = -135 + \int_1^{3.7840234968800388000 \times 10^{-693}\ \pi^2} \frac{1}{t}\, dt$$

-((((-134.9766+ln(((2.919771216728425×10^-696 (36Pi)^2))))))

Input interpretation:

$$-\left(-134.9766 + \log\left(\frac{2.919771216728425}{10^{696}} (36\pi)^2\right)\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

1727.0478...

mass of candidate glueball $f_0(1710)$ meson and very near to the Hardy-Ramanujan number

Series representations:

- More

$$-\left(-134.977+\log\left(\frac{(36\pi)^2\, 2.9197712167284250000}{10^{696}}\right)\right)= 134.977+\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+3.7840234968800388000\times 10^{-693}\,\pi^2\right)^k}{k}$$

Open code

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$$-\left(-134.977+\log\left(\frac{(36\pi)^2\, 2.9197712167284250000}{10^{696}}\right)\right)= 134.977-2 i\pi \left\lfloor\frac{\arg(3.7840234968800388000\times 10^{-693}\,\pi^2-1.0000000000000000000\,x)}{2\pi}\right\rfloor - \log(x)+\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(3.7840234968800388000\times 10^{-693}\,\pi^2-1.0000000000000000000\,x\right)^k x^{-k} \quad \text{for } x<0$$

Open code

$$-\left(-134.977+\log\left(\frac{(36\pi)^2\, 2.9197712167284250000}{10^{696}}\right)\right)= 134.977-\left\lfloor\frac{\arg(3.7840234968800388000\times 10^{-693}\,\pi^2-1.0000000000000000000\,z_0)}{2\pi}\right\rfloor \log\left(\frac{1}{z_0}\right)-\log(z_0)-\left\lfloor\frac{\arg(3.7840234968800388000\times 10^{-693}\,\pi^2-1.0000000000000000000\,z_0)}{2\pi}\right\rfloor \log(z_0)+\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(3.7840234968800388000\times 10^{-693}\,\pi^2-1.0000000000000000000\,z_0\right)^k z_0^{-k}$$

Integral representation:

$$-\left(-134.977+\log\left(\frac{(36\,\pi)^2\;2.9197712167284250000}{10^{696}}\right)\right)=$$
$$134.977-\int_1^{3.7840234968800388000\times10^{-693}\,\pi^2}\frac{1}{t}\,dt$$

-((((-137.03599917435+ln(((2.919771216728425×10^-696 (36Pi)^2))))))

Where 137,035999... is the reciprocal of the Fine-Structure Constant

Input interpretation:

$$-\left(-137.03599917435+\log\left(\frac{2.919771216728425}{10^{696}}\;(36\,\pi)^2\right)\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

1729.10722098682...

This result is practically equal to the Hardy-Ramanujan number 1729

Series representations:

- More

$$-\left(-137.035999174350000+\log\left(\frac{(36\,\pi)^2\;2.9197712167284250000}{10^{696}}\right)\right)=$$
$$137.035999174350000+\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+3.7840234968800388000\times10^{-693}\,\pi^2\right)^k}{k}$$

Open code

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$$-\left(-137.035999174350000+\log\left(\frac{(36\,\pi)^2\;2.9197712167284250000}{10^{696}}\right)\right)=$$
$$137.035999174350000-2\,i\,\pi\left\lfloor\frac{\arg(3.7840234968800388000\times10^{-693}\,\pi^2-1.0000000000000000000\,x)}{2\,\pi}\right\rfloor-$$
$$\log(x)+\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(3.7840234968800388000\times10^{-693}\,\pi^2-1.0000000000000000000\,x\right)^k x^{-k}\quad\text{for } x<0$$

Open code

$$-\left(-137.035999174350000 + \log\left(\frac{(36\,\pi)^2\, 2.9197712167284250000}{10^{696}}\right)\right) =$$

$$137.035999174350000 - \left\lfloor \frac{\arg(3.7840234968800388000 \times 10^{-693}\,\pi^2 - 1.0000000000000000000\, z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) - \log(z_0) - \left\lfloor \frac{\arg(3.7840234968800388000 \times 10^{-693}\,\pi^2 - 1.0000000000000000000\, z_0)}{2\pi} \right\rfloor \log(z_0) + \sum_{k=1}^{\infty} \frac{1}{k} (-1)^k \left(3.7840234968800388000 \times 10^{-693}\,\pi^2 - 1.0000000000000000000\, z_0\right)^k z_0^{-k}$$

Integral representation:

$$-\left(-137.035999174350000 + \log\left(\frac{(36\,\pi)^2\, 2.9197712167284250000}{10^{696}}\right)\right) =$$

$$137.035999174350000 - \int_1^{3.7840234968800388000 \times 10^{-693}\,\pi^2} \frac{1}{t}\, dt$$

EQUATION (5.11)

All other $Z_g(\beta_1, \ldots \beta_n)$ are given by the generic formula[55]

$$Z_g(\beta_1, \ldots, \beta_n) = c_n \int_0^{\infty} \prod_{j=1}^{n} \left[b_j \mathrm{d}b_j Z^T_{(\mathrm{S})\mathrm{JT}}(\beta_j, b_j) \right] V_g(b_1, \ldots b_n). \qquad (5.11)$$

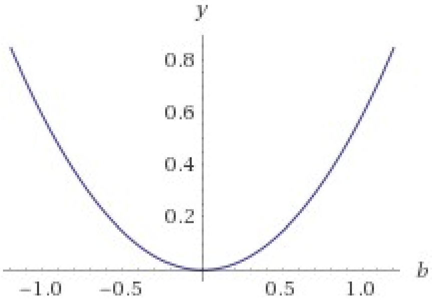
The volumes $V_g(b_1, \ldots, b_n)$ are computed using the torsion as described in section 3.4.7 and section 3.5.3. We define them to also include the sum over spin structures (if present) holding fixed the NS spin structure on the boundaries.[56] The constant c_n should be one in a theory where we do not gauge orientation reversal, and it should be 2^{n-1} in a theory where we do. This accounts for the possibility of gluing the n trumpets in with independent orientation-reversals, up to an overall orientation reversal.

2(((((((integrate [(((e^(-(36Pi)^2/8)))/(((sqrt(4Pi)))) * 0.500000000000000000000000276201244352235315487572795551755]b))))))

Input interpretation:

$$2 \int \frac{e^{-1/8\,(36\pi)^2}}{\sqrt{4\pi}} \times 0.500000000000000000000000276201244352235315487572795551755\, b\, db$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:
$5.8395424334568501450242820116559576114814304329753192454 3\times 10^{-696}\, b^2$
Plot:


(b from -1.2 to 1.2)
Open code

Now, we note that for the eq. (5.4)

$$Z_{\mathrm{JT}}^{T}(\beta, b) = \frac{1}{2\sqrt{\pi\beta}} e^{-\frac{b^2}{4\beta}}$$

(((e^(-(36Pi)^2/8)))/(((2sqrt(2Pi))))

Input:
$$\frac{e^{-1/8\,(36\pi)^2}}{2\sqrt{2\pi}}$$
Open code

Enlarge Data Customize A Plaintext Interactive
Exact result:
$$\frac{e^{-162\pi^2}}{2\sqrt{2\pi}}$$
Decimal approximation:
- More digits

$8.2583601074478643860851175124908807484844080759320 61\ldots \times 10^{-696}$
Open code

We have that:

(8.25836010744786438608511751249088074848440807593206 1 × 10^-696 / 5.83954243345685014502428201165595761148143043297531924543×10^-696)

Input interpretation:
$$\frac{\frac{8.258360107447864386085117512490880748484408075932061}{10^{696}}}{\frac{5.83954243345685014502428201165595761148143043297531924543}{10^{696}}}$$
Open code

Enlarge Data Customize A Plaintext Interactive

Result:
- More digits
  1.414213562373095048801687942994606664056862038260425368281...
  Open code

1.414213562373095048801687942994606664056862038260425368281

Possible closed forms:
- More
  $\sqrt{2} \approx 1.41421356237309504880168872 42$
  Enlarge Data Customize A Plaintext Interactive
  $e^{-1/8\, b_4(2)} \approx 1.41421356237309504880168872 42$
  $1 + \frac{1}{1+\sqrt{2}} \approx 1.41421356237309504880168872 42$

And:

(5.83954243345685014502428201165595761148143043297531924543×10^-696 / 8.25836010744786438608511751249088074848440807593206 1 × 10^-696)

Input interpretation:
$$\frac{\frac{5.83954243345685014502428201165595761148143043297531924543}{10^{696}}}{\frac{8.258360107447864386085117512490880748484408075932061}{10^{696}}}$$
Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits
  0.7071067811865475244008447527123947465412408562469511 61616...
  Open code

0.70710678118654752440084475271239474654124085624695116 1616

This result is equal to 1/√2

Possible closed forms:
- More
  $e^{b_4(2)/8} \approx 0.70710678118654752440084436210$
  Enlarge Data Customize A Plaintext Interactive
  $\frac{1}{\sqrt{2}} \approx 0.70710678118654752440084436210$
  $\frac{1}{35}\sqrt{\frac{10902937}{175686}}\,\pi \approx 0.70710678118654755197 1$
- $b_4(2)$ is the Madelung constant $b_4(2)$

Thence, we observe that:

((1/(sqrt(2))) * (sqrt(2))

Input:

$\frac{1}{\sqrt{2}}\sqrt{2}$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Step-by-step solution

  1

And

(1.414213562373095048801687942994606664056862038260425368281/0.707106781186547524400844752712394746541240856246951161616)

Input interpretation:

$$\frac{1.414213562373095048801687942994606664056862038260425368281}{0.707106781186547524400844752712394746541240856246951161616}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

  1.999999999999999999999997790390045182117476099419466225417...

Open code

1.999999999999999999999997790390045182117476099419466225417

Possible closed forms:

- More

  $2 \approx 2.000$

Enlarge Data Customize A Plaintext Interactive

$e^{-1/4\,b_4(2)} \approx 2.000$

$\frac{20\,\mathcal{W}_{\text{Wad}}}{3} \approx 2.000$

And

(0.707106781186547524400844752712394746541240856246951161616/1.414213562373095048801687942994606664056862038260425368281)

Input interpretation:

$$\frac{0.707106781186547524400844752712394746541240856246951161616}{1.414213562373095048801687942994606664056862038260425368281}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

  0.500000000000000000000000552402488704470630975145743740664...

0.500000000000000000000000552402488704470630975145743740664

Possible closed forms:

- More

$\frac{1}{2} \approx 0.50000000000000000000000000000000$

Enlarge Data Customize A Plaintext Interactive

$e^{b_4(2)/4} \approx 0.50000000000000000000000000000000$

$\frac{5\,\mathcal{W}_{\text{Wad}}}{3} \approx 0.50000000000000000000000000000000$

Practically, we obtain three spin: 1, 2 and 1/2 where 1 is the spin of the photon (gauge boson), 2 is the spin of the graviton (also gauge boson) and 1/2 is the spin of the electron (fermion, elementary particle)

(((((exp((((5.83954243345685014502428201165595761148143043297531924543×10^-696 / 8.258360107447864386085117512490880748484408075932061 × 10^-696))))))^4

Input interpretation:

$$\exp^4\left(\frac{\frac{5.83954243345685014502428201165595761148143043297531924543}{10^{696}}}{\frac{8.258360107447864386085117512490880748484408075932061}{10^{696}}}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

16.91882867855789669653467571711574197533238861942828...

From:

$$\begin{aligned} Z_{24}(\tau) &= j(\tau) - 744 \\ &= q^{-1} + 196884\,q + 21493760\,q^2 + 864299970\,q^3 + 20245856256\,q^4 + \ldots \end{aligned}$$

If we calculate ln (21493760), we obtain: 16,883273218414131766382885477742, a black hole entropy very near to above result obtained.

(((((exp((((5.83954243345685014502428201165595761148143043297531924543×10^-696 / 8.258360107447864386085117512490880748484408075932061 × 10^-696))))))^1/9

Input interpretation:

$$\sqrt[9]{\exp\left(\frac{\frac{5.83954243345685014502428201165595761148143043297531924543}{10^{696}}}{\frac{8.2583601074478643860851175124908807484844080759320 61}{10^{696}}}\right)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.08173628350667842343511562520329019259771484444402788...

1.08173628350667842343511562520329019259771484444402788

This result is very near to the value of the Ramanujan mock theta function, equal to 1,08185

Furthermore, we have also:

((((((((((exp((((5.83954243345685014502428201165595761148143043297531924543×10^-696 / 8.25836010744786438608511751249088074848440807593 2061 × 10^-696))))))^1/9))))))))^6

Input interpretation:

$$\sqrt[9]{\exp\left(\frac{\frac{5.83954243345685014502428201165595761148143043297531924543}{10^{696}}}{\frac{8.2583601074478643860851175124908807484844080759320 61}{10^{696}}}\right)}^{6}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.60224299720356015099517818946081526806037358174233 0...

1.602242997203560150995178189460815268060373581742330

This result is a golden number very near to the electric charge of positron

((((((((((exp((((5.83954243345685014502428201165595761148143043297531924543×10^-696 / 8.25836010744786438608511751249088074848440807593 2061 × 10^-696))))))^1/9))))))))^((((Pi+ln(Pi)+ln(2Pi)))

Input interpretation:

$$\sqrt[9]{\exp\left(\frac{\frac{5.83954243345685014502428201165595761148143043297531924543}{10^{696}}}{\frac{8.2583601074478643860851175124908807484844080759320 61}{10^{696}}}\right)}^{\pi+\log(\pi)+\log(2\pi)}$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.6179542836799114755038413881665979476650321782742 48...

$$1.61795428367991147550384138816659794766503217827424 8 \approx \phi = \frac{1+\sqrt{5}}{2}$$

Series representations:

- More

$$\exp\left(5.83954243345685014502428201165595761148143043297531924543 0000 \Big/ \frac{1}{10^{696}} 8.258360107447864386085117512490880748484408075932061 0000 \times 10^{696}\right) \wedge (1/9)^{\pi+\log(\pi)+\log(2\pi)} =$$

$$\exp^{\frac{1}{9}\left(\pi+\log(-1+\pi)+\log(-1+2\pi)+\sum_{k=1}^{\infty}\frac{(-1)^k\left(-(-1+\pi)^{-k}-(-1+2\pi)^{-k}\right)}{k}\right)}(0.70710678118654752440084475271239474654124085624695116162)$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\exp\left(5.83954243345685014502428201165595761148143043297531924543 0000 \Big/ \frac{1}{10^{696}} 8.25836010744786438608511751249088074848440807593206 1000 0 \times 10^{696}\right) \wedge (1/9)^{\pi+\log(\pi)+\log(2\pi)} =$$

$$\exp^{\frac{1}{9}\left(\pi+2 i \pi\left\lfloor\frac{\arg(\pi-x)}{2\pi}\right\rfloor+2 i \pi\left\lfloor\frac{\arg(2\pi-x)}{2\pi}\right\rfloor+2\log(x)+\sum_{k=1}^{\infty}\frac{(-1)^{1+k}\left((\pi-x)^k+(2\pi-x)^k\right)x^{-k}}{k}\right)}(0.70710678118654752440084475271239474654124085624695116162) \text{ for } x < 0$$

Open code

$$\exp\left(5.83954243345685014502428201165595761148143043297531924543 0000 \Big/ \frac{1}{10^{696}} 8.258360107447864386085117512490880748484408075932061 0000 \times 10^{696}\right) \wedge (1/9)^{\pi+\log(\pi)+\log(2\pi)} =$$

$$\exp^{\frac{1}{9}\left(\pi+2\log(z_0)+\left\lfloor\frac{\arg(\pi-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)+\left\lfloor\frac{\arg(2\pi-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)+\sum_{k=1}^{\infty}\frac{(-1)^{1+k}\left((\pi-z_0)^k+(2\pi-z_0)^k\right)z_0^{-k}}{k}\right)}(0.70710678118654752440084475271239474654124085624695116162)$$

Integral representations:

$$\exp\left(5.8395424334568501450242820116559576114814304329753192454300000 / \frac{1}{10^{696}} 8.2583601074478643860851175124908807484844080759320610000 \times 10^{696}\right) \wedge (1/9)^{\pi+\log(\pi)+\log(2\pi)} = \exp^{\frac{1}{9}\left(\pi+\int_1^{\pi} \frac{\pi+2t-4\pi t}{t(\pi+t-2\pi t)}\,dt\right)}(0.70710678118654752440084475271239474654124085624695116162)$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\exp\left(5.8395424334568501450242820116559576114814304329753192454300000 / \frac{1}{10^{696}} 8.2583601074478643860851175124908807484844080759320610000 \times 10^{696}\right) \wedge (1/9)^{\pi+\log(\pi)+\log(2\pi)} = \exp^{\frac{2i\pi^2+\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{((-1+\pi)^{-s}+(-1+2\pi)^{-s})\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}{18 i\pi}}(0.70710678118654752440084475271239474654124085624695116162)$$

for $-1 < \gamma < 0$

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{20+\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

We have, with the Ramanujan's mock theta function 0.0814135:

0.0814135/((((((5.83954243345685014502428201165595761148143043297531924543×10^-696 / 8.258360107447864386085117512490880748484408075932061 × 10^-696))))))^27 - 5

Input interpretation:

$$\frac{0.0814135}{\left(\frac{\frac{5.83954243345685014502428201165595761148143043297531924543}{10^{696}}}{\frac{8.258360107447864386085117512490880748484408075932061}{10^{696}}}\right)^{27}} - 5$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits
  938.1947334472660890059945386734833080958042278953818758628...

Result very near to the rest mass of the proton 938.272

And:

0.0814135^2/((((((5.83954243345685014502428201165595761148143043297531924543×10^-696 / 8.258360107447864386085117512490880748484408075932061 × 10^-696))))))^30 - 26*3

Input interpretation:

$$\frac{0.0814135^2}{\left(\frac{\frac{5.83954243345685014502428201165595761148143043297531924543}{10^{696}}}{\frac{8.258360107447864386085117512490880748484408075932061}{10^{696}}}\right)^{30}} - 26\times 3$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits
  139.1914807623679999999964006865650437628159997634134953185...

Result that is practically equal to the rest mass of the Pion 139.570

[0.0814135^2/((((((5.83954243345685014502428201165595761148143043297531924543×10^-696 / 8.258360107447864386085117512490880748484408075932061 × 10^-696))))))^36]^1/15

Input interpretation:

$$\sqrt[15]{\left(\frac{0.0814135^2}{\frac{\frac{5.8395424334568501450242820116559576114814304329753192454 3}{10^{696}}}{\frac{8.2583601074478643860851175124908807484844080759320 61}{10^{696}}}}\right)^{36}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.644355...

1.644355... ≈ ζ (2)

2*sqrt(((((((((6*[0.0814135^2/((((((5.83954243345685014502428201165595761148 1430432975319245 43×10^-696 / 8.25836010744786438608511751249088074848440807593206 1 × 10^-696))))))^36]^1/15))))))))

Input interpretation:

$$2\sqrt{6\sqrt[15]{\left(\frac{0.0814135^2}{\frac{\frac{5.8395424334568501450242820116559576114814304329753192454 3}{10^{696}}}{\frac{8.2583601074478643860851175124908807484844080759320 61}{10^{696}}}}\right)^{36}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

6.282079...

6.282079... ≈ 2π

From:

Edward Witten - **Open Strings On The Rindler Horizon** - arXiv:1810.11912v4 [hep-th] 26 Nov 2018

EQUATION (3.13)

Now let us consider $Z^B_{k,N}$. The nonzero modes of the bosons can be treated rather as before. First consider the complex boson field $\mathcal{X}$ that is twisted by $\exp(4\pi ik/N)$. For every positive integer n, both $\mathcal{X}$ and $\overline{\mathcal{X}}$ had a mode of energy n. The partition function of these modes is

$$\frac{1}{1-q^n\exp(4\pi ik/N)}\frac{1}{1-q^n\exp(-4\pi ik/N)}. \tag{3.13}$$

1/ ((((1-535.49^2*exp(-20Pi*i/5)))(((1-535.49^2*exp(20Pi*i/5))))))

Input interpretation:

$$\frac{1}{\left(1-535.49^2 \exp\left(-20\,\pi\times\frac{i}{5}\right)\right)\left(1-535.49^2 \exp\left(20\,\pi\times\frac{i}{5}\right)\right)}$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$1.2161791930175020244998975199362782984721717007358239\ldots \times 10^{-11}$

Open code

(535.49)^(1/24) * (1-535.49^2)

Input interpretation:

$$\sqrt[24]{535.49}\,\left(1-535.49^2\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-3.72563\ldots \times 10^5$

EQUATION (3.14)

This is just the inverse of the corresponding factor for fermions, except that the twist angle is twice as large. Similarly, the ground state energy of a complex boson (untwisted in the σ_1 direction) is $-1/12$, which will give a factor $q^{-1/12}$. We also have to include in light cone gauge the nonzero modes of six untwisted bosons $X_3, \cdots, X_8$. Including the ground state energy, these give a factor $1/\eta^6(\tau)$, where η is the Dedekind eta function $\eta(\tau) = q^{1/24}\prod_{n=1}^{\infty}(1-q^n)$. Altogether, then the nonzero modes of the bosons give

$$\frac{1}{q^{1/12}\prod_{n=1}^{\infty}\left((1-q^n\exp(4\pi i k/N))(1-q^n\exp(-4\pi i k/N)\right)\eta^6(\tau)}. \tag{3.14}$$

So far everything is just the reciprocal of what we would get for fermions with the same twist angles.

1/ (((((535.49^(1/12)*(((1-535.49^2*exp(-20Pi*i/5)))(((1-535.49^2*exp(20Pi*i/5)))))))

Input interpretation:

$$\frac{1}{\sqrt[12]{535.49}\,\left(\left(1-535.49^2 \exp\left(-20\,\pi\times\frac{i}{5}\right)\right)\left(1-535.49^2 \exp\left(20\,\pi\times\frac{i}{5}\right)\right)\right)}$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$7.20446... \times 10^{-12}$

1/ ((((535.49)^(1/24) * (1-535.49^2))))^6

Input interpretation:

$$\frac{1}{\left(\sqrt[24]{535.49}\,(1-535.49^2)\right)^6}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$3.73943... \times 10^{-34}$

(3.73943*10^(-34)) * 1/ (((((535.49^(1/12)*(((1-535.49^2*exp(-20Pi*i/5)))(((1-535.49^2*exp(20Pi*i/5))))))

Input interpretation:

$$3.73943\times 10^{-34}\times \frac{1}{\sqrt[12]{535.49}\left(\left(1-535.49^2\exp\left(-20\,\pi\times\frac{i}{5}\right)\right)\left(1-535.49^2\exp\left(20\,\pi\times\frac{i}{5}\right)\right)\right)}$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$2.69406... \times 10^{-45}$

((((((((((10^45 * (3.73943*10^(-34)) * 1/ (((((535.49^(1/12)*(((1-535.49^2*exp(-20Pi*i/5)))(((1-535.49^2*exp(20Pi*i/5)))))))))))))))^0.5

Input interpretation:

$$\sqrt{\left(10^{45}\left(3.73943\times 10^{-34}\times \frac{1}{\sqrt[12]{535.49}\left(\left(1-535.49^2\exp\left(-20\,\pi\times\frac{i}{5}\right)\right)\left(1-535.49^2\exp\left(20\,\pi\times\frac{i}{5}\right)\right)\right)}\right)\right)}$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1.641358750797434179112061219342273330117029976427560095080...

1.641358575... ≈ ζ (2)

2*sqrt[6*((((((((((10^45 * (3.73943*10^(-34) * 1/ (((((535.49^(1/12)*(((1-535.49^2*exp(-20Pi*i/5)))(((1-535.49^2*exp(20Pi*i/5))))))))))))))^0.5]

Input interpretation:

$$2\sqrt{\left(6\sqrt{\left(10^{45}\left(3.73943\times 10^{-34}\times \frac{1}{\sqrt[12]{535.49}\left(\left(1-535.49^2\exp\left(-20\pi\times\frac{i}{5}\right)\right)\left(1-535.49^2\exp\left(20\pi\times\frac{i}{5}\right)\right)\right)}\right)\right)}\right)}$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

6.27635...

6.27635... ≈ 2π

EQUATION (3.22)

Putting all these factors together, the bosonic partition function for $k \neq 0$ is

$$Z^B_{k,N} = \frac{V}{(8\pi^2\alpha' T)^{(p-1)/2}}\frac{1}{4\sin^2(2\pi k/N)q^{1/12}\prod_{n=1}^{\infty}(1-q^n\exp(4\pi ik/N)(1-q^n\exp(-4\pi ik/N))}\frac{1}{\eta^6(\tau)}. \quad (3.22)$$

(((2Pi^2)/(-8Pi^2*1/2)^0.5)))

Input:

$$\frac{2\pi^2}{\sqrt{-8\pi^2\times\frac{1}{2}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Exact result:

$-i\pi$

Decimal approximation:

- More digits

$-3.14159265358979323846264338327950288419716939937510582097\ldots i$

Open code

Property:

$-i\pi$ is a transcendental number

Open code

Polar coordinates:

- Exact form

$r \approx 3.14159$ (radius), $\theta = -90°$ (angle)

Open code

Continued fraction:

- Linear form

$$-3i+\cfrac{1}{7i+\cfrac{1}{-16i+\cfrac{1}{-294i+\cfrac{1}{-3i+\cfrac{1}{-4i+\cfrac{1}{-5i+\cfrac{1}{-15i+\cfrac{1}{3i+\cfrac{1}{2i+\cfrac{1}{-2i+\cfrac{1}{2i+\cfrac{1}{-2i+\cfrac{1}{\ldots}}}}}}}}}}}}}$$

(using the Hurwitz expansion)

Series representations:

- More

$$\frac{2\pi^2}{\sqrt{-\frac{8\pi^2}{2}}} = -4i\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{2\pi^2}{\sqrt{-\frac{8\pi^2}{2}}} = \sum_{k=0}^{\infty}\frac{4i(-1)^k\, 1195^{-1-2k}\left(5^{1+2k} - 4\times 239^{1+2k}\right)}{1+2k}$$

Open code

$$\frac{2\pi^2}{\sqrt{-\frac{8\pi^2}{2}}} = -i\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k} + \frac{2}{1+4k} + \frac{1}{3+4k}\right)$$

Open code

Integral representations:

- More

$$\frac{2\pi^2}{\sqrt{-\frac{8\pi^2}{2}}} = -4i\int_0^1 \sqrt{1-t^2}\,dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{2\pi^2}{\sqrt{-\frac{8\pi^2}{2}}} = -2i\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt$$

Open code

$$\frac{2\pi^2}{\sqrt{-\frac{8\pi^2}{2}}} = -2i\int_0^\infty \frac{1}{1+t^2}\,dt$$

1/ (((4sin^2(10Pi/3)))

Input:

$$\frac{1}{4\sin^2\left(10\times\frac{\pi}{3}\right)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\frac{1}{3}$$

Decimal approximation:

- More digits

0.333333333333333333333333333333333333333333333333333333333333...

Series representations:

- More

$$\frac{1}{4\sin^2\left(\frac{10\pi}{3}\right)} = \frac{1}{4\left(\sum_{k=0}^\infty \frac{\left(-\frac{289}{36}\right)^k \pi^{2k}}{(2k)!}\right)^2}$$

Open code

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$$\frac{1}{4\sin^2\left(\frac{10\pi}{3}\right)} = \frac{1}{16\left(\sum_{k=0}^\infty (-1)^k J_{1+2k}\left(\frac{10\pi}{3}\right)\right)^2}$$

Open code

$$\frac{1}{4\sin^2\left(\frac{10\pi}{3}\right)} \propto \frac{\theta\left(\frac{10\pi}{3}\right)^2}{4\left(\sum_{k=0}^\infty (-1)^k \frac{\partial^{2k}}{\partial\left(\frac{10\pi}{3}\right)^{2k}}\delta\left(\frac{10\pi}{3}\right)\right)^2}$$

1/3*(-i*Pi)* (3.73943*10^(-34) * 1/ (((((535.49^(1/12)*(((1-535.49^2*exp(-20Pi*i/3))(((1-535.49^2*exp(20Pi*i/3))))))

Input interpretation:

$$\frac{1}{3}(-i\pi)\left(3.73943\times10^{-34}\times\frac{1}{\sqrt[12]{535.49}\left(\left(1-535.49^2\exp\left(-20\pi\times\frac{i}{3}\right)\right)\left(1-535.49^2\exp\left(20\pi\times\frac{i}{3}\right)\right)\right)}\right)$$

Open code

- i is the imaginary unit

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Result:

- More digits

$-2.82118...\times10^{-45}\,i$

Polar coordinates:

$r = 2.82118\times10^{-45}$ (radius), $\theta = -90°$ (angle)

Open code

10*ln((((((1/3*(-i*Pi)* (3.73943*10^(-34) * 1/ (((((535.49^(1/12)*(((1-535.49^2*exp(-20Pi*i/3))(((1-535.49^2*exp(20Pi*i/3)))))))))))

Input interpretation:

$$10\log\left(\frac{1}{3}(-i\pi)\left(3.73943\times10^{-34}\times\frac{1}{\sqrt[12]{535.49}\left(\left(1-535.49^2\exp\left(-20\pi\times\frac{i}{3}\right)\right)\left(1-535.49^2\exp\left(20\pi\times\frac{i}{3}\right)\right)\right)}\right)\right)$$

Open code

- $\log(x)$ is the natural logarithm
- i is the imaginary unit

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Result:

- More digits

$-1025.79...-15.7080...\,i$

Polar coordinates:

$r = 1025.91$ (radius), $\theta = -179.123°$ (angle)

Open code

This result is very near to the rest mass of Phi meson 1019.445±0.020

(1025.91)^(1/14)

Input interpretation:

$\sqrt[14]{1025.91}$
Open code

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Result:
- More digits
1.640889...

1.640889... ≈ ζ (2)

2*sqrt(((6*(1025.91)^(1/14))))

Input interpretation:
$2\sqrt{6\sqrt[14]{1025.91}}$
Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits
6.275455...

6.275455... ≈ 2π

EQUATION (4.4)

$$\frac{\eta^8(\mathrm{i}T/2)}{\eta^{16}(\mathrm{i}T)} = (2T)^4 \frac{\eta^8(2\mathrm{i}/T)}{\eta^{16}(\mathrm{i}/T)} = (2T)^4 \frac{\eta^8(4\mathrm{i}\widetilde{T})}{\eta^{16}(2\mathrm{i}\widetilde{T})}. \quad (4.4)$$

2*(-694.44^8)(2*i/-1) / (-694.44^16)*(i/-1)

Input interpretation:
$2(-694.44^8)\left(-\frac{2\left(-\frac{i}{1}\right)}{694.44^{16}}\left(-\frac{i}{1}\right)\right)$
Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits
$-7.3957490096688236287610458938427589247645678652157 40... \times 10^{-23}$

2*(-694.44^8)(4*i/-2) / (-694.44^16)*(2i/-2)

Input interpretation:
$2(-694.44^8)\left(-\frac{4\left(-\frac{i}{2}\right)}{694.44^{16}}\left(2\left(-\frac{i}{2}\right)\right)\right)$
Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-7.395749009668823628761045893842758924764567865215740\ldots \times 10^{-23}$

1/31*ln((((2*(-694.44^8)(2*i/-1) / (-694.44^16)*(i/-1))))

Input interpretation:

$$\frac{1}{31}\log\left(2\left(-694.44^{8}\right)\left(-\frac{2\left(-\frac{i}{1}\right)}{694.44^{16}}\left(-\frac{i}{1}\right)\right)\right)$$

Open code

- $\log(x)$ is the natural logarithm
- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-1.64382\ldots +$
$0.101342\ldots i$

Polar coordinates:

$r = 1.64695$ (radius), $\theta = 176.472°$ (angle)

Open code

1.64695 ≈ ζ (2)

Series representations:

$$\frac{1}{31}\log\left(-\frac{2\left(-694.44^{8}\right)((2\,i)\,i)}{-694.44^{16}\,(-1)}\right) = \frac{2}{31}\pi\mathcal{A}\left\lfloor\frac{\arg\left(7.39575\times10^{-23}\,i^{2}-x\right)}{2\pi}\right\rfloor + \frac{\log(x)}{31} - \frac{1}{31}\sum_{k=1}^{\infty}\frac{(-1)^{k}\left(7.39575\times10^{-23}\,i^{2}-x\right)^{k}x^{-k}}{k} \quad \text{for } x<0$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{1}{31}\log\left(-\frac{2\left(-694.44^{8}\right)((2\,i)\,i)}{-694.44^{16}\,(-1)}\right) = \frac{1}{31}\left\lfloor\frac{\arg\left(7.39575\times10^{-23}\,i^{2}-z_0\right)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right) + \frac{\log(z_0)}{31} + \frac{1}{31}\left\lfloor\frac{\arg\left(7.39575\times10^{-23}\,i^{2}-z_0\right)}{2\pi}\right\rfloor\log(z_0) - \frac{1}{31}\sum_{k=1}^{\infty}\frac{(-1)^{k}\left(7.39575\times10^{-23}\,i^{2}-z_0\right)^{k}z_0^{-k}}{k}$$

Open code

$$\frac{1}{31}\log\left(-\frac{2(-694.44^8)((2i)i)}{-694.44^{16}(-1)}\right) = \frac{2}{31}\pi\mathcal{A}\left\lfloor-\frac{-\pi+\arg\left(\frac{7.39575\times10^{-23}i^2}{z_0}\right)+\arg(z_0)}{2\pi}\right\rfloor + \frac{\log(z_0)}{31} - \frac{1}{31}\sum_{k=1}^{\infty}\frac{(-1)^k(7.39575\times10^{-23}i^2-z_0)^k z_0^{-k}}{k}$$

Open code

- $\arg(z)$ is the complex argument
- $\lfloor x \rfloor$ is the floor function
- More information

Integral representation:

$$\frac{1}{31}\log\left(-\frac{2(-694.44^8)((2i)i)}{-694.44^{16}(-1)}\right) = \frac{1}{31}\int_1^{7.39575\times10^{-23}i^2}\frac{1}{t}\,dt$$

2*sqrt((((((6/31*ln((((2*(-694.44^8)(2*i/-1) / (-694.44^16)*(i/-1)))))))))))

Input interpretation:

$$2\sqrt{\frac{6}{31}\log\left(2(-694.44^8)\left(-\frac{2\left(-\frac{i}{1}\right)}{694.44^{16}}\left(-\frac{i}{1}\right)\right)\right)}$$

Open code

- $\log(x)$ is the natural logarithm
- i is the imaginary unit

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Result:

- More digits

0.193522... +
6.28405... i

Polar coordinates:

$r = 6.28703$ (radius), $\theta = 88.2361°$ (angle)

Open code

6.28703 ≈ 2π

Series representations:

- More

$$2\sqrt{\frac{1}{31}\log\left(-\frac{2(-694.44^8)((2i)i)}{-694.44^{16}(-1)}\right)6} = 2\sqrt{-1+\frac{6}{31}\log(7.39575\times10^{-23}i^2)}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+\frac{6}{31}\log(7.39575\times10^{-23}i^2)\right)^{-k}$$

Open code

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$$2\sqrt{\frac{1}{31}\log\left(-\frac{2(-694.44^8)((2\,i)\,i)}{-694.44^{16}(-1)}\right)6} = 2\sqrt{-1+\frac{6}{31}\log(7.39575\times10^{-23}\,i^2)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+\frac{6}{31}\log(7.39575\times10^{-23}\,i^2)\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$2\sqrt{\frac{1}{31}\log\left(-\frac{2(-694.44^8)((2\,i)\,i)}{-694.44^{16}(-1)}\right)6} = 2\sqrt{\left(\frac{6}{31}\left(2\,\pi\,\mathcal{A}\left\lfloor\frac{\arg(7.39575\times10^{-23}\,i^2-x)}{2\,\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(7.39575\times10^{-23}\,i^2-x)^k\,x^{-k}}{k}\right)\right)} \quad \text{for } x<0$$

Integral representation:

$$2\sqrt{\frac{1}{31}\log\left(-\frac{2(-694.44^8)((2\,i)\,i)}{-694.44^{16}(-1)}\right)6} = 2\sqrt{\frac{6}{31}\int_1^{7.39575\times10^{-23}\,i^2}\frac{1}{t}\,dt}$$

EQUATION (4.10)

Now let us discuss the exponentially small corrections for large $\widetilde{T}$. First of all, tree level exchange of a closed-string state is expected to produce a contribution proportional to $\exp(\ 2\pi\widetilde{T}(L_0 + \overline{L}_0))$ (times the amplitude for the state in question to be produced by the boundary on the left in fig. 1 of section 3 and annihilated on the right). We note that

$$\frac{16\eta^8(4i\widetilde{T})}{\eta^{16}(2i\widetilde{T})} = \frac{16\prod_{n=1}^{\infty}(1+\exp(-4\pi n\widetilde{T}))^8}{1-\exp(-4\pi n\widetilde{T})^8} \tag{4.10}$$

(((16(1+exp(-8Pi/-2))^8)))/(((1-exp(((-8Pi/-2))^8))))

Input:

$$\frac{16\left(1+\exp\left(-8\left(-\frac{\pi}{2}\right)\right)\right)^8}{1-\exp\left(\left(-8\left(-\frac{\pi}{2}\right)\right)^8\right)}$$

Open code

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Exact result:

$$\frac{16\left(1+e^{4\pi}\right)^8}{1-e^{65536\,\pi^8}}$$

Decimal approximation:

- More digits

$-1.3380045902819326192059617767050306219528115855... \times 10^{-270061796}$

1/24*ln((((((16(1+exp(-8Pi/-2))^8)))/(((1-exp(((-8Pi/-2))^8)))))))^2

Input:

$$\frac{1}{24} \log^2\left(\frac{16\left(1+\exp\left(-8\left(-\frac{\pi}{2}\right)\right)\right)^8}{1-\exp\left(\left(-8\left(-\frac{\pi}{2}\right)\right)^8\right)}\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Exact result:

$$\frac{1}{24}\left(\log\left(-\frac{16\left(1+e^{4\pi}\right)^8}{1-e^{65536\pi^8}}\right)+i\pi\right)^2$$

Decimal approximation:

- More digits

$1.6111888151249341502729714150533337117445240388813 75... \times 10^{16} -$
$1.6279740078157984044852396625111216242474085439025 87... \times 10^{8}\, i$

Open code

Polar coordinates:

- Exact form

$r \approx 1.61119\times10^{16}$ (radius), $\theta \approx -5.78927\times10^{-7}$° (angle)

Open code

This result is a multiple of a golden number

Continued fraction:

- Linear form

$$(16111888151249342 - 162797401\, i) + \cfrac{1}{(-2-i) + \cfrac{1}{(2-2\,i)+\cfrac{1}{(-1-2\,i)+\cfrac{1}{(2+i)+\cfrac{1}{\cdots}}}}}$$

(using the Hurwitz expansion)

Alternative representations:

$$\frac{1}{24} \log^2\left(\frac{16\left(1+\exp\left(\frac{-8\pi}{-2}\right)\right)^8}{1-\exp\left(\left(\frac{-8\pi}{-2}\right)^8\right)}\right) = \frac{1}{24} \log_e^2\left(\frac{16\left(1+\exp(4\pi)\right)^8}{1-\exp\left((4\pi)^8\right)}\right)$$

Open code

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$$\frac{1}{24} \log^2\left(\frac{16\left(1+\exp\left(\frac{-8\pi}{-2}\right)\right)^8}{1-\exp\left(\left(\frac{-8\pi}{-2}\right)^8\right)}\right) = \frac{1}{24}\left(\log(a)\log_a\left(\frac{16\left(1+\exp(4\pi)\right)^8}{1-\exp\left((4\pi)^8\right)}\right)\right)^2$$

Open code

- $\log_b(x)$ is the base- b logarithm
- More information

Integral representation:

$$\frac{1}{24}\log^2\left(\frac{16\left(1+\exp\left(\frac{-8\pi}{-2}\right)\right)^8}{1-\exp\left(\left(\frac{-8\pi}{-2}\right)^8\right)}\right) = -\frac{1}{24}\left(\pi - i\int_1^{\frac{16(1+e^{4\pi})^8}{-1+e^{65\,536\,\pi^8}}}\frac{1}{t}\,dt\right)^2$$

EQUATION (4.16)

$$\frac{\eta^8(\mathrm{i}T)}{\eta^8(\mathrm{i}T/2)\eta^8(2\mathrm{i}T)} = T^4\frac{\eta^8(2\mathrm{i}\tilde{T})}{\eta^8(\mathrm{i}\tilde{T})\eta^8(4\mathrm{i}\tilde{T})}, \qquad \frac{16\eta^8(2\mathrm{i}T)}{\eta^{16}(\mathrm{i}T)} = T^4\frac{\eta^8(\mathrm{i}\tilde{T})}{\eta^{16}(2\mathrm{i}\tilde{T})}. \tag{4.16}$$

((-694.44^8*(-i/2))) / ((-694.44^16*(-i)))

Input interpretation:

$$\frac{-694.44^8\left(-\frac{i}{2}\right)}{-694.44^{16}(-i)}$$

Open code

- i is the imaginary unit

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Result:

- More digits

$9.2446862620860295359513073673034486559557098315196752\ldots \times 10^{-24}$

-1/32*ln((((-694.44^8*(-i/2))) / ((-694.44^16*(-i)))))

Input interpretation:

$$-\frac{1}{32}\log\left(\frac{-694.44^8\left(-\frac{i}{2}\right)}{-694.44^{16}(-i)}\right)$$

Open code

- $\log(x)$ is the natural logarithm
- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1.6574372907359352189814848907613767481939194297834350203 95...

We note that, the result 1,657437... is practically equal to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164{,}2696$ i.e. 1,65578...

Indeed:

$$\sqrt[14]{\left(\sqrt{\frac{113+\sqrt{505}}{8}}+\sqrt{\frac{105\quad\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots \Rightarrow$$

$$\Rightarrow -\frac{1}{32}\log\left(\frac{-694.44^8\left(-\frac{i}{2}\right)}{-694.44^{16}(-i)}\right)$$

$= 1.657437\ldots$

Series representations:

$$\frac{1}{32}\log\left(-\frac{694.44^8(-i)}{2\left(-694.44^{16}(-i)\right)}\right)(-1) = -\frac{1}{16}i\pi\left\lfloor\frac{\arg(9.24469\times10^{-24}-x)}{2\pi}\right\rfloor - \frac{\log(x)}{32}+\frac{1}{32}\sum_{k=1}^{\infty}\frac{(-1)^k(9.24469\times10^{-24}-x)^k x^{-k}}{k} \quad \text{for } x<0$$

Open code

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$$\frac{1}{32}\log\left(-\frac{694.44^8(-i)}{2\left(-694.44^{16}(-i)\right)}\right)(-1) = -\frac{1}{32}\left\lfloor\frac{\arg(9.24469\times10^{-24}-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)-\frac{\log(z_0)}{32}-\frac{1}{32}\left\lfloor\frac{\arg(9.24469\times10^{-24}-z_0)}{2\pi}\right\rfloor\log(z_0)+\frac{1}{32}\sum_{k=1}^{\infty}\frac{(-1)^k(9.24469\times10^{-24}-z_0)^k z_0^{-k}}{k}$$

Open code

$$\frac{1}{32}\log\left(-\frac{694.44^8(-i)}{2\left(-694.44^{16}(-i)\right)}\right)(-1) = -\frac{1}{16}i\pi\left\lfloor-\frac{-\pi+\arg\left(\frac{9.24469\times10^{-24}}{z_0}\right)+\arg(z_0)}{2\pi}\right\rfloor - \frac{\log(z_0)}{32}+\frac{1}{32}\sum_{k=1}^{\infty}\frac{(-1)^k(9.24469\times10^{-24}-z_0)^k z_0^{-k}}{k}$$

Open code

- $\arg(z)$ is the complex argument
- $\lfloor x\rfloor$ is the floor function
- More information

Integral representation:

$$\frac{1}{32}\log\left(-\frac{694.44^8\,(-i)}{2\,(-694.44^{16}\,(-i))}\right)(-1) = -\frac{1}{32}\int_1^{9.24469\times 10^{-24}} \frac{1}{t}\,dt$$

EQUATION (4.19)

The functions

$$\frac{\eta^8(2i\widetilde{T})}{\eta^8(i\widetilde{T})\eta^8(4i\widetilde{T})} = \exp(2\pi\widetilde{T})\frac{\prod_{n=1}^{\infty}(1+\exp(-2\pi(2n-1)\widetilde{T}))^8}{(1-\exp(4\pi n\widetilde{T}))^8} = \exp(2\pi\widetilde{T}) + 8 + \mathcal{O}(\exp(-2\pi\widetilde{T}))$$

$$\frac{\eta^8(i\widetilde{T})}{\eta^{16}(2i\widetilde{T})} = \exp(2\pi\widetilde{T})\frac{\prod_{n-1}^{\infty}(1-\exp(-2\pi(2n-1)\widetilde{T}))^8}{(1-\exp(4\pi n\widetilde{T}))^8} = \exp(2\pi\widetilde{T}) - 8 + \mathcal{O}(\exp(-2\pi\widetilde{T})) \qquad (4.19)$$

can be interpreted, respectively, as $\mathrm{Tr}\exp(-4\pi L_0 T)$ and as $\mathrm{Tr}\,(-1)^F\exp(-4\pi L_0 T)$, in the right-moving Neveu-Schwarz sector of a closed string. This suggests that the K_2 contribution to the partition function represents, for large $\widetilde{T}$, the contribution of NS - NS states in the crossed channel. (Like the analogous comment in section 4.1, this interpretation may be oversimplified.)

exp(-Pi)+8+(exp(Pi))

Input:

$\exp(-\pi) + 8 + \exp(\pi)$

Open code

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Exact result:

$8 + e^{-\pi} + e^{\pi}$

Decimal approximation:

- More digits

31.183906551043041255503504105120275391541834352410845076 42...

Open code

Property:

$8 + e^{-\pi} + e^{\pi}$ is a transcendental number

Open code

Continued fraction:

- Linear form

$$31+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{87+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{16+\cfrac{1}{1+\cfrac{1}{13+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{28+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\exp(-\pi)+8+\exp(\pi)=e^{-4\sum_{k=0}^{\infty}(-1)^k/(1+2k)}\left(1+8\,e^{4\sum_{k=0}^{\infty}(-1)^k/(1+2k)}+e^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}\right)$$

Open code

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$$\exp(-\pi)+8+\exp(\pi)=\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-\pi}\left(1+8\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{\pi}+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2\pi}\right)$$

Open code

$$\exp(-\pi)+8+\exp(\pi)=\left(1+8\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{\pi}+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{2\pi}\right)\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{-\pi}$$

1/19*((((exp(-Pi)+8+(exp(Pi))))

Input:

$$\frac{1}{19}(\exp(-\pi)+8+\exp(\pi))$$

Open code

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\frac{1}{19}\left(8+e^{-\pi}+e^{\pi}\right)$$

Decimal approximation:

- More digits

1.641258239528581118710710742374751336396938650126886582969...

Open code

1.64125823952... $\approx \zeta(2)$

Property:

$$\frac{1}{19}\left(8+e^{-\pi}+e^{\pi}\right) \text{ is a transcendental number}$$

Open code

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{7+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{14+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{11+\cfrac{1}{5+\cfrac{1}{5+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{1}{19}(\exp(-\pi)+8+\exp(\pi)) = \frac{1}{19} e^{-4\sum_{k=0}^{\infty}(-1)^k/(1+2k)}\left(1+8\,e^{4\sum_{k=0}^{\infty}(-1)^k/(1+2k)}+e^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}\right)$$

Open code

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$$\frac{1}{19}(\exp(-\pi)+8+\exp(\pi)) = \frac{1}{19}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-\pi}\left(1+8\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{\pi}+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2\pi}\right)$$

Open code

$$\frac{1}{19}(\exp(-\pi)+8+\exp(\pi)) = \frac{1}{19}\left(1+8\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{\pi}+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{2\pi}\right)\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{-\pi}$$

Integral representations:

- More

$$\frac{1}{19}(\exp(-\pi)+8+\exp(\pi)) = \frac{1}{19} e^{-4\int_0^1 \sqrt{1-t^2}\,dt}\left(1+8e^{4\int_0^1 \sqrt{1-t^2}\,dt}+e^{8\int_0^1 \sqrt{1-t^2}\,dt}\right)$$

Open code

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$$\frac{1}{19}(\exp(-\pi)+8+\exp(\pi)) = \frac{1}{19} e^{-2\int_0^\infty 1/(1+t^2)\,dt}\left(1+8e^{2\int_0^\infty 1/(1+t^2)\,dt}+e^{4\int_0^\infty 1/(1+t^2)\,dt}\right)$$

Open code

$$\frac{1}{19}(\exp(-\pi)+8+\exp(\pi)) = \frac{1}{19} e^{-2\int_0^1 1/\sqrt{1-t^2}\,dt}\left(1+8e^{2\int_0^1 1/\sqrt{1-t^2}\,dt}+e^{4\int_0^1 1/\sqrt{1-t^2}\,dt}\right)$$

2*sqrt((((((6/19*((((exp(-Pi)+8+(exp(Pi)))))))))))

Input:

$$2\sqrt{\frac{6}{19}(\exp(-\pi)+8+\exp(\pi))}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$2\sqrt{\frac{6}{19}(8+e^{-\pi}+e^{\pi})}$$

Decimal approximation:

- More digits

6.276161067777495052729544557111914763600043381769387217701...

Open code

6.276161067… ≈ 2π

Property:

$2\sqrt{\frac{6}{19}(8+e^{-\pi}+e^{\pi})}$ is a transcendental number

Continued fraction:

- Linear form

$$6+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{18+\cfrac{1}{3+\cfrac{1}{5+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$2\sqrt{\frac{1}{19}(\exp(-\pi)+8+\exp(\pi))\,6} =$$
$$2\sqrt{-1+\frac{6}{19}(8+\exp(-\pi)+\exp(\pi))}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+\frac{6}{19}(8+\exp(-\pi)+\exp(\pi))\right)^{-k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$2\sqrt{\frac{1}{19}(\exp(-\pi)+8+\exp(\pi))\,6} =$$
$$2\sqrt{-1+\frac{6}{19}(8+\exp(-\pi)+\exp(\pi))}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+\frac{6}{19}(8+\exp(-\pi)+\exp(\pi))\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$2\sqrt{\frac{1}{19}(\exp(-\pi)+8+\exp(\pi))\,6} =$$
$$2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{6}{19}(8+\exp(-\pi)+\exp(\pi))-z_0\right)^k z_0^{-k}}{k!}$$
$$\text{for not }((z_0\in\mathbb{R}\text{ and }-\infty<z_0\leq 0))$$

((((exp(-Pi)-8+(exp(Pi)))))))))

Input:

$\exp(-\pi) - 8 + \exp(\pi)$

Open code

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Exact result:

$-8 + e^{-\pi} + e^{\pi}$

Decimal approximation:

- More digits

15.183906551043041255503504105120275391541834352410845076420...

Open code

Property:

$-8 + e^{-\pi} + e^{\pi}$ is a transcendental number

Open code

Continued fraction:

- Linear form

$$15 + \cfrac{1}{5 + \cfrac{1}{2 + \cfrac{1}{3 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{87 + \cfrac{1}{1 + \cfrac{1}{4 + \cfrac{1}{2 + \cfrac{1}{1 + \cfrac{1}{2 + \cfrac{1}{3 + \cfrac{1}{1 + \cfrac{1}{16 + \cfrac{1}{1 + \cfrac{1}{13 + \cfrac{1}{2 + \cfrac{1}{5 + \cfrac{1}{28 + \cfrac{1}{1 + \cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\exp(-\pi) - 8 + \exp(\pi) = e^{-4 \sum_{k=0}^{\infty} (-1)^k/(1+2k)} \left(1 - 8\, e^{4 \sum_{k=0}^{\infty} (-1)^k/(1+2k)} + e^{8 \sum_{k=0}^{\infty} (-1)^k/(1+2k)}\right)$$

Open code

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$$\exp(-\pi) - 8 + \exp(\pi) = \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{-\pi} \left(1 - 8 \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{\pi} + \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{2\pi}\right)$$

Open code

$$\exp(-\pi) - 8 + \exp(\pi) = \left(1 - 8\left(\frac{1}{\sum_{k=0}^{\infty} \frac{(-1)^k}{k!}}\right)^{\pi} + \left(\frac{1}{\sum_{k=0}^{\infty} \frac{(-1)^k}{k!}}\right)^{2\pi}\right)\left(\frac{1}{\sum_{k=0}^{\infty} \frac{(-1)^k}{k!}}\right)^{-\pi}$$

27*4*1/10^3((((exp(-Pi)-8+(exp(Pi)))))))))

Input:

$$27 \times 4 \times \frac{1}{10^3} (\exp(-\pi) - 8 + \exp(\pi))$$

Open code

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Exact result:

$$\frac{27}{250} \left(-8 + e^{-\pi} + e^{\pi}\right)$$

Decimal approximation:

- More digits

1.639861907512648455594378443352989742286518110060371268253...

Open code

1.6398619… is a golden number

Property:

$\frac{27}{250} \left(-8 + e^{-\pi} + e^{\pi}\right)$ is a transcendental number

Continued fraction:

- Linear form

$$1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{3 + \cfrac{1}{2 + \cfrac{1}{11 + \cfrac{1}{6 + \cfrac{1}{1 + \cfrac{1}{4 + \cfrac{1}{1 + \cfrac{1}{5 + \cfrac{1}{2 + \cfrac{1}{1 + \cfrac{1}{5 + \cfrac{1}{171 + \cfrac{1}{1 + \cfrac{1}{5 + \cfrac{1}{1 + \cfrac{1}{14 + \cfrac{1}{2 + \cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{27\times 4(\exp(-\pi)-8+\exp(\pi))}{10^3} = \frac{27}{250} e^{-4\sum_{k=0}^{\infty}(-1)^k/(1+2k)}\left(1-8e^{4\sum_{k=0}^{\infty}(-1)^k/(1+2k)}+e^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}\right)$$

Open code

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$$\frac{27\times 4(\exp(-\pi)-8+\exp(\pi))}{10^3} = \frac{27}{250}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-\pi}\left(1-8\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{\pi}+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2\pi}\right)$$

Open code

$$\frac{27\times 4(\exp(-\pi)-8+\exp(\pi))}{10^3} = \frac{27}{250}\left(1-8\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{\pi}+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{2\pi}\right)\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{-\pi}$$

Integral representations:

- More

$$\frac{27\times 4(\exp(-\pi)-8+\exp(\pi))}{10^3} = \frac{27}{250} e^{-4\int_0^1\sqrt{1-t^2}\,dt}\left(1-8e^{4\int_0^1\sqrt{1-t^2}\,dt}+e^{8\int_0^1\sqrt{1-t^2}\,dt}\right)$$

Open code

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$$\frac{27\times 4(\exp(-\pi)-8+\exp(\pi))}{10^3} = \frac{27}{250} e^{-2\int_0^{\infty}1/(1+t^2)\,dt}\left(1-8e^{2\int_0^{\infty}1/(1+t^2)\,dt}+e^{4\int_0^{\infty}1/(1+t^2)\,dt}\right)$$

Open code

$$\frac{27\times 4(\exp(-\pi)-8+\exp(\pi))}{10^3} = \frac{27}{250} e^{-2\int_0^1 1/\sqrt{1-t^2}\,dt}\left(1-8e^{2\int_0^1 1/\sqrt{1-t^2}\,dt}+e^{4\int_0^1 1/\sqrt{1-t^2}\,dt}\right)$$

(31.1839065-15.1839065)

Input interpretation:

31.1839065 – 15.1839065

Open code

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Result:

16

EQUATION (4.25)

$$P(x) = \left(\tanh \pi N x/2 - \frac{1}{N}\tanh \pi x/2\right)\frac{1}{\sinh \pi x}. \qquad (4.25)$$

((((tanh(Pi/2)-1/3*tanh(Pi/6)))) / (((sinh(Pi/3))))

Input:

$$\frac{\tanh\left(\frac{\pi}{2}\right) - \frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)}$$

Open code

- $\tanh(x)$ is the hyperbolic tangent function
- $\sinh(x)$ is the hyperbolic sine function

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Exact result:

$$\left(\tanh\left(\frac{\pi}{2}\right) - \frac{1}{3}\tanh\left(\frac{\pi}{6}\right)\right)\operatorname{csch}\left(\frac{\pi}{3}\right)$$

- $\operatorname{csch}(x)$ is the hyperbolic cosecant function

Decimal approximation:

- More digits

0.6059025989447850170219780981853741660599265910276886886602...

Open code

Property:

$\operatorname{csch}\left(\frac{\pi}{3}\right)\left(-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right) + \tanh\left(\frac{\pi}{2}\right)\right)$ is a transcendental number

Open code

Continued fraction:

- Linear form

$$\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{16+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{\tanh\left(\frac{\pi}{2}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)}=\sum_{k=1}^{\infty}\frac{8(1-2k)^2\operatorname{csch}\left(\frac{\pi}{3}\right)}{\left(1-2k+2k^2\right)\left(5-18k+18k^2\right)\pi}$$

Open code

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$$\frac{\tanh\left(\frac{\pi}{2}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)}=-\frac{2\left(-1+\sum_{k=0}^{\infty}\left(3e^{(-1-(1-i)k)\pi}+(-1)^{1+k}e^{-1/3(1+k)\pi}\right)\right)\left(1+2\sum_{k=1}^{\infty}\frac{(-1)^k}{1+9k^2}\right)}{\pi}$$

Open code

$$\frac{\tanh\left(\frac{\pi}{2}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)}=-2\left(-1+\sum_{k=0}^{\infty}\left(3e^{(-1-(1-i)k)\pi}+(-1)^{1+k}e^{-1/3(1+k)\pi}\right)\right)\sum_{k=-\infty}^{\infty}\frac{(-1)^k}{\pi+9k^2\pi}$$

Open code

- More information

Integral representations:

$$\frac{\tanh\left(\frac{\pi}{2}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)} = -\frac{\int_0^{\frac{\pi}{6}}\operatorname{sech}^2(t)\,dt - 3\int_0^{\frac{\pi}{2}}\operatorname{sech}^2(t)\,dt}{\pi\int_0^1\cosh\left(\frac{\pi t}{3}\right)dt}$$

Open code

$$\frac{\tanh\left(\frac{\pi}{2}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)} = \int_0^{\frac{\pi}{6}} -\frac{4\,i\left(\operatorname{sech}^2(t)-9\operatorname{sech}^2(3\,t)\right)}{\sqrt{\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{\pi^2/(36\,s)+s}}{s^{3/2}}\,ds}\,dt \quad \text{for } \gamma > 0$$

Open code

1/ ((((tanh(Pi/2)-1/3*tanh(Pi/6))) / (((sinh(Pi/3))))

Input:

$$\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)}}$$

Open code

- $\tanh(x)$ is the hyperbolic tangent function
- $\sinh(x)$ is the hyperbolic sine function

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Exact result:

$$\frac{\sinh\left(\frac{\pi}{3}\right)}{\tanh\left(\frac{\pi}{2}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}$$

Decimal approximation:

- More digits

1.650430286553579348779898026887393089244934442301566466796...

Open code

1.650430286553579348779898026887393089244934442301566466796

This result is a golden number

Input interpretation:

$$\sqrt{1.650430286553579348779898026887393089244934442301566466796 \times 6}$$

Open code

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Result:

- More digits

3.146836779898423027308882267472300622128330360326822252425...

And

Input interpretation:

$2\sqrt{1.6504302865535793487798980268873930892449344423015664667 96 \times 6}$

Open code

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Result:

- More digits

6.293673559796846054617764534944601244256660720653644504850...

$6.2936735\ldots \approx 2\pi$

Property:

$$\frac{\sinh\left(\frac{\pi}{3}\right)}{-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)+\tanh\left(\frac{\pi}{2}\right)} \text{ is a transcendental number}$$

Open code

Series representations:

- More

$$\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)}} = -\frac{9\sinh\left(\frac{\pi}{3}\right)}{\sum_{k=1}^{\infty}\frac{36\left(-\frac{1}{1+(1-2k)^2}+\frac{1}{1+9(1-2k)^2}\right)}{\pi}}$$

Open code

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$$\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)}} = -\frac{9\sum_{k=0}^{\infty}\frac{\left(\frac{3}{\pi}\right)^{-1-2k}}{(1+2k)!}}{4\pi\sum_{k=1}^{\infty}\frac{9\left(-\frac{1}{1+(1-2k)^2}+\frac{1}{1+9(1-2k)^2}\right)}{\pi^2}}$$

Open code

$$\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)}} = -\frac{9\,i\sum_{k=0}^{\infty}\frac{\left(\left(\frac{1}{3}-\frac{i}{2}\right)\pi\right)^{2k}}{(2k)!}}{4\pi\sum_{k=1}^{\infty}\frac{9\left(-\frac{1}{1+(1-2k)^2}+\frac{1}{1+9(1-2k)^2}\right)}{\pi^2}}$$

Open code

- $n!$ is the factorial function

Integral representations:

$$\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)}} = -\frac{\pi\int_0^1\cosh\left(\frac{\pi t}{3}\right)dt}{\int_0^{\frac{\pi}{6}}\left(\operatorname{sech}^2(t)-9\operatorname{sech}^2(3t)\right)dt}$$

Open code

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$$\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)}} = \frac{i\sqrt{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(36 s)+s}}{s^{3/2}}\,ds}{4\int_0^{\frac{\pi}{6}}\left(\operatorname{sech}^2(t)-9\operatorname{sech}^2(3t)\right)dt} \quad \text{for } \gamma > 0$$

Open code

- $\operatorname{sech}(x)$ is the hyperbolic secant function
-

((((tanh(Pi/4)-1/3*tanh(Pi/12)))) / (((sinh(Pi/6))))

Input:

$$\frac{\tanh\left(\frac{\pi}{4}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{12}\right)}{\sinh\left(\frac{\pi}{6}\right)}$$

Open code

- $\tanh(x)$ is the hyperbolic tangent function
- $\sinh(x)$ is the hyperbolic sine function

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Exact result:

$$\left(\tanh\left(\frac{\pi}{4}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{12}\right)\right)\operatorname{csch}\left(\frac{\pi}{6}\right)$$

- $\operatorname{csch}(x)$ is the hyperbolic cosecant function

Decimal approximation:

- More digits

1.041278918677976129189063267875867715592224220989867526609...

Open code

Property:

$\operatorname{csch}\left(\frac{\pi}{6}\right)\left(-\frac{1}{3}\tanh\left(\frac{\pi}{12}\right)+\tanh\left(\frac{\pi}{4}\right)\right)$ is a transcendental number

Open code

Continued fraction:

- Linear form

$$1+\cfrac{1}{24+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{67+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{\tanh\left(\frac{\pi}{4}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{12}\right)}{\sinh\left(\frac{\pi}{6}\right)}=\sum_{k=1}^{\infty}\frac{256\,(1-2\,k)^2\,\operatorname{csch}\left(\frac{\pi}{6}\right)}{(5-16\,k+16\,k^2)\,(37-144\,k+144\,k^2)\,\pi}$$

Open code

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$$\frac{\tanh\left(\frac{\pi}{4}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{12}\right)}{\sinh\left(\frac{\pi}{6}\right)}=-\frac{4\left(-1+\sum_{k=0}^{\infty}(-1)^{1+k}\,e^{-1/2\,(1+k)\,\pi}\left(-3+e^{1/3\,(1+k)\,\pi}\right)\right)\left(1+2\,\sum_{k=1}^{\infty}\frac{(-1)^k}{1+36\,k^2}\right)}{\pi}$$

Open code

$$\frac{\tanh\left(\frac{\pi}{4}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{12}\right)}{\sinh\left(\frac{\pi}{6}\right)}=-4\left(-1+\sum_{k=0}^{\infty}(-1)^{1+k}\,e^{-1/2\,(1+k)\,\pi}\left(-3+e^{1/3\,(1+k)\,\pi}\right)\right)\sum_{k=-\infty}^{\infty}\frac{(-1)^k}{\pi+36\,k^2\,\pi}$$

Open code

- More information

Integral representations:

$$\frac{\tanh\left(\frac{\pi}{4}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{12}\right)}{\sinh\left(\frac{\pi}{6}\right)} = -\frac{2\left(\int_0^{\frac{\pi}{12}}\operatorname{sech}^2(t)\,dt - 3\int_0^{\frac{\pi}{4}}\operatorname{sech}^2(t)\,dt\right)}{\pi\int_0^1\cosh\left(\frac{\pi t}{6}\right)dt}$$

Open code

$$\frac{\tanh\left(\frac{\pi}{4}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{12}\right)}{\sinh\left(\frac{\pi}{6}\right)} = \int_0^{\frac{\pi}{12}} -\frac{8\,i\left(\operatorname{sech}^2(t)-9\operatorname{sech}^2(3\,t)\right)}{\sqrt{\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{\pi^2/(144\,s)+s}}{s^{3/2}}\,ds}\,dt \quad \text{for } \gamma>0$$

((((tanh(Pi*i/4)-1/3*tanh(Pi*i/12)))) / (((sinh(Pi*i/6))))

Input:

$$\frac{\tanh\left(\pi\times\frac{i}{4}\right)-\frac{1}{3}\tanh\left(\pi\times\frac{i}{12}\right)}{\sinh\left(\pi\times\frac{i}{6}\right)}$$

Open code

- $\tanh(x)$ is the hyperbolic tangent function
- $\sinh(x)$ is the hyperbolic sine function
- i is the imaginary unit

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Exact result:

$$-2\,i\left(i-\frac{1}{3}\,i\left(2-\sqrt{3}\right)\right)$$

Decimal approximation:

- More digits

1.821367205045918195684964227670581577961870169206920418703...

Open code

Alternate forms:

- More

$$\frac{2}{3}+\frac{2}{\sqrt{3}}$$

Open code

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$$\frac{2}{3}\left(1+\sqrt{3}\right)$$

Open code

$$\frac{1}{3}\left(2+2\sqrt{3}\right)$$

Open code

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{20+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{20+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{\tanh\left(\frac{\pi i}{4}\right)-\frac{1}{3}\tanh\left(\frac{\pi i}{12}\right)}{\sinh\left(\frac{\pi i}{6}\right)}=\frac{4\,i\left(\sum_{k=1}^{\infty}\frac{1}{i^2+4(1-2k)^2}-\sum_{k=1}^{\infty}\frac{1}{i^2+36(1-2k)^2}\right)}{\pi\sum_{k=0}^{\infty}I_{1+2k}\left(\frac{i\pi}{6}\right)}$$

Open code

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$$\frac{\tanh\left(\frac{\pi i}{4}\right)-\frac{1}{3}\tanh\left(\frac{\pi i}{12}\right)}{\sinh\left(\frac{\pi i}{6}\right)}=\frac{8\left(\sum_{k=1}^{\infty}\frac{1}{i^2+4(1-2k)^2}-\sum_{k=1}^{\infty}\frac{1}{i^2+36(1-2k)^2}\right)}{\pi^2\sum_{k=0}^{\infty}\frac{6^{-1-2k}(i\pi)^{2k}}{(1+2k)!}}$$

Open code

$$\frac{\tanh\left(\frac{\pi i}{4}\right)-\frac{1}{3}\tanh\left(\frac{\pi i}{12}\right)}{\sinh\left(\frac{\pi i}{6}\right)}=\frac{8\,i\left(\sum_{k=1}^{\infty}\frac{1}{i^2+4(1-2k)^2}-\sum_{k=1}^{\infty}\frac{1}{i^2+36(1-2k)^2}\right)}{\pi\,\mathcal{A}\sum_{k=0}^{\infty}\frac{6^{-2k}(\pi(i-3\mathcal{A}))^{2k}}{(2k)!}}$$

Open code

- $I_n(z)$ is the modified Bessel function of the first kind

- $n!$ is the factorial function
  - More information

Integral representations:

$$\frac{\tanh\left(\frac{\pi i}{4}\right) - \frac{1}{3}\tanh\left(\frac{\pi i}{12}\right)}{\sinh\left(\frac{\pi i}{6}\right)} = -\frac{2\left(\int_0^{\frac{i\pi}{12}} \operatorname{sech}^2(t)\,dt - 3\int_0^{\frac{i\pi}{4}} \operatorname{sech}^2(t)\,dt\right)}{i\pi\int_0^1 \cosh\left(\frac{i\pi t}{6}\right)dt}$$

Open code

$$\frac{\tanh\left(\frac{\pi i}{4}\right) - \frac{1}{3}\tanh\left(\frac{\pi i}{12}\right)}{\sinh\left(\frac{\pi i}{6}\right)} = \int_0^{\frac{i\pi}{12}} -\frac{8\mathcal{A}\left(\operatorname{sech}^2(t) - 9\operatorname{sech}^2(3t)\right)}{i\sqrt{\pi}\int_{-\mathcal{A}\infty+\gamma}^{\mathcal{A}\infty+\gamma} \frac{e^{(i^2\pi^2)/(144 s)+s}}{s^{3/2}}\,ds}\,dt \quad \text{for } \gamma > 0$$

((((tanh(Pi*i/2)-1/3*tanh(Pi*i/6)))) / (((sinh(Pi*i/3))))

Input:

$$\frac{\tanh\left(\pi\times\frac{i}{2}\right) - \frac{1}{3}\tanh\left(\pi\times\frac{i}{6}\right)}{\sinh\left(\pi\times\frac{i}{3}\right)}$$

Open code

- $\tanh(x)$ is the hyperbolic tangent function
- $\sinh(x)$ is the hyperbolic sine function
- i is the imaginary unit

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Result:

$\tilde{\infty}$

1/ ((((tanh(Pi/2)-1/3*tanh(Pi/6)))) / (((sinh(Pi/3))))

Input:

$$\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right) - \frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)}}$$

Open code

- $\tanh(x)$ is the hyperbolic tangent function
- $\sinh(x)$ is the hyperbolic sine function

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Exact result:

$$\frac{\sinh\left(\frac{\pi}{3}\right)}{\tanh\left(\frac{\pi}{2}\right) - \frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}$$

Decimal approximation:

- More digits

1.650430286553579348779898026887393089244934442301566466796...

Open code

1.65043028 is a golden number

Property:

$$\frac{\sinh\left(\frac{\pi}{3}\right)}{-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)+\tanh\left(\frac{\pi}{2}\right)} \text{ is a transcendental number}$$

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{16+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)}}=-\frac{9\sinh\left(\frac{\pi}{3}\right)}{\sum_{k=1}^{\infty}\frac{36\left(-\frac{1}{1+(1-2k)^2}+\frac{1}{1+9(1-2k)^2}\right)}{\pi}}$$

Open code

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$$\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)}}=-\frac{9\sum_{k=0}^{\infty}\frac{\left(\frac{3}{\pi}\right)^{-1-2k}}{(1+2k)!}}{4\pi\sum_{k=1}^{\infty}\frac{9\left(-\frac{1}{1+(1-2k)^2}+\frac{1}{1+9(1-2k)^2}\right)}{\pi^2}}$$

Open code

$$\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)}} = -\frac{9\,i\sum_{k=0}^{\infty}\frac{\left(\left(\frac{1}{3}-\frac{i}{2}\right)\pi\right)^{2k}}{(2k)!}}{4\pi\sum_{k=1}^{\infty}\frac{9\left(-\frac{1}{1+(1-2k)^2}+\frac{1}{1+9(1-2k)^2}\right)}{\pi^2}}$$

Integral representations:

$$\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)}} = -\frac{\pi\int_0^1\cosh\left(\frac{\pi t}{3}\right)dt}{\int_0^{\frac{\pi}{6}}\left(\operatorname{sech}^2(t)-9\operatorname{sech}^2(3t)\right)dt}$$

Open code

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$$\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)-\frac{1}{3}\tanh\left(\frac{\pi}{6}\right)}{\sinh\left(\frac{\pi}{3}\right)}} = \frac{i\sqrt{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(36s)+s}}{s^{3/2}}ds}{4\int_0^{\frac{\pi}{6}}\left(\operatorname{sech}^2(t)-9\operatorname{sech}^2(3t)\right)dt} \quad \text{for } \gamma > 0$$

89/100 ((((tanh(Pi*i/4)-1/3*tanh(Pi*i/12)))) / (((sinh(Pi*i/6))))

Input:

$$\frac{89}{100}\times\frac{\tanh\left(\pi\times\frac{i}{4}\right)-\frac{1}{3}\tanh\left(\pi\times\frac{i}{12}\right)}{\sinh\left(\pi\times\frac{i}{6}\right)}$$

Open code

- $\tanh(x)$ is the hyperbolic tangent function
- $\sinh(x)$ is the hyperbolic sine function
- i is the imaginary unit

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Exact result:

$$-\frac{89}{50}\,i\left(i-\frac{1}{3}\,i\left(2-\sqrt{3}\right)\right)$$

Decimal approximation:

- More digits

1.621016812490867194159618162626817604386064450594159172646...

1.62101681249…

This result is a golden number

Open code

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{11+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{\left(\tanh\left(\frac{\pi i}{4}\right)-\frac{1}{3}\tanh\left(\frac{\pi i}{12}\right)\right)89}{\sinh\left(\frac{\pi i}{6}\right)100}=\frac{89\,i\left(\sum_{k=1}^{\infty}\frac{1}{i^2+4(1-2k)^2}-\sum_{k=1}^{\infty}\frac{1}{i^2+36(1-2k)^2}\right)}{25\,\pi\sum_{k=0}^{\infty}I_{1+2k}\left(\frac{i\pi}{6}\right)}$$

Open code

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$$\frac{\left(\tanh\left(\frac{\pi i}{4}\right)-\frac{1}{3}\tanh\left(\frac{\pi i}{12}\right)\right)89}{\sinh\left(\frac{\pi i}{6}\right)100}=\frac{178\left(\sum_{k=1}^{\infty}\frac{1}{i^2+4(1-2k)^2}-\sum_{k=1}^{\infty}\frac{1}{i^2+36(1-2k)^2}\right)}{25\,\pi^2\sum_{k=0}^{\infty}\frac{6^{-1-2k}(i\pi)^{2k}}{(1+2k)!}}$$

Open code

$$\frac{\left(\tanh\left(\frac{\pi i}{4}\right)-\frac{1}{3}\tanh\left(\frac{\pi i}{12}\right)\right)89}{\sinh\left(\frac{\pi i}{6}\right)100}=\frac{178\,i\left(\sum_{k=1}^{\infty}\frac{1}{i^2+4(1-2k)^2}-\sum_{k=1}^{\infty}\frac{1}{i^2+36(1-2k)^2}\right)}{25\,\pi\,\mathcal{A}\sum_{k=0}^{\infty}\frac{6^{-2k}(\pi(i-3\mathcal{A}))^{2k}}{(2k)!}}$$

Integral representations:

$$\frac{\left(\tanh\left(\frac{\pi i}{4}\right)-\frac{1}{3}\tanh\left(\frac{\pi i}{12}\right)\right)89}{\sinh\left(\frac{\pi i}{6}\right)100}=-\frac{89\left(\int_0^{\frac{i\pi}{12}}\operatorname{sech}^2(t)\,dt-3\int_0^{\frac{i\pi}{4}}\operatorname{sech}^2(t)\,dt\right)}{50\,i\,\pi\int_0^1\cosh\left(\frac{i\pi t}{6}\right)dt}$$

Open code

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$$\frac{\left(\tanh\left(\frac{\pi i}{4}\right)-\frac{1}{3}\tanh\left(\frac{\pi i}{12}\right)\right)89}{\sinh\left(\frac{\pi i}{6}\right)100} = \int_0^{\frac{i\pi}{12}} -\frac{178\,\mathcal{A}\left(\operatorname{sech}^2(t)-9\operatorname{sech}^2(3t)\right)}{25\,i\sqrt{\pi}\int_{-\mathcal{A}\,\infty+\gamma}^{\mathcal{A}\,\infty+\gamma}\frac{e^{(i^2\pi^2)/(144\,s)+s}}{s^{3/2}}\,ds}\,dt \quad \text{for } \gamma > 0$$

(0.6059025989447+1.0412789186779)

Input interpretation:

0.6059025989447 + 1.0412789186779

Open code

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Result:

1.6471815176226

Open code

1.6471815176226 ≈ ζ (2)

2*sqrt((((6*(0.6059025989447+1.0412789186779)))))

Input interpretation:

$2\sqrt{6\,(0.6059025989447 + 1.0412789186779)}$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

6.2874761568488...

6.2874761568488... ≈ 2π

EQUATION (B.5)

A standard result is that the functions $x = P(z)$ and $y = P'(z)$ are related by

$$y^2 = 4x^3 - g_2 x - g_3, \tag{B.4}$$

which is the usual description of a Riemann surface of genus 1 as an algebraic curve. Here g_2 and g_3 depend on τ only, and are modular forms of weights 4 and 6, respectively[11]:

$$g_2(\tau) = \frac{60}{\pi^4}\sum_{m,n\in\mathbb{Z}^2_{\neq 0}}\frac{1}{(m+n\tau)^4}, \quad g_3(\tau) = \frac{140}{\pi^6}\sum_{m,n\in\mathbb{Z}^2_{\neq 0}}\frac{1}{(m+n\tau)^6}. \tag{B.5}$$

60/(Pi)^4 * 1/ ((-3^2-2^2))^4

Input:

$$\frac{60}{\pi^4} \times \frac{1}{(-3^2 - 2^2)^4}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Approximate form
- Step-by-step solution

$$\frac{60}{28561\,\pi^4}$$

Decimal approximation:

- More digits

0.000021566434483423553494246244740279459700629113519074814...

Open code

Property:

$$\frac{60}{28561\,\pi^4} \text{ is a transcendental number}$$

Open code

Continued fraction:

- Linear form

$$\cfrac{1}{46368 + \cfrac{1}{2 + \cfrac{1}{1 + \cfrac{1}{5 + \cfrac{1}{1 + \cfrac{1}{2 + \cfrac{1}{4 + \cfrac{1}{1 + \cfrac{1}{3 + \cfrac{1}{3 + \cfrac{1}{1 + \cfrac{1}{3 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{3 + \cfrac{1}{11 + \cfrac{1}{3 + \cfrac{1}{24 + \cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Open code

Series representations:

- More

$$\frac{60}{(-3^2 - 2^2)^4\,\pi^4} = \frac{15}{1827904\left(\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}\right)^4}$$

Open code

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$$\frac{60}{(-3^2-2^2)^4\pi^4} = \frac{15}{1827904\left(\sum_{k=0}^{\infty}\frac{(-1)^k\, 1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^4}$$

Open code

$$\frac{60}{(-3^2-2^2)^4\pi^4} = \frac{60}{28561\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^4}$$

Open code

Integral representations:

- More

$$\frac{60}{(-3^2-2^2)^4\pi^4} = \frac{15}{114244\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^4}$$

Open code

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$$\frac{60}{(-3^2-2^2)^4\pi^4} = \frac{15}{1827904\left(\int_0^1\sqrt{1-t^2}\,dt\right)^4}$$

Open code

$$\frac{60}{(-3^2-2^2)^4\pi^4} = \frac{15}{114244\left(\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt\right)^4}$$

Open code

140/(Pi)^6 *1/ ((-3^2-2^2))^6

Input:

$$\frac{140}{\pi^6}\times\frac{1}{(-3^2-2^2)^6}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Approximate form
- Step-by-step solution

$$\frac{140}{4826809\,\pi^6}$$

Decimal approximation:

- More digits

$3.0169539805991768361370269444676340090775914764471972\ldots\times 10^{-8}$

Open code

Property:

$\frac{140}{4826809\,\pi^6}$ is a transcendental number

Open code

Continued fraction:

- Linear form

$$\cfrac{1}{33146014+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{30+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{56+\cfrac{1}{12+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{140}{(-3^2-2^2)^6\,\pi^6} = \frac{35}{4942652416\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^6}$$

Open code

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$$\frac{140}{(-3^2-2^2)^6\,\pi^6} = \frac{35}{4942652416\left(\sum_{k=0}^{\infty}\frac{(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^6}$$

Open code

$$\frac{140}{(-3^2-2^2)^6\,\pi^6} = \frac{140}{4826809\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^6}$$

Integral representations:

- More

$$\frac{140}{(-3^2-2^2)^6\,\pi^6} = \frac{35}{77228944\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^6}$$

Open code

Note that 775.4 is a rest mass of a charged Rho meson, very near to the value 77228944 that is a multiple

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$$\frac{140}{(-3^2-2^2)^6 \pi^6} = \frac{35}{77\,228\,944 \left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\, dt\right)^6}$$

Open code

$$\frac{140}{(-3^2-2^2)^6 \pi^6} = \frac{35}{4\,942\,652\,416 \left(\int_0^1 \sqrt{1-t^2}\, dt\right)^6}$$

(((((140/(Pi)^6 *1/ ((-3^2-2^2))^6))))) * (((((60/(Pi)^4 * 1/ ((-3^2-2^2))^4)))))

Input:

$$\left(\frac{140}{\pi^6} \times \frac{1}{(-3^2-2^2)^6}\right)\left(\frac{60}{\pi^4} \times \frac{1}{(-3^2-2^2)^4}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Approximate form
- Step-by-step solution

$$\frac{8400}{137\,858\,491\,849\, \pi^{10}}$$

Decimal approximation:

- More digits

$$6.5064940362096041720743317020124337796354557313504504\ldots \times 10^{-13}$$

Open code

Property:

$$\frac{8400}{137\,858\,491\,849\, \pi^{10}} \text{ is a transcendental number}$$

Continued fraction:

- Linear form

$$\cfrac{1}{1536926022578+\cfrac{1}{7+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{6+\cfrac{1}{18+\cfrac{1}{1+\cfrac{1}{10+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{9+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{60\times 140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6}=\frac{525}{9034694121816064\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^{10}}$$

Open code

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$$\frac{60\times 140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6}=$$
$$\frac{8400}{137858491849\left(\sum_{k=0}^{\infty}-\frac{4(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^{10}}$$

Open code

$$\frac{60\times 140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6}=\frac{8400}{137858491849\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^{10}}$$

Note that 137858491849 is a multiple of a rest mass of Pion

Integral representations:

- More

$$\frac{60\times 140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6}=\frac{525}{8822943478336\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^{10}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{60 \times 140}{\left(\pi^4 \left(-3^2 - 2^2\right)^4\right) \pi^6 \left(-3^2 - 2^2\right)^6} = \frac{525}{8\,822\,943\,478\,336 \left(\int_0^1 \frac{1}{\sqrt{1-t^2}} \, dt\right)^{10}}$$

Open code

$$\frac{60 \times 140}{\left(\pi^4 \left(-3^2 - 2^2\right)^4\right) \pi^6 \left(-3^2 - 2^2\right)^6} = \frac{525}{9\,034\,694\,121\,816\,064 \left(\int_0^1 \sqrt{1 - t^2} \, dt\right)^{10}}$$

(((((140/(Pi)^6 *1/ ((-3^2-2^2))^6))))) / (((((60/(Pi)^4 * 1/ ((-3^2-2^2))^4)))))

Input:

$$\frac{\frac{140}{\pi^6} \times \frac{1}{\left(-3^2-2^2\right)^6}}{\frac{60}{\pi^4} \times \frac{1}{\left(-3^2-2^2\right)^4}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Approximate form
- Step-by-step solution

$$\frac{7}{507 \pi^2}$$

Decimal approximation:

- More digits

0.001398911805712750296069341701120499945425071839656263988...

Open code

Note that 0.0013989118 * 10^5 = 139.89118 is very near to the pion rest mass 139.570

Property:

$\frac{7}{507 \pi^2}$ is a transcendental number

Continued fraction:

- Linear form

$$\cfrac{1}{714+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{18+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{21+\cfrac{1}{1+\cfrac{1}{18+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{12+\cfrac{1}{28+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{140}{\frac{60\,\pi^6\,(-3^2-2^2)^6}{\pi^4\,(-3^2-2^2)^4}} = \frac{7}{8112\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2\,k}\right)^2}$$

Open code

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$$\frac{140}{\frac{60\,\pi^6\,(-3^2-2^2)^6}{\pi^4\,(-3^2-2^2)^4}} = \frac{7}{8112\left(\sum_{k=0}^{\infty}\frac{(-1)^k\,1195^{-1-2\,k}\left(5^{1+2\,k}-4\times 239^{1+2\,k}\right)}{1+2\,k}\right)^2}$$

Open code

$$\frac{140}{\frac{60\,\pi^6\,(-3^2-2^2)^6}{\pi^4\,(-3^2-2^2)^4}} = \frac{7}{507\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2\,k}+\frac{2}{1+4\,k}+\frac{1}{3+4\,k}\right)\right)^2}$$

Integral representations:

- More

$$\frac{140}{\frac{60\,\pi^6\,(-3^2-2^2)^6}{\pi^4\,(-3^2-2^2)^4}} = \frac{7}{8112\left(\int_0^1\sqrt{1-t^2}\,dt\right)^2}$$

Open code

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$$\frac{140}{\frac{60\,\pi^6\left(-3^2-2^2\right)^6}{\pi^4\left(-3^2-2^2\right)^4}} = \frac{7}{2028\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^2}$$

Open code

$$\frac{140}{\frac{60\,\pi^6\left(-3^2-2^2\right)^6}{\pi^4\left(-3^2-2^2\right)^4}} = \frac{7}{2028\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt\right)^2}$$

1/4(((((140/(Pi)^6 *1/ ((-3^2-2^2))^6))))) * (((((60/(Pi)^4 * 1/ ((-3^2-2^2))^4)))))

Input:

$$\frac{1}{4}\left(\frac{140}{\pi^6}\times\frac{1}{\left(-3^2-2^2\right)^6}\right)\left(\frac{60}{\pi^4}\times\frac{1}{\left(-3^2-2^2\right)^4}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Approximate form
- Step-by-step solution

$$\frac{2100}{137\,858\,491\,849\,\pi^{10}}$$

Decimal approximation:

- More digits

$$1.6266235090524010430185829255031084449088639328376126\ldots \times 10^{-13}$$

Open code

1.626623509…

This result is a sub-multiple of a golden number

Property:

$\frac{2100}{137\,858\,491\,849\,\pi^{10}}$ is a transcendental number

Open code

Continued fraction:

- Linear form

$$\cfrac{1}{6147704090312+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{4+\cfrac{1}{25+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{6+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{21+\cfrac{1}{2+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{140\times 60}{\left(\left(\pi^6\left(-3^2-2^2\right)^6\right)\left(\pi^4\left(-3^2-2^2\right)^4\right)\right)4}=\frac{525}{36138776487264256\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^{10}}$$

Open code

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$$\frac{140\times 60}{\left(\left(\pi^6\left(-3^2-2^2\right)^6\right)\left(\pi^4\left(-3^2-2^2\right)^4\right)\right)4}=\frac{2100}{137858491849\left(\sum_{k=0}^{\infty}-\frac{4(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^{10}}$$

Open code

$$\frac{140\times 60}{\left(\left(\pi^6\left(-3^2-2^2\right)^6\right)\left(\pi^4\left(-3^2-2^2\right)^4\right)\right)4}=\frac{2100}{137858491849\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^{10}}$$

Note that 137858491849 is a multiple of the rest mass of pion

Integral representations:

- More

$$\frac{140\times 60}{\left(\left(\pi^6\left(-3^2-2^2\right)^6\right)\left(\pi^4\left(-3^2-2^2\right)^4\right)\right)4}=\frac{525}{35291773913344\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^{10}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{140\times 60}{((\pi^6(-3^2-2^2)^6)(\pi^4(-3^2-2^2)^4))\,4} = \frac{525}{35\,291\,773\,913\,344\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt\right)^{10}}$$

Open code

$$\frac{140\times 60}{((\pi^6(-3^2-2^2)^6)(\pi^4(-3^2-2^2)^4))\,4} = \frac{525}{36\,138\,776\,487\,264\,256\left(\int_0^1 \sqrt{1-t^2}\,dt\right)^{10}}$$

0.256(((((140/(Pi)^6 *1/ ((-3^2-2^2))^6))))) * (((((60/(Pi)^4 * 1/ ((-3^2-2^2))^4)))))

Input:

$$0.256\left(\frac{140}{\pi^6}\times\frac{1}{(-3^2-2^2)^6}\right)\left(\frac{60}{\pi^4}\times\frac{1}{(-3^2-2^2)^4}\right)$$

Open code

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Result:

- More digits

$$1.66566\ldots\times 10^{-13}$$

This result 1.66566 is a sub-multiple of a golden number

Series representations:

- More

$$\frac{(0.256\times 60)\,140}{(\pi^4(-3^2-2^2)^4)\,\pi^6(-3^2-2^2)^6} = \frac{1.4876\times 10^{-14}}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^{10}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{(0.256\times 60)\,140}{(\pi^4(-3^2-2^2)^4)\,\pi^6(-3^2-2^2)^6} = \frac{1.5233\times 10^{-11}}{\left(-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)^{10}}$$

Open code

$$\frac{(0.256\times 60)\,140}{(\pi^4(-3^2-2^2)^4)\,\pi^6(-3^2-2^2)^6} = \frac{1.55986\times 10^{-8}}{\left(\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^{10}}$$

Integral representations:

- More

$$\frac{(0.256\times 60)\,140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6}=\frac{1.5233\times 10^{-11}}{\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^{10}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{(0.256\times 60)\,140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6}=\frac{1.4876\times 10^{-14}}{\left(\int_0^1 \sqrt{1-t^2}\,dt\right)^{10}}$$

Open code

$$\frac{(0.256\times 60)\,140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6}=\frac{1.5233\times 10^{-11}}{\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^{10}}$$

1.5233 is a value sub-multiple very near to the rest mass of baryon Xi 1531.80

0.254(((((140/(Pi)^6 *1/ ((-3^2-2^2))^6))))) * (((((60/(Pi)^4 * 1/ ((-3^2-2^2))^4)))))

Input:

$$0.254\left(\frac{140}{\pi^6}\times\frac{1}{\left(-3^2-2^2\right)^6}\right)\left(\frac{60}{\pi^4}\times\frac{1}{\left(-3^2-2^2\right)^4}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$1.65265\ldots\times 10^{-13}$

This result is a sub-multiple of a golden number

Series representations:

- More

$$\frac{(0.254\times 60)\,140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6}=\frac{1.47598\times 10^{-14}}{\left(\sum_{k=0}^\infty \frac{(-1)^k}{1+2k}\right)^{10}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{(0.254\times 60)\,140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6}=\frac{1.5114\times 10^{-11}}{\left(-1+\sum_{k=1}^\infty \frac{2^k}{\binom{2k}{k}}\right)^{10}}$$

Open code

$$\frac{(0.254 \times 60)\,140}{\left(\pi^4 \left(-3^2-2^2\right)^4\right)\pi^6 \left(-3^2-2^2\right)^6} = \frac{1.54767 \times 10^{-8}}{\left(\sum_{k=0}^{\infty} \frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^{10}}$$

1.54767 is a value sub-multiple very near to the rest mass of baryon Xi that is 1535

Integral representations:

- More

$$\frac{(0.254 \times 60)\,140}{\left(\pi^4 \left(-3^2-2^2\right)^4\right)\pi^6 \left(-3^2-2^2\right)^6} = \frac{1.5114 \times 10^{-11}}{\left(\int_0^{\infty} \frac{1}{1+t^2}\,dt\right)^{10}}$$

Open code

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$$\frac{(0.254 \times 60)\,140}{\left(\pi^4 \left(-3^2-2^2\right)^4\right)\pi^6 \left(-3^2-2^2\right)^6} = \frac{1.47598 \times 10^{-14}}{\left(\int_0^{1} \sqrt{1-t^2}\,dt\right)^{10}}$$

Open code

$$\frac{(0.254 \times 60)\,140}{\left(\pi^4 \left(-3^2-2^2\right)^4\right)\pi^6 \left(-3^2-2^2\right)^6} = \frac{1.5114 \times 10^{-11}}{\left(\int_0^{\infty} \frac{\sin(t)}{t}\,dt\right)^{10}}$$

0.2487(((((140/(Pi)^6 *1/ ((-3^2-2^2))^6))))) * (((((60/(Pi)^4 * 1/ ((-3^2-2^2))^4)))))

Input:

$$0.2487\left(\frac{140}{\pi^6} \times \frac{1}{\left(-3^2-2^2\right)^6}\right)\left(\frac{60}{\pi^4} \times \frac{1}{\left(-3^2-2^2\right)^4}\right)$$

Open code

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Result:

- More digits

$1.61817\ldots \times 10^{-13}$

This result is a sub-multiple of the golden ratio 1,61803398...

Series representations:

- More

$$\frac{(0.2487 \times 60)\,140}{\left(\pi^4 \left(-3^2-2^2\right)^4\right)\pi^6 \left(-3^2-2^2\right)^6} = \frac{1.44518 \times 10^{-14}}{\left(\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}\right)^{10}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{(0.2487 \times 60)\,140}{\left(\pi^4 \left(-3^2-2^2\right)^4\right) \pi^6 \left(-3^2-2^2\right)^6} = \frac{1.47986 \times 10^{-11}}{\left(-1+\sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}\right)^{10}}$$

Open code

$$\frac{(0.2487 \times 60)\,140}{\left(\pi^4 \left(-3^2-2^2\right)^4\right) \pi^6 \left(-3^2-2^2\right)^6} = \frac{1.51538 \times 10^{-8}}{\left(\sum_{k=0}^{\infty} \frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^{10}}$$

Integral representations:

- More

$$\frac{(0.2487 \times 60)\,140}{\left(\pi^4 \left(-3^2-2^2\right)^4\right) \pi^6 \left(-3^2-2^2\right)^6} = \frac{1.47986 \times 10^{-11}}{\left(\int_0^{\infty} \frac{1}{1+t^2}\, dt\right)^{10}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{(0.2487 \times 60)\,140}{\left(\pi^4 \left(-3^2-2^2\right)^4\right) \pi^6 \left(-3^2-2^2\right)^6} = \frac{1.44518 \times 10^{-14}}{\left(\int_0^{1} \sqrt{1-t^2}\, dt\right)^{10}}$$

Open code

$$\frac{(0.2487 \times 60)\,140}{\left(\pi^4 \left(-3^2-2^2\right)^4\right) \pi^6 \left(-3^2-2^2\right)^6} = \frac{1.47986 \times 10^{-11}}{\left(\int_0^{\infty} \frac{\sin(t)}{t}\, dt\right)^{10}}$$

Or:

sin(2Pi/25)(((((140/(Pi)^6 *1/ ((-3^2-2^2))^6))))) * (((((60/(Pi)^4 * 1/ ((-3^2-2^2))^4)))))

Input:

$$\sin\left(2 \times \frac{\pi}{25}\right) \left(\frac{140}{\pi^6} \times \frac{1}{\left(-3^2-2^2\right)^6}\right) \left(\frac{60}{\pi^4} \times \frac{1}{\left(-3^2-2^2\right)^4}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\frac{8400 \sin\left(\frac{2\pi}{25}\right)}{137858491849\, \pi^{10}}$$

Decimal approximation:

- More digits

$1.6180992677037670664069104743866955102714312150780421\ldots \times 10^{-13}$

Open code

This result is a sub-multiple of the golden ratio 1,61803398...

Property:

$\frac{8400 \sin\left(\frac{2\pi}{25}\right)}{137\,858\,491\,849\,\pi^{10}}$ is a transcendental number

Open code

Continued fraction:

- Linear form

$$\cfrac{1}{6\,180\,090\,554\,141+\cfrac{1}{1+\cfrac{1}{10+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{25+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{\left(\sin\left(\frac{2\pi}{25}\right)60\right)140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6} = \frac{8400\sum_{k=0}^{\infty}\frac{(-1)^{3k}\left(\frac{21\pi}{50}\right)^{2k}}{(2k)!}}{137\,858\,491\,849\,\pi^{10}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{\left(\sin\left(\frac{2\pi}{25}\right)60\right)140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6} = \frac{16\,800\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(\frac{2\pi}{25}\right)}{137\,858\,491\,849\,\pi^{10}}$$

Open code

$$\frac{\left(\sin\left(\frac{2\pi}{25}\right)60\right)140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6} = \frac{8400\sum_{k=0}^{\infty}\frac{(-1)^k\,25^{-1-2k}\,(2\pi)^{1+2k}}{(1+2k)!}}{137\,858\,491\,849\,\pi^{10}}$$

Integral representations:

$$\frac{\left(\sin\left(\frac{2\pi}{25}\right)60\right)140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6} = \frac{672}{137858491849\,\pi^9}\int_0^1 \cos\left(\frac{2\pi t}{25}\right)dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{\left(\sin\left(\frac{2\pi}{25}\right)60\right)140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6} = -\frac{168\,i}{137858491849\,\pi^{19/2}}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{-\pi^2/(625\,s)+s}}{s^{3/2}}\,ds \quad \text{for } \gamma>0$$

Open code

$$\frac{\left(\sin\left(\frac{2\pi}{25}\right)60\right)140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6} = -\frac{4200\,i}{137858491849\,\pi^{21/2}}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\left(\frac{\pi}{25}\right)^{1-2s}\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}\,ds \quad \text{for } 0<\gamma<1$$

Multiple-argument formulas:

$$\frac{\left(\sin\left(\frac{2\pi}{25}\right)60\right)140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6} = -\frac{4200\,(-1)^{21/50}\left(-1+(-1)^{4/25}\right)}{137858491849\,\pi^{10}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{\left(\sin\left(\frac{2\pi}{25}\right)60\right)140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6} = \frac{8400\left(3\sin\left(\frac{2\pi}{75}\right)-4\sin^3\left(\frac{2\pi}{75}\right)\right)}{137858491849\,\pi^{10}}$$

Open code

$$\frac{\left(\sin\left(\frac{2\pi}{25}\right)60\right)140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6} = \frac{16800\cos\left(\frac{\pi}{25}\right)\sin\left(\frac{\pi}{25}\right)}{137858491849\,\pi^{10}}$$

Open code

$$\frac{\left(\sin\left(\frac{2\pi}{25}\right)60\right)140}{\left(\pi^4\left(-3^2-2^2\right)^4\right)\pi^6\left(-3^2-2^2\right)^6} = \frac{8400\left(3\cos^2\left(\frac{2\pi}{75}\right)\sin\left(\frac{2\pi}{75}\right)-\sin^3\left(\frac{2\pi}{75}\right)\right)}{137858491849\,\pi^{10}}$$

note that 137858491849 is a multiple very near to the pion rest mass 139.570

From:

Kevin Costello, Edward Witten and Masahito Yamazaki - **Gauge Theory And Integrability, I** - arXiv:1709.09993v2 [hep-th] 4 Feb 2018

Next, let us compute the angles. Let us label the representations as $V_1 = \mathbf{27}$, $V_2 = \mathbf{27}$, $V_3 = \mathbf{351}$. Table 47 of [35] tells us that the Dynkin index of $\mathbf{27}$ is 6 and that of $\mathbf{351}'$ is 6×28. The values of the quadratic Casimirs are $6/27$ and $6 \times 28/351$. We can change the normalization so that the values of the quadratic Casimirs are 1 and $28/13$. The angles are

$$\begin{aligned} \theta_{12} &= \pi - \pi \frac{\frac{28}{13}}{4 - \frac{28}{13}} = -\pi \frac{1}{6} , \\ \theta_{23} &= \theta_{31} = \pi \frac{2}{4 - \frac{28}{13}} = \pi \frac{13}{12} . \end{aligned} \tag{7.51}$$

Since, in this example, $\theta_{12} < 0$, we have to shift the Wilson lines in the z-plane instead of just placing them at angles in the topological plane.

From (7.51), we have that:

((((Pi*13)/12-(Pi/6))))

Input:

$$\frac{\pi \times 13}{12} - \frac{\pi}{6}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Approximate form
- Step-by-step solution

$$\frac{11\,\pi}{12}$$

Decimal approximation:

- More digits

2.879793265790643801924089768006210977180738616093847002560...

Open code

Property:

$\frac{11\,\pi}{12}$ is a transcendental number

Open code

Series representations:

- More

$$\frac{\pi\, 13}{12} - \frac{\pi}{6} = \frac{11}{3} \sum_{k=0}^{\infty} \frac{(-1)^k}{1 + 2k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{\pi\, 13}{12} - \frac{\pi}{6} = \sum_{k=0}^{\infty} -\frac{11\,(-1)^k\, 1195^{-1-2k}\left(5^{1+2k} - 4 \times 239^{1+2k}\right)}{3\,(1+2k)}$$

Open code

$$\frac{\pi\, 13}{12} - \frac{\pi}{6} = \frac{11}{12} \sum_{k=0}^{\infty} \left(-\frac{1}{4}\right)^k \left(\frac{1}{1+2k} + \frac{2}{1+4k} + \frac{1}{3+4k}\right)$$

Open code

Integral representations:

- More

$$\frac{\pi\, 13}{12} - \frac{\pi}{6} = \frac{11}{3} \int_0^1 \sqrt{1-t^2}\, dt$$

Open code

$$\frac{\pi\, 13}{12} - \frac{\pi}{6} = \frac{11}{6} \int_0^1 \frac{1}{\sqrt{1-t^2}}\, dt$$

Open code

$$\frac{\pi\, 13}{12} - \frac{\pi}{6} = \frac{11}{6} \int_0^{\infty} \frac{1}{1+t^2}\, dt$$

Open code

Now:

From Wikipedia

In atomic physics, **Rydberg unit of energy**, symbol Ry, corresponds to the energy of the photon whose wavenumber is the Rydberg constant, i.e. the ionization energy of the hydrogen atom.

Rydberg unit of energy

$$1\ \mathrm{Ry} \equiv hcR_\infty = \frac{m_e e^4}{8\varepsilon_0^2 h^2} = 13.605\,693\,009(84)\ \mathrm{eV}$$

where

m_e is the rest mass of the electron,
e is the elementary charge,
ε_0 is the permittivity of free space,
h is the Planck constant, and
c is the speed of light in vacuum.

Thence, we have that:

1/((((Pi*13)/12-(Pi/6))))^2 * 13.605693009

Input interpretation:

$$\frac{1}{\left(\frac{\pi\times 13}{12}-\frac{\pi}{6}\right)^2}\times 13.605693009$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.6405823841...

1.6405823841... ≈ ζ (2)

Series representations:

- More

$$\frac{13.6056930090000}{\left(\frac{\pi\,13}{12}-\frac{\pi}{6}\right)^2} = \frac{1.01199369488430}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^2}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{13.6056930090000}{\left(\frac{\pi\,13}{12}-\frac{\pi}{6}\right)^2} = \frac{4.04797477953719}{\left(-1.00000000000000+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)^2}$$

Open code

$$\frac{13.6056930090000}{\left(\frac{\pi\,13}{12}-\frac{\pi}{6}\right)^2} = \frac{16.1918991181488}{\left(\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^2}$$

Open code

- $\binom{n}{m}$ is the binomial coefficient

- Integral representations:
More

$$\frac{13.6056930090000}{\left(\frac{\pi\,13}{12}-\frac{\pi}{6}\right)^2} = \frac{4.04797477953719}{\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^2}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{13.6056930090000}{\left(\frac{\pi\,13}{12}-\frac{\pi}{6}\right)^2} = \frac{1.01199369488430}{\left(\int_0^1 \sqrt{1-t^2}\,dt\right)^2}$$

Open code

$$\frac{13.6056930090000}{\left(\frac{\pi\,13}{12}-\frac{\pi}{6}\right)^2} = \frac{4.04797477953719}{\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^2}$$

Open code

And:

2*sqrt((((((6*1/((((Pi*13)/12-(Pi/6))))^2 * 13.605693009))))))

Input interpretation:

$$2\sqrt{6\times\frac{1}{\left(\frac{\pi\times 13}{12}-\frac{\pi}{6}\right)^2}\times 13.605693009}$$

Open code

Enlarge Data Customize A Plaintext Interactive

- Result:
More digits

6.2748687012...

6.2748687012... ≈ 2π

We have also the following expression:

((((((1/((((Pi*13)/12-(Pi/6))))^2 * (137.035/10))))))

Where 137.035 is the value of the reciprocal of the fine-structure constant

Input interpretation:

$$\frac{1}{\left(\frac{\pi\times13}{12}-\frac{\pi}{6}\right)^2}\times\frac{137.035}{10}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.65238...

1.65238... is a golden number

Series representations:

- More

$$\frac{137.035}{10\left(\frac{\pi\,13}{12}-\frac{\pi}{6}\right)^2}=\frac{1.01927}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^2}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{137.035}{10\left(\frac{\pi\,13}{12}-\frac{\pi}{6}\right)^2}=\frac{4.07707}{\left(-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)^2}$$

Open code

$$\frac{137.035}{10\left(\frac{\pi\,13}{12}-\frac{\pi}{6}\right)^2}=\frac{16.3083}{\left(\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^2}$$

Open code

- $\binom{n}{m}$ is the binomial coefficient

Integral representations:

- More

$$\frac{137.035}{10\left(\frac{\pi\,13}{12}-\frac{\pi}{6}\right)^2}=\frac{4.07707}{\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^2}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{137.035}{10\left(\frac{\pi\,13}{12}-\frac{\pi}{6}\right)^2}=\frac{1.01927}{\left(\int_0^{1}\sqrt{1-t^2}\,dt\right)^2}$$

Open code

$$\frac{137.035}{10\left(\frac{\pi\,13}{12}-\frac{\pi}{6}\right)^2}=\frac{4.07707}{\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^2}$$

Open code

And:

sqrt[6*((((((1/((((Pi*13)/12-(Pi/6))))^2 * (137.035/10))))))]

Input interpretation:

$$\sqrt{6\left(\frac{1}{\left(\frac{\pi\times13}{12}-\frac{\pi}{6}\right)^2}\times\frac{137.035}{10}\right)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

3.148691164263136357587706612012413498051035653376790147532...

3.14869116... ≈ π

Series representations:

- More

$$\sqrt{\frac{6\times137.035}{\left(\frac{\pi\,13}{12}-\frac{\pi}{6}\right)^2 10}}=\sqrt{-1+\frac{97.8498}{\pi^2}}\sum_{k=0}^{\infty}\left(-1+\frac{97.8498}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\sqrt{\frac{6\times137.035}{\left(\frac{\pi\,13}{12}-\frac{\pi}{6}\right)^2 10}}=\sqrt{-1+\frac{97.8498}{\pi^2}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+\frac{97.8498}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$\sqrt{\frac{6\times137.035}{\left(\frac{\pi\,13}{12}-\frac{\pi}{6}\right)^2 10}}=\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{97.8498}{\pi^2}-z_0\right)^k z_0^{-k}}{k!}$$

for not $((z_0\in\mathbb{R}$ and $-\infty<z_0\le 0))$

Open code

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\mathbb{R}$ is the set of real numbers

The smallest representation of E_7 is the **56**. It is a pseudoreal or symplectic representation, so there is an invariant antisymmetric form $\omega \in \wedge^2\mathbf{56}$. In addition, there is a completely symmetric quartic invariant $\psi \in \mathrm{Sym}^4\mathbf{56}$. It is natural to ask whether this vertex can be quantized, like the $\mathbf{27}^3$ of E_6, which was one of our examples in section 7.6. The answer is that it can, though the proof is not as simple as for the $\mathbf{27}^3$ vertex. Both of these examples will be useful in [25].

We would like to understand the possible vertices that are D_4 invariant, and the possible anomalies that are compatible with the D_4 symmetry. Let us first enumerate the E_7-invariant elements in $\mathbf{56}^{\otimes 4}$ that are also D_4-invariant. Note that we can identify **56** with its dual, using the E_7-invariant symplectic form ω. We can therefore identify E_7-invariant elements of $\mathbf{56}^{\otimes 4}$ with maps of E_7 representations

$$\mathbf{56}^{\otimes 2} \to \mathbf{56}^{\otimes 2} . \tag{7.52}$$

From the tables in [35] or [36], one has $\wedge^2\mathbf{56} \cong \mathbf{1} \oplus \mathbf{1539}$. So the D_2 anti-invariant part of $\mathbf{56}^{\otimes 4}$ is $(\mathbf{1} \oplus \mathbf{1539}) \otimes (\mathbf{1} \oplus \mathbf{1539})$.

Now we want to identify the part of this that is anti-invariant under D_4, not just under D_2. So we have to consider the action of a $\pi/2$ rotation. The D_4 anti-invariants are simply the D_2 anti-invariants that are invariant under a $\pi/2$ rotation. However, there is a small surprise when we try to impose invariance under a $\pi/2$ rotation on the above description of the D_2 anti-invariants.

A $\pi/2$ rotation exchanges the two factors of $\wedge^2\mathbf{56}$ that we used in the above analysis, but with an important minus sign. This happens as follows. We recall that the two factors of $\wedge^2\mathbf{56}$ are associated respectively to the pair of Wilson lines 13 and 24. A $\pi/2$ rotation maps 13 to 24, but it maps 24 to 31; replacing 31 with 13 acts as -1 on one of the two copies of $\wedge^2\mathbf{56}$. Thus the D_4 anti-invariant part of $\mathbf{56}^{\otimes 4}$ is the antisymmetric part of $(\mathbf{1} \oplus \mathbf{1539}) \otimes (\mathbf{1} \ominus \mathbf{1539})$, or more explicitly it is[31] $\mathbf{1539} \oplus \wedge^2\mathbf{1539}$.

From the tables of [36], one learns that the adjoint or **133** of E_7 occurs precisely once in $\mathbf{1539}^{\otimes 2}$. This one occurrence actually is in $\wedge^2\mathbf{1539}$, not in $\mathrm{Sym}^2\mathbf{1539}$, because, as **1539** is a real representation of E_7, the adjoint must occur at least once in $\wedge^2\mathbf{1539}$. So as claimed above, there is precisely one possible anomaly.

Thence, we have: 13, 24, 27, 56, 133 and 1539.

Thence:

[(56*56)-(27*27)-5*133-13))))))]

Input:

$56 \times 56 - 27 \times 27 - 5 \times 133 - 13$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Step-by-step solution

1729

We note that [(27*27)] = 729

1+1/sqrt(1729/728)

Input:

$$1+\frac{1}{\sqrt{\frac{1729}{728}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

$$1+2\sqrt{\frac{2}{19}}$$

Decimal approximation:

- More digits

1.648885684523050152657914987521499392130065686678376267881...

Open code

1.648885684... ≈ ζ (2)

sqrt((((6((1+1/sqrt(1729/728)))))))

Input:

$$\sqrt{6\left(1+\frac{1}{\sqrt{\frac{1729}{728}}}\right)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

$$\sqrt{6\left(1+2\sqrt{\frac{2}{19}}\right)}$$

Decimal approximation:

- More digits

3.145363906949130888743440753586698442099663588385464063771...

3.1453639... ≈ π

Just for fun, let us use our formula to calculate the angles in a vertex associated to representations of the exceptional group E_6. The fundamental representation of E_6 will be denoted by $\mathbf{27}$, and its dual by $\overline{\mathbf{27}}$. There are four representations of dimension 351, which come in dual pairs. We will use the conventions of [35] and denote them by $\mathbf{351}$, $\overline{\mathbf{351}}$, $\mathbf{351}'$, $\overline{\mathbf{351}}'$. The $\mathbf{27}^3$ vertex was already considered in section 7.6, so here we primarily consider a more elaborate example. (We also will complete the discussion of the $\mathbf{27}^3$ by showing that the $\mathbf{27}$ can be quantized.)

According to table 48 of [35], $\overline{\mathbf{351}}'$ appears once in $\mathbf{27} \otimes \mathbf{27}$. Thus there is an invariant tensor in $\mathbf{27} \otimes \mathbf{27} \otimes \mathbf{351}'$.

We would like to quantize this to a vertex connecting three Wilson lines. To do this, we first need to show that the Wilson lines themselves quantize. It is sufficient, according to condition (†), to show that any map from the exterior square of the adjoint representation to the endomorphisms of the $\mathbf{27}$ or $\mathbf{351}'$ factors through the adjoint representation.

According to table 48 of [35], the exterior square of the adjoint representation decomposes as

$$\wedge^2 \mathbf{78} = \mathbf{78} \oplus \mathbf{2925}\,. \tag{7.49}$$

To show that the $\mathbf{27}$ and $\mathbf{351}'$ quantize, we need to show that $\mathbf{2925}$ does not appear in $\overline{\mathbf{27}} \otimes \mathbf{27}$ or in $\overline{\mathbf{351}}' \otimes \mathbf{351}'$. Table 48 of [35] shows that it does not, so these representations quantize.

Next, to show that the vertex in $\mathbf{27} \otimes \mathbf{27} \otimes \mathbf{351}'$ quantizes, we need to show that the adjoint representation appears precisely twice in this tensor product. Table 48 of [35] tells us that

$$\mathbf{27} \otimes \mathbf{27} = \overline{\mathbf{27}} \oplus \overline{\mathbf{351}} \oplus \overline{\mathbf{351}}'\,. \tag{7.50}$$

((((2925+78)/21)))*5+13

Input:

$$\frac{2925+78}{21} \times 5 + 13$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Step-by-step solution

728

((((27*27*351)))/144-48

Input:

$$\frac{1}{144}(27 \times 27 \times 351) - 48$$

Open code

Enlarge Data Customize A Plaintext Interactive
Exact result:
- Step-by-step solution

$$\frac{27663}{16}$$

Decimal form:

1728.9375

Open code

This result is very near to the mass of candidate glueball $f_0(1710)$ meson. Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. As a consequence, it is sometimes called a Zagier as a pun on the Gross–Zagier theorem. The number 1728 is one less than the Hardy–Ramanujan number 1729

sqrt((((((56*56*56*56))))))/3-(13*2)

Input:

$$\frac{1}{3}\sqrt{56\times 56\times 56\times 56}-13\times 2$$

Open code

Enlarge Data Customize A Plaintext Interactive
Exact result:
- Step-by-step solution

$$\frac{3058}{3}$$

Decimal approximation:
- More digits

1019.3333333333333333333333333333333333333333333333333333...

Open code

1019.3333...

This result is very near to the rest mass of Phi meson 1019.445

((((((((sqrt((((((56*56*56*56))))))/3-(13*2)))))))))^1/14

Input:

$$\sqrt[14]{\frac{1}{3}\sqrt{56\times 56\times 56\times 56}-13\times 2}$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:

$$\sqrt[14]{\frac{3058}{3}}$$

Decimal approximation:
- More digits

1.6401355061599274190091606211384111167496444307474991592 50...

1.640135506... ≈ ζ (2)

2sqrt((((((((((6*(((((((sqrt((((((56*56*56*56))))))/3-(13*2))))))))^1/14))))))))))))))

Input:

$$2\sqrt{6\sqrt[14]{\frac{1}{3}\sqrt{56\times56\times56\times56}-13\times2}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

$$2\times2^{15/28}\times3^{13/28}\sqrt[28]{1529}$$

Decimal approximation:

- More digits

6.2740140379057375883584984660400432242448079707014245568 58...

6,2740140379... ≈ 2π

-27-13+10^3*sqrt((((((((((6*(((((((sqrt((((((56*56*56*56))))))/3-(13*2))))))))^1/14))))))))))))))

Input:

$$-27-13+10^3\sqrt{6\sqrt[14]{\frac{1}{3}\sqrt{56\times56\times56\times56}-13\times2}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

$$1000\times2^{15/28}\times3^{13/28}\sqrt[28]{1529}-40$$

Decimal approximation:

- More digits

3097.0070189528687941792492330200216121224039853507122784 29...

3097

This result is practically equal to the rest mass of J/Psi meson 3096.916

Open code

Alternate forms:

- Step-by-step solution

$$40\left(25\times2^{15/28}\times3^{13/28}\sqrt[28]{1529}-1\right)$$

Open code

$$\left(\text{root of } x^7 + 17\,920\,000\,x^6 + 137\,625\,600\,000\,000\,x^5 + 587\,202\,560\,000\,000\,000\,000\,x^4 + 1\,503\,238\,553\,600\,000\,000\,000\,000\,000\,x^3 + 2\,308\,974\,418\,329\,600\,000\,000\,000\,000\,000\,x^2 + 1\,970\,324\,836\,974\,592\,000\,000\,000\,000\,000\,000\,000\,x - 79\,879\,204\,601\,855\,999\,999\,999\,999\,999\,999\,999\,999\,999\,999\,999\,999\,279\,424\,059\,620\,720\,640\,000\,000\,000\,000\,000\,000\,000\,000\,000 \text{ near } x = 9.68416\times10^{13} + 2\,560\,000 \right)\hat{}\,(1/4) - 40$$

Open code

Minimal polynomial:

$$x^{28} + 1120\,x^{27} + 604\,800\,x^{26} + 209\,664\,000\,x^{25} + 52\,416\,000\,000\,x^{24} + 10\,063\,872\,000\,000\,x^{23} + 1\,543\,127\,040\,000\,000\,x^{22} + 193\,993\,113\,600\,000\,000\,x^{21} + 20\,369\,276\,928\,000\,000\,000\,x^{20} + 1\,810\,602\,393\,600\,000\,000\,000\,x^{19} + 137\,605\,781\,913\,600\,000\,000\,000\,x^{18} + 9\,006\,923\,907\,072\,000\,000\,000\,000\,x^{17} + 510\,392\,354\,734\,080\,000\,000\,000\,000\,x^{16} + 25\,127\,008\,233\,062\,400\,000\,000\,000\,000\,x^{15} + 1\,076\,871\,781\,416\,960\,000\,000\,000\,000\,000\,x^{14} + 40\,203\,213\,172\,899\,840\,000\,000\,000\,000\,000\,x^{13} + 1\,306\,604\,428\,119\,244\,800\,000\,000\,000\,000\,000\,x^{12} + 36\,892\,360\,323\,366\,912\,000\,000\,000\,000\,000\,000\,x^{11} + 901\,813\,252\,348\,968\,960\,000\,000\,000\,000\,000\,000\,x^{10} + 18\,985\,542\,154\,715\,136\,000\,000\,000\,000\,000\,000\,000\,x^9 + 341\,739\,758\,784\,872\,448\,000\,000\,000\,000\,000\,000\,000\,x^8 + 5\,207\,462\,991\,007\,580\,160\,000\,000\,000\,000\,000\,000\,000\,x^7 + 66\,276\,801\,703\,732\,838\,400\,000\,000\,000\,000\,000\,000\,000\,x^6 + 691\,584\,017\,778\,081\,792\,000\,000\,000\,000\,000\,000\,000\,000\,x^5 + 5\,763\,200\,148\,150\,681\,600\,000\,000\,000\,000\,000\,000\,000\,000\,x^4 + 36\,884\,480\,948\,164\,362\,240\,000\,000\,000\,000\,000\,000\,000\,000\,x^3 + 170\,236\,065\,914\,604\,748\,800\,000\,000\,000\,000\,000\,000\,000\,000\,x^2 + 504\,403\,158\,265\,495\,552\,000\,000\,000\,000\,000\,000\,000\,000\,000\,x - 79\,879\,204\,601\,855\,999\,999\,999\,999\,999\,999\,999\,999\,999\,999\,999\,999\,279\,424\,059\,620\,720\,640\,000\,000\,000\,000\,000\,000\,000\,000\,000$$

[-27-13+10^3*sqrt((((((((((6*((((((((sqrt((((((56*56*56*56))))))/3-(13*2))))))))))^1/14))))))))))))))))]^1/16

Input:

$$\sqrt[16]{-27 - 13 + 10^3 \sqrt{6 \sqrt[14]{\frac{1}{3}\sqrt{56\times56\times56\times56} - 13\times2}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\sqrt[16]{1000\times 2^{15/28}\times 3^{13/28}\sqrt[28]{1529}-40}$$

Decimal approximation:

- More digits

1.652661411941201262147555391109561457991243999180130757247...

Open code

1.65266141194... is a golden number

sqrt((((((((((6*[-27-13+10^3*sqrt((((((((((6*((((((((sqrt((((((56*56*56*56))))))/3-(13*2))))))))^1/14))))))))))))))]^1/16))))))))))

Input:

$$\sqrt{6\sqrt[16]{-27-13+10^3\sqrt{6\sqrt[14]{\frac{1}{3}\sqrt{56\times 56\times 56\times 56}-13\times 2}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\sqrt{6}\sqrt[32]{1000\times 2^{15/28}\times 3^{13/28}\sqrt[28]{1529}-40}$$

Decimal approximation:

- More digits

3.148963078800259222385985296021236308443577568518852651044...

Open code

2sqrt((((((((((6*[-27-13+10^3*sqrt((((((((((6*((((((((sqrt((((((56*56*56*56))))))/3-(13*2))))))))^1/14))))))))))))))]^1/16))))))))))

Input:

$$2\sqrt{6\sqrt[16]{-27-13+10^3\sqrt{6\sqrt[14]{\frac{1}{3}\sqrt{56\times 56\times 56\times 56}-13\times 2}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$2\sqrt{6}\sqrt[32]{1000\times 2^{15/28}\times 3^{13/28}\sqrt[28]{1529}-40}$$

Decimal approximation:

- More digits

6.297926157600518444771970592042472616887155137037705302088...

Open code

6.297926157 ≈ 2π

[-27-13+10^3*sqrt((((((((((6*(((((((sqrt((((((56*56*56*56))))))/3-(13*2))))))))^1/14))))))))))))))] / 1.08185^36-34-13

Input interpretation:

$$\frac{-27-13+10^3\sqrt{6\sqrt[14]{\frac{1}{3}\sqrt{56\times56\times56\times56}-13\times2}}}{1.08185^{36}}-34-13$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:

- More digits
135.360...

135.360...

This result is very near to the rest mass of Pion 134.9766

[-27-13+10^3*sqrt((((((((((6*(((((((sqrt((((((56*56*56*56))))))/3-(13*2))))))))^1/14))))))))))))))] / 1.08185^15 -89-8+377

Input interpretation:

$$\frac{-27-13+10^3\sqrt{6\sqrt[14]{\frac{1}{3}\sqrt{56\times56\times56\times56}-13\times2}}}{1.08185^{15}}-89-8+377$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:

- More digits
1231.56...

1231.56...

This result is very near to the rest mass of Delta baryon 1232

[-27-13+10^3*sqrt((((((((((6*(((((((sqrt((((((56*56*56*56))))))/3-(13*2))))))))^1/14))))))))))))))] / 1.08185^15 -13

Input interpretation:

$$\frac{-27-13+10^3\sqrt{6\sqrt[14]{\frac{1}{3}\sqrt{56\times56\times56\times56}-13\times2}}}{1.08185^{15}}-13$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:

- More digits

938.561...

938.561…

This result is very near to the proton mass 938.272

Now, we have that:

means for $SU(2)$. A maximal torus of $SU(2)$ is the $U(1)$ subgroup diag$(e^{i\theta}, e^{-i\theta})$. The character of the n-dimensional representation ρ_n of $SU(2)$ is

$$e^{i(n-1)\theta} + e^{i(n-3)\theta} + \cdots + e^{-i(n-1)\theta} = \frac{\sin(n\theta)}{\sin\theta} . \qquad (11.5)$$

The Weyl anti-invariant function corresponding to ρ_n is the numerator, or

$$\sin(n\theta) = \frac{1}{2i}\left(e^{in\theta} - e^{-in\theta}\right) . \qquad (11.6)$$

The functions $\sin(n\theta)$, $n = 1, 2, 3, \ldots$ are a basis for the Hilbert space of Weyl anti-invariant functions on T. This is the Hilbert space of BF theory of $SU(2)$, quantized on a circle. In this description, we can conveniently see the effective $U(1)$ description

From the (11.6), we have:

1/2i (((e^(27i)-e^(-27i)))

Input:

$$\frac{1}{2}\, i\left(e^{27i} - e^{-27i}\right)$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Decimal approximation:

- More digits

-0.9563759284045030134323405583291929504745602808001312 6789...

(using the principal branch of the logarithm for complex exponentiation)

Open code

Property:

$\frac{1}{2}\, i\left(-e^{-27i} + e^{27i}\right)$ is a transcendental number

Open code

Alternate forms:

- More
$-\sin(27)$
Open code

Enlarge Data Customize A Plaintext Interactive
$$\frac{1}{2}\, i \left(-1+e^{54 i}\right) e^{-27 i}$$
Open code

$$\frac{1}{2}\, i\, e^{27 i} - \frac{1}{2}\, i\, e^{-27 i}$$
Open code

Series representations:
- More
$$\frac{1}{2}\, i \left(e^{27 i} - e^{-27 i}\right) = -\frac{1}{2}\, i \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{-27 i} + \frac{1}{2}\, i \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{27 i}$$
Open code

Enlarge Data Customize A Plaintext Interactive
$$\frac{1}{2}\, i \left(e^{27 i} - e^{-27 i}\right) = -i\, 2^{-1+27 i} \left(\sum_{k=0}^{\infty} \frac{1+k}{k!}\right)^{-27 i} + i\, 2^{-1-27 i} \left(\sum_{k=0}^{\infty} \frac{1+k}{k!}\right)^{27 i}$$
Open code

$$\frac{1}{2}\, i \left(e^{27 i} - e^{-27 i}\right) = -\frac{1}{2}\, i \left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{-27 i} + \frac{1}{2}\, i \left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{27 i}$$
Open code

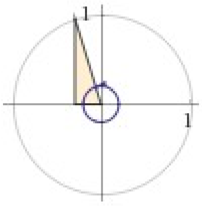
sin (27)

Input:
$\sin(27)$
Open code

Enlarge Data Customize A Plaintext Interactive
Decimal approximation:
- More digits
0.956375928404503013432340558329192950474560280800131267899...
Open code

Property:
$\sin(27)$ is a transcendental number
Open code

Reference triangle for angle 27 radians:



width	$\cos(27) \approx -0.292139$
height	$\sin(27) \approx 0.956376$

Alternate forms:

$$\frac{1}{2} i e^{-27 i} - \frac{1}{2} i e^{27 i}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\sin(1)(1 + 2\cos(2))(1 + 2\cos(6))(1 + 2\cos(18))$$

Open code

Integral representations:

$$\sin(27) = 27 \int_0^1 \cos(27 t)\, dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\sin(27) = -\frac{27 i}{4\sqrt{\pi}} \int_{-i \infty+\gamma}^{i \infty+\gamma} \frac{e^{-729/(4 s)+s}}{s^{3/2}}\, ds \quad \text{for } \gamma > 0$$

Open code

$$\sin(27) = -\frac{i}{2\sqrt{\pi}} \int_{-i \infty+\gamma}^{i \infty+\gamma} \frac{\left(\frac{27}{2}\right)^{1-2 s} \Gamma(s)}{\Gamma\left(\frac{3}{2} - s\right)}\, ds \quad \text{for } 0 < \gamma < 1$$

Note that:

sqrt(3) * sin (27)

Input:

$$\sqrt{3} \sin(27)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Decimal approximation:

- More digits

1.6564916991324542165949697717858789939520637288039885559 84...

Open code

We note that, the result 1,6564916... is practically equal to the 14th root of the following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3 = 1164{,}2696$ i.e. 1,65578...

Indeed:

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots \Rightarrow$$

$$\Rightarrow \sqrt{3}\,\sin(27)$$

$$= 1.6564916\ldots$$

Property:

$\sqrt{3}\,\sin(27)$ is a transcendental number

Series representations:

- More

$$\sqrt{3}\,\sin(27) = \sqrt{3}\sum_{k=0}^{\infty}\frac{(-1)^k\,27^{1+2k}}{(1+2k)!}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\sqrt{3}\,\sin(27) = 2\sqrt{3}\sum_{k=0}^{\infty}(-1)^k J_{1+2k}(27)$$

Open code

$$\sqrt{3}\,\sin(27) = \sqrt{3}\sum_{k=0}^{\infty}\frac{(-1)^k\left(27-\frac{\pi}{2}\right)^{2k}}{(2k)!}$$

Integral representations:

$$\sqrt{3}\,\sin(27) = 27\sqrt{3}\int_0^1\cos(27t)\,dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\sqrt{3}\,\sin(27) = -\frac{27}{4}\,i\sqrt{\frac{3}{\pi}}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{-729/(4s)+s}}{s^{3/2}}\,ds \quad \text{for } \gamma > 0$$

Open code

$$\sqrt{3}\ \sin(27) = -\frac{1}{2}\, i \sqrt{\frac{3}{\pi}} \int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{\left(\frac{27}{2}\right)^{1-2\,s}\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}\, d\,s \quad \text{for } 0 < \gamma < 1$$

Now let us see what happens to the value of b' in crossing a Wilson operator, say the operator W_m associated to the m-dimensional representation ρ_m. The character of ρ_m is $F_m(\theta) = e^{\mathrm{i}(m-1)\theta} + \cdots + e^{-\mathrm{i}(m-1)\theta}$. Crossing W_m has the effect of multiplying the quantum state by $F_m(\theta)$. We have

$$F_m(\theta)\sin(n\theta) = \sum_{j=-m+1,-m+3,\ldots,m-1} \sin((n+j)\theta)\ , \tag{11.7}$$

and if $m \leq n$, then $n+j$ is always positive. This means that in crossing W_m, b' can jump by j for any $j = -m+1, -m+3, \ldots, m-1$, that is, any weight of the representation ρ_m. This is the result that was claimed in section 11.2. For $m > n$, it is possible for $n+j$ to be nonpositive, and some terms on the right hand side of eqn. (11.7) vanish or cancel. This leads to some modification of the formalism when b' is not large.

sin (36)

Input:

sin(36)

Open code

Enlarge Data Customize A Plaintext Interactive

Decimal approximation:

- More digits

−0.99177885344311573683528896884081577859591980659077822976...

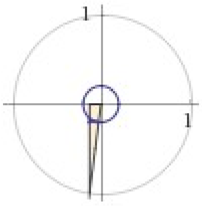
Open code

Property:

sin(36) is a transcendental number

Open code

Reference triangle for angle 36 radians:



width	$\cos(36) \approx -0.127964$
height	$\sin(36) \approx -0.991779$

Enlarge Data Customize A Plaintext Interactive

Alternate forms:

$$\frac{1}{2} i e^{-36 i} - \frac{1}{2} i e^{36 i}$$

Open code

$$4 \sin(1) (2 \sin(2) - 1) (1 + 2 \sin(2)) (2 \sin(6) - 1) (1 + 2 \sin(6)) \cos(1) (2 \cos(2) - 1) (1 + 2 \cos(2)) (2 \cos(6) - 1) (1 + 2 \cos(6)) (\cos(1) - \sin(1)) (\sin(1) + \cos(1))$$

Open code

Integral representations:

$$\sin(36) = 36 \int_0^1 \cos(36 t) \, dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\sin(36) = -\frac{9 i}{\sqrt{\pi}} \int_{-i \infty + \gamma}^{i \infty + \gamma} \frac{e^{-324/s + s}}{s^{3/2}} \, ds \quad \text{for } \gamma > 0$$

Open code

$$\sin(36) = -\frac{i}{2 \sqrt{\pi}} \int_{-i \infty + \gamma}^{i \infty + \gamma} \frac{18^{1 - 2 s} \Gamma(s)}{\Gamma\left(\frac{3}{2} - s\right)} \, ds \quad \text{for } 0 < \gamma < 1$$

-25/((((0.0864055^2(-0.991778853443115-0.956375928404503))))

Input interpretation:

$$-\frac{25}{0.0864055^2 (-0.991778853443115 - 0.956375928404503)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1718.833361689400583258029652275040162425352916682255203540...

This result is very near to the mass of candidate glueball $f_0(1710)$ meson.

2*(((((((-25/((((0.0864055^2(-0.991778853443115-0.956375928404503)))))))))))^1/3

Input interpretation:

$$2\sqrt[3]{-\frac{25}{0.0864055^2\,(-0.991778853443115-0.956375928404503)}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

23.9575...

(((((((-25/((((0.0864055^2(-0.991778853443115-0.956375928404503)))))))))))^1/15

Input interpretation:

$$\sqrt[15]{-\frac{25}{0.0864055^2\,(-0.991778853443115-0.956375928404503)}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.643169...

1.643169... ≈ ζ (2)

2sqrt[6*(((((((-25/((((0.0864055^2(-0.991778853443115-0.956375928404503)))))))))))^1/15]

Input interpretation:

$$2\sqrt{6\sqrt[15]{-\frac{25}{0.0864055^2\,(-0.991778853443115-0.956375928404503)}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

6.279814...

6.279814... ≈ 2π

The action of our theory is given by

$$S = \frac{1}{2\pi} \int_{\mathbb{R}^2 \times \mathbb{C}} \mathrm{d}z \wedge \mathrm{CS}(A) \,, \tag{3.3}$$

where CS(A) is the Chern-Simons three-form

$$\mathrm{CS}(A) := \mathrm{Tr}\left(A \wedge \mathrm{d}A + \frac{2}{3} A \wedge A \wedge A \right) = \varepsilon^{ijk} \mathrm{Tr}\left(A_i \partial_j A_k + \frac{2}{3} A_i A_j A_k \right) \,. \tag{3.4}$$

Here and afterwards the indices $i, j, \ldots$ run over x, y and $\bar{z}$ (ε is a totally antisymmetric tensor with $\varepsilon^{xy\bar{z}} = 1$). The VEV (vacuum expectation value) of an observable $\mathcal{O}$ is given by the path-integral

$$\langle \mathcal{O} \rangle = \frac{\displaystyle\int \mathcal{D}A \, \mathcal{O} \exp\left(\frac{\mathrm{i}S}{\hbar}\right)}{\displaystyle\int \mathcal{D}A \, \exp\left(\frac{\mathrm{i}S}{\hbar}\right)} \,. \tag{3.5}$$

The action S is obviously not invariant under four-dimensional diffeomorphisms, because the use of the 1-form $\mathrm{d}z$ spoils the four-dimensional symmetry. Nor does it have the three-dimensional diffeomorphism symmetry of three-dimensional Chern-Simons theory; this is the symmetry that enables one to define quantum invariants of knots. But we still have two-dimensional diffeomorphism symmetry – invariance under orientation-preserving diffeomorphisms of $\mathbb{R}^2$ (or of its generalization Σ that will be introduced later). This will ultimately lead to the Yang-Baxter equation and the unitarity relation.

We understand the action S as a holomorphic function of complex variables A_x, A_y, $A_{\bar{z}}$, and this implies that the construction that we will be describing is somewhat formal. There is no difficulty in formally carrying out perturbation theory in such a holomorphic theory. That approach was taken in [11, 12] and it is the approach that we will follow here. (We expect that a nonperturbative definition of the theory can be given by considering the D4-NS5 system of string theory, along the lines of the study of the D3-NS5 system in [26], but we will not pursue this in the present paper.) The parameter $\hbar$ that appears in the action is, at the quantum level, the loop-counting parameter. In the semi-classical limit $\hbar \to 0$, this parameter will be identified with the parameter of the same name that appears in the quasi-classical R-matrix (2.4). The parameter $\hbar$ has dimensions of length, in the sense that for $C = \mathbb{C}$, the theory is invariant under a common rescaling of z and $\hbar$. The factor of $1/(2\pi)$ in the action is included here to match with the literature on integrable models.

A reflection of the fact that the construction is formal and leads (in the form we present here) only to a perturbative theory is the following. There is no quantization condition for $\hbar$ that will ensure that the action is gauge-invariant mod $2\pi\mathbb{Z}$. This contrasts with three-dimensional Chern-Simons theory, which is defined with such a condition.

The action is invariant, modulo surface terms that are irrelevant in perturbation theory, under gauge transformations acting in the usual way.

$$A_i \mapsto g^{-1} A_i g + g^{-1} \partial_i g\ , \quad (i = x, y, \bar{z})\ . \tag{3.6}$$

From the eq. (3.5), we obtain:

1/10^34 * integrate (((1+(2/3) * exp (2/(6.626/(2Pi)))))x

Input:

$$\frac{1}{10^{34}} \int \left(1 + \frac{2}{3} \exp\left(\frac{2}{\frac{6.626}{2\pi}}\right)\right) x \, dx$$

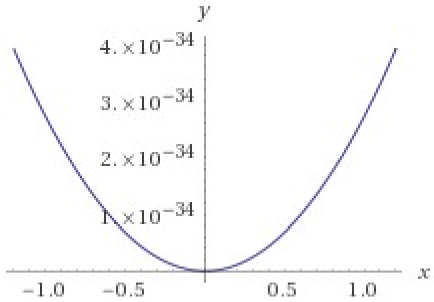
Open code

Enlarge Data Customize A Plaintext Interactive

Result:

$2.7209 \times 10^{-34}\, x^2$

Plot:



(x from -1.2 to 1.2)

We have also the following result:

exp((((2.7209×10^-34 (i^2))))

Input interpretation:

$\exp(2.7209\times 10^{-34} i^2)$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

0.99999999999999999999999999999999972791...

0.99999999999999999999999999999999972791

Possible closed forms:

- More

$1 \approx 1.000$

Enlarge Data Customize A Plaintext Interactive

$\frac{10 \mathcal{W}_{\text{Wad}}}{3} \approx 1.000$

$\frac{1000000 \mathcal{L}_{\text{Li}}}{110001} \approx 1.000$

-

Where 1 is the spin of photon (gauge boson).

Then:

sqrt((((2.7209×10^-34 (i^2))))

Input interpretation:

$\sqrt{2.7209\times 10^{-34} i^2}$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$1.64952... \times 10^{-17} i$

Polar coordinates:

$r = 1.64952 \times 10^{-17}$ (radius), $\theta = 90°$ (angle)
Open code

1.64952 ≈ ζ (2)

1/10^17 * 2sqrt[6*sqrt((((2.7209 (i^2))))]

Input interpretation:

$$\frac{1}{10^{17}} \times 2\sqrt{6\sqrt{2.7209\, i^2}}$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$4.44907\ldots \times 10^{-17} +$
$4.44907\ldots \times 10^{-17}\, i$

Polar coordinates:

$r = 6.29193 \times 10^{-17}$ (radius), $\theta = 45°$ (angle)
Open code

6.29193 ≈ 2π

(2Pi * 6.29193) * 1/10^17

Input interpretation:

$$(2\,\pi \times 6.29193) \times \frac{1}{10^{17}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$3.95334\ldots \times 10^{-16}$

$3.95334\ldots*10^{-16}$

Series representations:

- More

$$\frac{2\,(\pi\, 6.29193)}{10^{17}} = 5.03354 \times 10^{-16} \sum_{k=0}^{\infty} \frac{(-1)^k}{1+2\,k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{2\,(\pi\, 6.29193)}{10^{17}} = -2.51677 \times 10^{-16} + 2.51677 \times 10^{-16} \sum_{k=1}^{\infty} \frac{2^k}{\binom{2\,k}{k}}$$

Open code

$$\frac{2(\pi\, 6.29193)}{10^{17}} = 1.25839\times 10^{-16} \sum_{k=0}^{\infty} \frac{2^{-k}(-6+50k)}{\binom{3k}{k}}$$

Open code

- $\binom{n}{m}$ is the binomial coefficient

Integral representations:

- More

$$\frac{2(\pi\, 6.29193)}{10^{17}} = 2.51677\times 10^{-16} \int_0^{\infty} \frac{1}{1+t^2}\, dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{2(\pi\, 6.29193)}{10^{17}} = 5.03354\times 10^{-16} \int_0^{1} \sqrt{1-t^2}\, dt$$

Open code

$$\frac{2(\pi\, 6.29193)}{10^{17}} = 2.51677\times 10^{-16} \int_0^{\infty} \frac{\sin(t)}{t}\, dt$$

Open code

The result 3.95334...* 10^{-16} can be written also as follows:

39,5334×10^{-17} = 3,95334 * 10^{-16}

Note that (2Pi * 6.29193) * 1/10^{17}

Input interpretation:

$$(2\,\pi\times 6.29193)\times \frac{1}{10^{17}}$$

Open code

Is equal about to $(2\pi \cdot 2\pi)\cdot 10^{-17}$ that is the torus area with radii equals to 1

$$A = 2\pi r\; 2\pi R = 4\pi^2 R r$$

We have also, if A is equal to:

e^(2Pi/5)

Input:

$$e^{2\times\pi/5}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Exact result:

$e^{(2\pi)/5}$

Decimal approximation:

- More digits

3.5135856242857336377046719245603403449272726069575727267 79...

Open code

3.51358562428573363770467192456034034492727260695757272 6779

Property:

$e^{(2\pi)/5}$ is a transcendental number

Open code

Series representations:

- More

$e^{(2\pi)/5} = e^{8/5 \sum_{k=0}^{\infty} (-1)^k/(1+2k)}$

Open code

Enlarge Data Customize A Plaintext Interactive

$$e^{(2\pi)/5} = \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{(2\pi)/5}$$

Open code

$$e^{(2\pi)/5} = \left(\frac{1}{\sum_{k=0}^{\infty} \frac{(-1)^k}{k!}}\right)^{(2\pi)/5}$$

Open code

Integral representations:

- More

$e^{(2\pi)/5} = e^{8/5 \int_0^1 \sqrt{1-t^2}\, dt}$

Open code

Enlarge Data Customize A Plaintext Interactive

$e^{(2\pi)/5} = e^{4/5 \int_0^1 1/\sqrt{1-t^2}\, dt}$

Open code

$e^{(2\pi)/5} = e^{4/5 \int_0^{\infty} 1/(1+t^2)\, dt}$

Open code

10^-34 * integrate ((((3.5135856242857336377046719245603403449272726069575727267 79) * exp (2/(6.626/(2Pi)))))x

Input interpretation:

$$\frac{1}{10^{34}}\left(\int\left(3.513585624285733637704671924560340344927272606957572726779\exp\left(\frac{2}{\frac{6.626}{2\pi}}\right)\right)x\,dx\right)$$

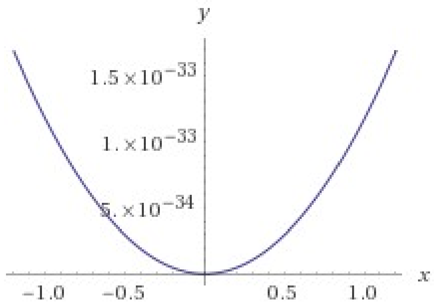
Open code

Enlarge Data Customize A Plaintext Interactive

Result:

$1.1705\times10^{-33}\,x^2$

Plot:



(x from −1.2 to 1.2)

sqrt(1.1705) *1/10^33

Input interpretation:

$\sqrt{1.1705}\times\frac{1}{10^{33}}$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$1.08190...\times10^{-33}$

This result is a sub-multiple very near to a result of a Ramanujan mock theta function that is 1,08185

(((sqrt(1.1705)))^(2Pi) *1/10^33

Input interpretation:

$\sqrt{1.1705}^{\,2\pi}\times\frac{1}{10^{33}}$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$1.63982... \times 10^{-33}$

1.63982 ≈ ζ (2) (sub-multiple)

Series representations:

- More

$$\frac{\sqrt{1.1705}^{2\pi}}{10^{33}} = \frac{\left(\sum_{k=0}^{\infty} \frac{(-0.1705)^k \left(-\frac{1}{2}\right)_k}{k!}\right)^{2\pi}}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{\sqrt{1.1705}^{2\pi}}{10^{33}} = \frac{2^{-33-2\pi}\left(-\frac{\sum_{j=0}^{\infty} \text{Res}_{s=-j}\, e^{1.76902\, s}\, \Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)^{2\pi}}{116\,415\,321\,826\,934\,814\,453\,125}$$

$$\frac{\sqrt{1.1705}^{2\pi}}{10^{33}} = \frac{\left(\sqrt{z_0}\, \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (1.1705-z_0)^k z_0^{-k}}{k!}\right)^{2\pi}}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

for not $((z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0))$

Open code

- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\Gamma(x)$ is the gamma function
- $\text{Res}_{z=z_0} f$ is a complex residue
- $\mathbb{R}$ is the set of real numbers
- More information

1/10^33 * 2sqrt((((((6*(((sqrt(1.1705)))^(2Pi))))))

Input interpretation:

$$\frac{1}{10^{33}} \times 2\sqrt{6\sqrt{1.1705}^{2\pi}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$6.27340... \times 10^{-33}$

6,27340… ≈ 2π (sub-multiple)

Series representations:

- More

$$\frac{2\sqrt{6\sqrt{1.1705}^{2\pi}}}{10^{33}} = \frac{\sqrt{-1+6\sqrt{1.1705}^{2\pi}}\ \sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+6\sqrt{1.1705}^{2\pi}\right)^{-k}}{500\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{2\sqrt{6\sqrt{1.1705}^{2\pi}}}{10^{33}} = \frac{\sqrt{-1+6\sqrt{1.1705}^{2\pi}}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-1+6\sqrt{1.1705}^{2\pi}\right)^{-k}}{k!}}{500\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

Open code

$$\frac{2\sqrt{6\sqrt{1.1705}^{2\pi}}}{10^{33}} = \frac{\sqrt{z_0}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(6\sqrt{1.1705}^{2\pi}-z_0\right)^k z_0^{-k}}{k!}}{500\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

for not $((z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0))$

Open code

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\mathbb{R}$ is the set of real numbers
- More information

From:

Kevin Costello, Edward Witten and Masahito Yamazaki - **Gauge Theory And Integrability, II** - arXiv:1802.01579v1 [hep-th] 5 Feb 2018

The framing anomaly, together with the fact that the Wilson lines form angles of $2\pi/3$ at the vertex, tells us that the z-values of the Wilson lines (when they are vertical) must satisfy

$$\begin{aligned} z_1 &= z_0 + \tfrac{2}{3}\hbar \mathsf{h}^\vee = z_0 + \tfrac{8}{3}\hbar \,, \\ z_2 &= z_0 + \tfrac{4}{3}\hbar \mathsf{h}^\vee = z_0 + \tfrac{16}{3}\hbar \,. \end{aligned} \tag{5.4}$$

From (5.4), we obtain:

(((1+8/3) * 6.582*10^-16)) * (((1+16/3) * 6.582*10^-16))

Input interpretation:

$$\left(\left(1+\frac{8}{3}\right)\times 6.582\times 10^{-16}\right)\left(\left(1+\frac{16}{3}\right)\times 6.582\times 10^{-16}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

$1.006049924\times 10^{-29}$

Open code

This result is a sub-multiple very near to a value of a Ramanujan mock theta function that is -1,00615716...

10^3 * 1/(((((((1+8/3) * 6.582*10^-16)) / (((1+16/3) * 6.582*10^-16)))))))

Input interpretation:

$$10^3\times \frac{1}{\frac{\left(1+\frac{8}{3}\right)\times 6.582\times 10^{-16}}{\left(1+\frac{16}{3}\right)\times 6.582\times 10^{-16}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1727.272727272727272727272727272727272727272727272727...

Open code

1727,27...

This result is very near to the mass of candidate glueball $f_0(1710)$ meson. Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. As a consequence, it is sometimes called a Zagier as a pun on the Gross–Zagier theorem. The number 1728 is one less than the Hardy–Ramanujan number 1729

Repeating decimal:

$1727.\overline{27}$ (period 2)

Enlarge Data Customize A Plaintext Interactive

[10^3 * 1/(((((((1+8/3) * 6.582*10^-16)) / (((1+16/3) * 6.582*10^-16)))))))]^1/15

Input interpretation:

$$\sqrt[15]{10^3 \times \frac{1}{\frac{\left(1+\frac{8}{3}\right)\times 6.582\times 10^{-16}}{\left(1+\frac{16}{3}\right)\times 6.582\times 10^{-16}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1.643705699473342754916393381942989690636779272850521670054...

1,64370569... ≈ ζ (2)

2sqrt(((((6*[10^3 * 1/(((((((1+8/3) * 6.582*10^-16)) / (((1+16/3) * 6.582*10^-16)))))))]^1/15)))))

Input interpretation:

$$2\sqrt{6\sqrt[15]{10^3 \times \frac{1}{\frac{\left(1+\frac{8}{3}\right)\times 6.582\times 10^{-16}}{\left(1+\frac{16}{3}\right)\times 6.582\times 10^{-16}}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

6.280839...

6,280839... ≈ 2π

Now, we have that:

$$\sum_{k_0,k_1,k_2} \Omega_{k_0k_1k_2} T_{i_0}^{k_0}(z)\, T_{i_1}^{k_1}\left(z+\tfrac{2}{3}\hbar \mathrm{h}^\vee\right) T_{i_2}^{k_2}\left(z+\tfrac{4}{3}\hbar \mathrm{h}^\vee\right) = \Omega_{i_0i_1i_2}\,. \qquad (5.9)$$

(1+2/3((6.582*10^-16*9))) (1+4/3((6.582*10^-16*9)))

Input interpretation:

$$\left(1+\frac{2}{3}\left(6.582\times 10^{-16}\times 9\right)\right)\left(1+\frac{4}{3}\left(6.582\times 10^{-16}\times 9\right)\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:
1.0000000000000118476000000003119236128
Open code
This result is equal to the photon spin (gauge boson)

1/6(((((ln(1+2/3((6.582*10^-16*9))) ((((1+4/3((6.582*10^-16*9)))))))^(5/2)

Input interpretation:

$$\frac{1}{6}\left(\log\left(1+\frac{2}{3}\left(6.582\times 10^{-16}\times 9\right)\right)\left(1+\frac{4}{3}\left(6.582\times 10^{-16}\times 9\right)\right)\right)^{5/2}$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits

1.63351... × 10^{-37}
1.63351... is a sub-multiple of a golden number

sqrt(sqrt(sqrt[6*((((((1/6(((((ln(1+2/3((6.582*10^-16*9))) ((((1+4/3((6.582*10^-16*9)))))))^(5/2))))))]

Input interpretation:

$$\sqrt{\sqrt{\sqrt{6\left(\frac{1}{6}\left(\log\left(1+\frac{2}{3}\left(6.582\times 10^{-16}\times 9\right)\right)\left(1+\frac{4}{3}\left(6.582\times 10^{-16}\times 9\right)\right)\right)^{5/2}\right)}}}$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits

0.00003154344...
0.00003154344

3.154344*10^{-5}

Now, we have that:

Let us denote this quartic tensor by Ω_{ijkl}, and the skew-symmetric bilinear form by ω_{ij}. Then by the usual reasoning, a presentation of the Yangian is provided by the coefficients of the series

$T^i_j(z)$, where the indices i, j run from 1 to 56, subject to the relations

$$\sum_{r,s} R^{ik}_{rs}(z-z')T^r_j(z')T^s_l(z) = \sum_{r,s} T^i_r(z)T^k_s(z')R^{rs}_{jl}(z-z') \ , \tag{5.12}$$

$$\sum \Omega_{k_0k_1k_2k_3} T^{k_0}_{i_0}(z)\, T^{k_1}_{i_1}\left(z+\tfrac{1}{2}\hbar\mathsf{h}^\vee\right) T^{k_2}_{i_2}\left(z+\tfrac{2}{2}\hbar\mathsf{h}^\vee\right) T^{k_3}_{i_3}\left(z+\tfrac{3}{2}\hbar\mathsf{h}^\vee\right) = \Omega_{i_0i_1i_2i_3} \ , \tag{5.13}$$

$$\sum T^k_i(z)\, T^l_j\left(z+\hbar\mathsf{h}^\vee\right) \omega_{kl} = \omega_{ij} \ . \tag{5.14}$$

The dual Coxeter number of $\mathfrak{e}_7$ is $\mathsf{h}^\vee = 18$.

((((1+1/2(18*6.582*10^-16)))) ((((1+(18*6.582*10^-16)))) ((((1+3/2(18*6.582*10^-16))))

Input interpretation:

$\left(1+\frac{1}{2}\left(18\times 6.582\times 10^{-16}\right)\right)\left(\left(1+18\times 6.582\times 10^{-16}\right)\left(1+\frac{3}{2}\left(18\times 6.582\times 10^{-16}\right)\right)\right)$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.000000000000035542800000000386005470840001247246840815632...

Open code

((((1+(18*6.582*10^-16))))

Input interpretation:

$1+18\times 6.582\times 10^{-16}$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

1.0000000000000118476

Open code

((((1+1/2(18*6.582*10^-16)))) ((((1+(18*6.582*10^-16)))) ((((1+3/2(18*6.582*10^-16)))) + 1.0000000000000118476

Input interpretation:

$\left(1+\frac{1}{2}\left(18\times 6.582\times 10^{-16}\right)\right)$
$\left(\left(1+18\times 6.582\times 10^{-16}\right)\left(\left(1+\frac{3}{2}\left(18\times 6.582\times 10^{-16}\right)\right)+1.0000000000000118476\right)\right)$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits

2.00000000000006516180000000066673672236000207874473469272...
Open code

The results 1 and 2 are the spin of the photon and graviton (gauge bosons)

((((1+1/2(18*6.582*10^-16)))) ((((1+(18*6.582*10^-16)))) ((((1+3/2(18*6.582*10^-16)))) - 1.0000000000000118476

Input interpretation:

$$\left(1+\frac{1}{2}\left(18\times 6.582\times 10^{-16}\right)\right)\left(\left(1+18\times 6.582\times 10^{-16}\right)\left(\left(1+\frac{3}{2}\left(18\times 6.582\times 10^{-16}\right)\right)-1.0000000000000118476\right)\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:

$$5.923800000000105274219320000415748946938544\times 10^{-15}$$

21*2+27*2*ln(((((((((((1+1/2(18*6.582*10^-16)))) ((((1+(18*6.582*10^-16)))) ((((1+3/2(18*6.582*10^-16)))) - 1.0000000000000118476))))))))))

Input interpretation:

$$21\times 2+27\times 2\log\left(\left(1+\frac{1}{2}\left(18\times 6.582\times 10^{-16}\right)\right)\left(\left(1+18\times 6.582\times 10^{-16}\right)\left(\left(1+\frac{3}{2}\left(18\times 6.582\times 10^{-16}\right)\right)-1.0000000000000118476\right)\right)\right)$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits

−1727.029...

This result is very near to the mass of candidate glueball $f_0(1710)$ meson. Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. As a consequence, it is sometimes called a Zagier as a pun on the Gross–Zagier theorem. The number 1728 is one less than the Hardy–Ramanujan number 1729

[21*2+27*2*ln((((((((((1+1/2(18*6.582*10^-16)))) ((((1+(18*6.582*10^-16)))) ((((1+3/2(18*6.582*10^-16)))) - 1.0000000000000118476))))))))))]^1/15

Input interpretation:

$$\left(21\times 2+27\times 2\log\left(\left(1+\frac{1}{2}\left(18\times 6.582\times 10^{-16}\right)\right)\left(\left(1+18\times 6.582\times 10^{-16}\right)\left(\left(1+\frac{3}{2}\left(18\times 6.582\times 10^{-16}\right)\right)-1.0000000000000118476\right)\right)\right)\right)\text{^}(1/15)$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.6077717... +
0.34174242... i

Polar coordinates:

$r = 1.64365$ (radius), $\theta = 12.°$ (angle)

Open code

1.64365 ≈ ζ (2)

2sqrt(((((6*[21*2+27*2*ln((((((((((1+1/2(18*6.582*10^-16)))) ((((1+(18*6.582*10^-16)))) ((((1+3/2(18*6.582*10^-16)))) - 1.0000000000000118476))))))))))]^1/15)))))

Input interpretation:

$$2\sqrt{\left(6\left(21\times 2+27\times 2\log\left(\left(1+\frac{1}{2}\left(18\times 6.582\times 10^{-16}\right)\right)\left(\left(1+18\times 6.582\times 10^{-16}\right)\left(\left(1+\frac{3}{2}\left(18\times 6.582\times 10^{-16}\right)\right)-1.0000000000000118476\right)\right)\right)\right)\text{^}(1/15)\right)}$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

6.2464024... +
0.65652335... i

Polar coordinates:

$r = 6.28073$ (radius), $\theta = 6°$ (angle)

Open code

6.28073 ≈ 2π

Now, we have:

The free R-matrix can be calculated by a Feynman diagram analysis. Since it is a calculation in a free theory, the result is just the exponential of a contribution from single gauge boson exchange. Contributions from a propagator going from one Wilson line to itself vanish.[6] The contribution from gauge boson exchange between the two Wilson lines gives

$$\begin{aligned} R_{\text{free}}(z, c_0, c_1, \dots) &= \exp\left(\sum_{n,m\geq 0} \hbar^{n+m+1}(-1)^m c_n c_m \partial_z^{n+m} z^{-1}\right) \\ &= \exp\left(\sum_{\substack{n,m\geq 0 \\ n+m \text{ even}}} \hbar^{n+m+1}(-1)^m c_n c_m \partial_z^{n+m} z^{-1}\right) , \end{aligned} \tag{6.13}$$

This is an odd function of $\hbar/z$, and all odd functions of $\hbar/z$ can be constructed in this way by suitable choices of the constants c_i.

-(6.582*10^-16)^9 * derivative ((1^-1)^8))c

Input interpretation:

$-(6.582\times 10^{-16})^9 \times \frac{\partial}{\partial c}\left(\left(\frac{1}{1}\right)^8 c\right)$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

$-2.318573680510126337244966985380403 2\times 10^{-137}$

Open code

$-2.3185736805101263372449669853804032 \times 10^{-137}$

[-(6.582*10^-16)^9 * derivative ((1^-1)^8))c]^1/36

Input interpretation:

$\sqrt[36]{-(6.582\times 10^{-16})^9 \times \frac{\partial}{\partial c}\left(\left(\frac{1}{1}\right)^8 c\right)}$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

0.0001595636... +
0.00001396000... i

Polar coordinates:

$r = 0.000160173$ (radius), $\theta = 5°$ (angle)

Open code

0.000160173

$1.60173*10^{-4}$ is a sub-multiple of a golden number and very near to the absolute value of the electric charge of positron

Now, we have that

In addition to these relations, there are analogs of the quantum determinant associated to suitable invariant tensors. For the **7** of $\mathfrak{g}_2$, **26** of $\mathfrak{f}_4$ and the **27** of $\mathfrak{e}_6$, there is an invariant cubic tensor which we denote Ω_{ijk}. As in the rational case, this leads to the relations

$$\begin{aligned}\sum \Omega_{k_0k_1k_2} T^{k_0}_{i_0}(z)\, T^{k_1}_{i_1}\left(z\, e^{\frac{2}{3}\hbar h^\vee}\right) T^{k_2}_{i_2}\left(z\, e^{\frac{4}{3}\hbar h^\vee}\right) &= \Omega_{i_0i_1i_2}\,,\\ \sum \Omega_{k_0k_1k_2} S^{k_0}_{i_0}(z)\, S^{k_1}_{i_1}\left(z\, e^{\frac{2}{3}\hbar h^\vee}\right) S^{k_2}_{i_2}\left(z\, e^{\frac{4}{3}\hbar h^\vee}\right) &= \Omega_{i_0i_1i_2}\,.\end{aligned} \tag{7.37}$$

For the **56** of $\mathfrak{e}_7$, there is a quartic invariant tensor Ω_{ijkl} leading to the relations

$$\begin{aligned}\sum \Omega_{k_0k_1k_2k_3} T^{k_0}_{i_0}(z)\, T^{k_1}_{i_1}\left(z\, e^{\frac{1}{2}\hbar h^\vee}\right) T^{k_2}_{i_2}\left(z\, e^{\frac{2}{2}\hbar h^\vee}\right) T^{k_3}_{i_3}\left(z\, e^{\frac{3}{2}\hbar h^\vee}\right) &= \Omega_{i_0i_1i_2i_3}\,,\\ \sum \Omega_{k_0k_1k_2k_3} S^{k_0}_{i_0}(z)\, S^{k_1}_{i_1}\left(z\, e^{\frac{1}{2}\hbar h^\vee}\right) S^{k_2}_{i_2}\left(z\, e^{\frac{2}{2}\hbar h^\vee}\right) S^{k_3}_{i_3}\left(z\, e^{\frac{3}{2}\hbar h^\vee}\right) &= \Omega_{i_0i_1i_2i_3}\,.\end{aligned} \tag{7.38}$$

We have that:

((((exp(((2/3(9*6.582*10^-16)))) ((((exp(((4/3(9*6.582*10^-16))))

Input interpretation:

$\exp\left(\frac{2}{3}\left(9\times 6.582\times 10^{-16}\right)\right)\exp\left(\frac{4}{3}\left(9\times 6.582\times 10^{-16}\right)\right)$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.0000000000000118476...

And:

2((((exp(((2/3(9*6.582*10^-16)))) ((((exp(((4/3(9*6.582*10^-16))))

Input interpretation:

$2\left(\exp\left(\frac{2}{3}\left(9\times 6.582\times 10^{-16}\right)\right)\exp\left(\frac{4}{3}\left(9\times 6.582\times 10^{-16}\right)\right)\right)$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

2.0000000000000236952...

((((e^(((1/2(18*6.582*10^-16)))) ((((e^(((2/2(18*6.582*10^-16)))) ((((e^(((3/2(18*6.582*10^-16))))

Input interpretation:

$$\exp\left(\frac{1}{2}\left(18\times 6.582\times 10^{-16}\right)\right)\left(\exp\left(\frac{2}{2}\left(18\times 6.582\times 10^{-16}\right)\right)\exp\left(\frac{3}{2}\left(18\times 6.582\times 10^{-16}\right)\right)\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.000000000000035543...

And:

2((((e^(((1/2(18*6.582*10^-16)))) ((((e^(((2/2(18*6.582*10^-16)))) ((((e^(((3/2(18*6.582*10^-16))))

Input interpretation:

$$2\left(\exp\left(\frac{1}{2}\left(18\times 6.582\times 10^{-16}\right)\right)\left(\exp\left(\frac{2}{2}\left(18\times 6.582\times 10^{-16}\right)\right)\exp\left(\frac{3}{2}\left(18\times 6.582\times 10^{-16}\right)\right)\right)\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

2.000000000000071086...

The results 1 and 2 are the spin of the photon and graviton (gauge bosons)

Furthermore, we obtain:

0.0864055+1.0864055 1/ ln (((((2((((exp(((2/3(9*6.582*10^-16)))) ((((exp(((4/3(9*6.582*10^-16))))))))))

Where 0.0864055 and 1.0864055 are Ramanujan mock theta functions

Input interpretation:

$$0.0864055+1.0864055\times\frac{1}{\log\left(2\left(\exp\left(\frac{2}{3}\left(9\times 6.582\times 10^{-16}\right)\right)\exp\left(\frac{4}{3}\left(9\times 6.582\times 10^{-16}\right)\right)\right)\right)}$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.653757...

1.653757... is a golden number, very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164{,}2696$ i.e. 1,65578...

((((((((((((e ln(9) ((((((((0.0864055+1.0864055 1/ ln (((((2((((exp(((2/3(9*6.582*10^-16)))) ((((exp(((4/3(9*6.582*10^-16)))))))))))))))))))))))))))))^1/2

Input interpretation:

$$\sqrt{\left(e \log(9) \left(0.0864055 + 1.0864055 \times \frac{1}{\log\left(2\left(\exp\left(\frac{2}{3}\left(9\times 6.582\times 10^{-16}\right)\right)\exp\left(\frac{4}{3}\left(9\times 6.582\times 10^{-16}\right)\right)\right)\right)}\right)\right)}$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

3.1428261...

And:

2(((((((((((((e ln(9) ((((((((0.0864055+1.0864055 1/ ln (((((2((((exp(((2/3(9*6.582*10^-16)))) ((((exp(((4/3(9*6.582*10^-16)))))))))))))))))))))))))))))^1/2

Input interpretation:

$$2\sqrt{\left(e \log(9) \left(0.0864055 + 1.0864055 \times \frac{1}{\log\left(2\left(\exp\left(\frac{2}{3}\left(9\times 6.582\times 10^{-16}\right)\right)\exp\left(\frac{4}{3}\left(9\times 6.582\times 10^{-16}\right)\right)\right)\right)}\right)\right)}$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

6.2856523...

6.2856523 ≈ 2π

0.0864055+1.0864055 1/ ln((((((2((((e^(((1/2(18*6.582*10^-16)))) ((((e^(((2/2(18*6.582*10^-16)))) ((((e^(((3/2(18*6.582*10^-16))))))))))

Input interpretation:

$$0.0864055 + 1.0864055 \times 1 \Big/ \log\left(2\left(\exp\left(\frac{1}{2}\left(18\times 6.582\times 10^{-16}\right)\right)\left(\exp\left(\frac{2}{2}\left(18\times 6.582\times 10^{-16}\right)\right)\exp\left(\frac{3}{2}\left(18\times 6.582\times 10^{-16}\right)\right)\right)\right)\right)$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.653757...

1.653757... to the 14th root of the following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3 = 1164{,}2696$ i.e. 1,65578...

sqrt[(((((e ln(9) (0.0864055+1.0864055 1/ ln((((((2((((e^(((1/2(18*6.582*10^-16)))) ((((e^(((2/2(18*6.582*10^-16)))) ((((e^(((3/2(18*6.582*10^-16)))))]

Input interpretation:

$$\sqrt{\left(e \log(9) \left(0.0864055 + 1.0864055 \times 1 \Big/ \log\left(2 \left(\exp\left(\frac{1}{2} \left(18 \times 6.582 \times 10^{-16}\right)\right) \left(\exp\left(\frac{2}{2} \left(18 \times 6.582 \times 10^{-16}\right)\right) \exp\left(\frac{3}{2} \left(18 \times 6.582 \times 10^{-16}\right)\right)\right)\right)\right)\right)\right)}$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

3.1428261...

$3.1428261\ldots \approx \pi$

that is a identical result as the previous expression.

From:

Robbert Dijkgraaf and Edward Witten - **Developments In Topological Gravity** - arXiv:1804.03275v3 [hep-th] 15 May 2018

A special case is the computation of volumes. As before, we write just κ for κ_1, and we define the volume of $\overline{\mathcal{M}}_g$ as $\int_{\overline{\mathcal{M}}_g} \kappa^{3g-3}/(3g-3)!$. This can be expressed in terms of correlation functions of the τ's, but one has to take the contact terms into account.

As an example, we consider the case of a closed surface of genus 2. The volume of the compactified moduli space $\overline{\mathcal{M}}_2$ is

$$V_2 = \frac{1}{3!}\langle \kappa\kappa\kappa \rangle, \tag{2.16}$$

and we want to compare this to topological gravity correlation functions such as

$$\frac{1}{3!}\langle \tau_2\tau_2\tau_2 \rangle. \tag{2.17}$$

By integrating over the position of one puncture, we can replace one copy of τ_2 with κ, while also generating contact terms. In such a contact term, τ_2 collides with some τ_s, $s \geq 0$, to generate a contact term τ_{s+1}. Thus for example

$$\langle \tau_2\tau_2\tau_2 \rangle = \langle \kappa\tau_2\tau_2 \rangle + 2\langle \tau_3\tau_2 \rangle, \tag{2.18}$$

where the factor of 2 reflects the fact that the first τ_2 may collide with either of the two other τ_2 insertions to generate a τ_3. The same process applies if factors of κ are already present; they do not generate additional contact terms. For example,

$$\langle \kappa\tau_2\tau_2 \rangle = \langle \kappa\kappa\tau_2 \rangle + \langle \kappa\tau_3 \rangle = \langle \kappa\kappa\kappa \rangle + \langle \kappa\tau_3 \rangle. \tag{2.19}$$

Similarly

$$\langle \tau_2\tau_3 \rangle = \langle \kappa\tau_3 \rangle + \langle \tau_4 \rangle. \tag{2.20}$$

Taking linear combinations of these formulas, we learn finally that

$$\langle \kappa\kappa\kappa \rangle = \langle \tau_2\tau_2\tau_2 \rangle - 3\langle \tau_2\tau_3 \rangle + \langle \tau_4 \rangle. \tag{2.21}$$

This is equivalent to saying that V_2, which is the term of order ξ^3 in

$$\langle \exp(\xi\kappa) \rangle, \tag{2.22}$$

is equally well the term of order ξ^3 in

$$\left\langle \exp\left(\xi\tau_2 - \frac{\xi^2}{2!}\tau_3 + \frac{\xi^3}{3!}\tau_4\right)\right\rangle. \tag{2.23}$$

The generalization of this for higher genus is that

$$\Big\langle \exp(\xi\kappa) \Big\rangle = \left\langle \exp\left(\sum_{k=2}^{\infty} \frac{(-1)^k \xi^{k-1}}{(k-1)!}\tau_k\right)\right\rangle. \tag{2.24}$$

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The volume of $\overline{\mathcal{M}}_g$ is the coefficient of ξ^{3g-3} in the expansion of either of these formulas.

From (2.24), we obtain various solutions:

exp [sum (((-1)^k * 1^(k-1)/(k-1)!)), k = 2 to infinity]

Input interpretation:

$$\exp\left(\sum_{k=2}^{\infty} (-1)^k \times \frac{1^{k-1}}{(k-1)!}\right)$$

- $n!$ is the factorial function

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Result:

- More digits

$e^{(e-1)/e} \approx 1.8816$

Note that:

-12 + 10^3 * exp [sum (((-1)^k * 1^(k-1)/(k-1)!)), k = 2 to infinity]

Input interpretation:

$$-12 + 10^3 \exp\left(\sum_{k=2}^{\infty} (-1)^k \times \frac{1^{k-1}}{(k-1)!}\right)$$

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$1000\, e^{(e-1)/e} - 12 \approx 1869.6$

1869.6

Alternate forms:

$1000\, e^{1-1/e} - 12$

Open code

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$4\left(250\, e^{1-1/e} - 3\right)$

$-4\, e^{-1/e}\left(3\sqrt[e]{e} - 250\, e\right)$

Open code

The result, 1869.6 is practically equal to the rest mass of the D meson 1869.62

Now:

exp [sum (((-1)^k * 2^(k-1)/(k-1)! * 2)), k = 2 to infinity

Input interpretation:

$$\exp\left(\sum_{k=2}^{\infty} (-1)^k \times \frac{2^{k-1}}{(k-1)!} \times 2\right)$$

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$e^{2-2/e^2} \approx 5.63687$

Note that:

-16 + 10^3 * exp [sum (((-1)^k * 2^(k-1)/(k-1)! * 2)), k = 2 to infinity]

Input interpretation:

$$-16 + 10^3 \exp\left(\sum_{k=2}^{\infty} (-1)^k \times \frac{2^{k-1}}{(k-1)!} \times 2\right)$$

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$$1000\, e^{2-2/e^2} - 16 \approx 5620.87$$

5620.87

Alternate forms:

$$8\left(125\, e^{2-2/e^2} - 2\right)$$

$$-8\, e^{-2/e^2}\left(2\, e^{2/e^2} - 125\, e^2\right)$$

Open code

The result, 5620.87 is practically equal to the rest mass of bottom Lambda baryon 5619.4

We have also:

((((((exp [sum (((-1)^k * 1^(k-1)/(k-1)!)), k = 2 to infinity])))))^3/4

Input interpretation:

$$\frac{1}{4} \exp^3\left(\sum_{k=2}^{\infty} (-1)^k \times \frac{1^{k-1}}{(k-1)!}\right)$$

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$$\frac{1}{4}\, e^{(3(e-1))/e} \approx 1.6654$$

1.6654 is a golden number, very near to the proton mass

Alternate form:

$$\frac{1}{4}\, e^{3-3/e}$$

Open code

((((((exp [sum (((-1)^k * 2^(k-1)/(k-1)! * 2)), k = 2 to infinity])))))^1/17

Input interpretation:

$$\sqrt[17]{\exp\left(\sum_{k=2}^{\infty} (-1)^k \times \frac{2^{k-1}}{(k-1)!} \times 2\right)}$$

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$e^{2/17-2/(17e^2)} \approx 1.10708$

Alternate form:

$e^{2/17(1-1/e^2)}$

Open code

((((((exp [sum (((-1)^k * 3^(k-1)/(k-1)! * 3)), k = 2 to infinity]))))))^1/28.397

Where 28.397 ≈ 15.8174 + 12.5664 = 28.3838

Input interpretation:

$$\sqrt[28.397]{\exp\left(\sum_{k=2}^{\infty} (-1)^k \times \frac{3^{k-1}}{(k-1)!} \times 3\right)}$$

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

1.1056

The results 1.1070 and 1.1056 are very near (the second is equal) to the value of the Cosmological Constant:

$\Lambda = 1.1056 \times 10^{-52}\ \mathrm{m}^{-2}$,

Furthermore:

8+ 10^3 * ((((((exp [sum (((-1)^k * 2^(k-1)/(k-1)! * 2)), k = 2 to infinity]))))))^1/17

Input interpretation:

$$8 + 10^3 \sqrt[17]{\exp\left(\sum_{k=2}^{\infty} (-1)^k \times \frac{2^{k-1}}{(k-1)!} \times 2\right)}$$

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$8 + 1000\, e^{2/17-2/(17e^2)} \approx 1115.08$

1115.08

Alternate forms:

$8 + 1000\, e^{2/17(1-1/e^2)}$

Open code

$8\left(1 + 125\, e^{2/17-2/(17e^2)}\right)$

$8\, e^{-2/(17e^2)}\left(125\, e^{2/17} + e^{2/(17e^2)}\right)$

Open code

The result 1115.08 is very near, practically equal, to the rest mass of Lambda baryon 1115.683

Then:

((((((exp [sum (((-1)^k * 3^(k-1)/(k-1)! * 3)), k = 2 to infinity])))))^1/6

Input interpretation:

$$\sqrt[6]{\exp\left(\sum_{k=2}^{\infty} (-1)^k \times \frac{3^{k-1}}{(k-1)!} \times 3\right)}$$

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$e^{1/2-1/(2e^3)} \approx 1.60819$

1.60819 is a golden number

((((((exp [sum (((-1)^k * 5^(k-1)/(k-1)! * 5)), k = 2 to infinity])))))

Input interpretation:

$$\exp\left(\sum_{k=2}^{\infty} (-1)^k \times \frac{5^{k-1}}{(k-1)!} \times 5\right)$$

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$e^{5-5/e^5} \approx 143.496$

-8+((((((exp [sum (((-1)^k * 5^(k-1)/(k-1)! * 5)), k = 2 to infinity])))))

Input interpretation:

$$-8 + \exp\left(\sum_{k=2}^{\infty} (-1)^k \times \frac{5^{k-1}}{(k-1)!} \times 5\right)$$

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$e^{5-5/e^5} - 8 \approx 135.496$

135.496

Alternate form:

$-e^{-5/e^5}\left(8\, e^{5/e^5} - e^5\right)$

Open code

This result, 135.496 is very near to the rest mass of Pion 134.9766

((((((12*((((((exp [sum (((-1)^k * 5^(k-1)/(k-1)! * 5)), k = 2 to infinity]))))))))))^1/15

Input interpretation:

$$\sqrt[15]{12 \exp\left(\sum_{k=2}^{\infty} (-1)^k \times \frac{5^{k-1}}{(k-1)!} \times 5\right)}$$

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$$2^{2/15} \sqrt[15]{3}\, e^{1/3-1/(3 e^5)} \approx 1.64337$$

1.64337 ≈ ζ (2)

2sqrt((((((6*((((((12*((((((exp [sum (((-1)^k * 5^(k-1)/(k-1)! * 5)), k = 2 to infinity]))))))))))^1/15))))))

Input interpretation:

$$2 \sqrt{6 \sqrt[15]{12 \exp\left(\sum_{k=2}^{\infty} (-1)^k \times \frac{5^{k-1}}{(k-1)!} \times 5\right)}}$$

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$$2 \times 2^{17/30} \times 3^{8/15}\, e^{1/6-1/(6 e^5)} \approx 6.28019$$

This result 6.28019 is a good approximation to 2π.

Now, we have that:

Returning to a theme from section 2.4, we are now also in a position to write the spectral curve that corresponds to the model computing the volumes of the moduli space of curves. As we have seen in equation (2.24), in that case the values of the coupling constants are

$$t_n = \frac{(-1)^n \xi^{n-1}}{(n-1)!}, \qquad n \geq 2, \tag{4.44}$$

which corresponds to

$$s_n = \frac{n(-1)^n 2^{2n} \xi^{n-1}}{(2n+1)!}, \qquad n \geq 2. \tag{4.45}$$

Plugging this into (4.35) we find

$$y = \frac{\sin(2\sqrt{\xi x})}{2\sqrt{2\xi}} \tag{4.46}$$

From (4.44), we obtain:

8/3!

Input:

$$\frac{8}{3!}$$

Open code

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\frac{4}{3}$$

Decimal approximation:

- More digits

1.333333333333333333333333333333333333333333333333333333333333...

Open code

Series representation:

$$\frac{8}{3!} = \frac{8}{\sum_{k=0}^{\infty} \frac{(3-n_0)^k \Gamma^{(k)}(1+n_0)}{k!}} \quad \text{for } ((n_0 \notin \mathbb{Z} \text{ or } n_0 \geq 0) \text{ and } n_0 \to 3)$$

Open code

- $\mathbb{Z}$ is the set of integers
- More information

Enlarge Data Customize A Plaintext Interactive

Integral representations:

$$\frac{8}{3!} = \frac{8}{\int_0^\infty e^{-t} t^3 \, dt}$$

Open code

$$\frac{8}{3!} = \frac{8}{\int_0^1 \log^3\left(\frac{1}{t}\right) dt}$$

Open code

$$\frac{8}{3!} = \frac{8}{\int_1^\infty e^{-t} t^3 \, dt + \sum_{k=0}^{\infty} \frac{(-1)^k}{(4+k) k!}}$$

Open code

- $\log(x)$ is the natural logarithm

From (4.45), we obtain:

(4*2^8*2^3)/9!

Input:

$$\frac{4\times 2^8\times 2^3}{9!}$$

Open code

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\frac{64}{2835}$$

Decimal approximation:

- More digits

0.022574955908289241622574955908289241622574955908289241622...

Open code

Alternative representations:

- More

$$\frac{4(2^8\times 2^3)}{9!} = \frac{32\times 2^8}{\Gamma(10)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{4(2^8\times 2^3)}{9!} = \frac{32\times 2^8}{\Gamma(10,0)}$$

Open code

$$\frac{4(2^8\times 2^3)}{9!} = \frac{32\times 2^8}{(1)_9}$$

Open code

- $\Gamma(x)$ is the gamma function
- $\Gamma(a, x)$ is the incomplete gamma function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- More information

Enlarge Data Customize A Plaintext Interactive

Series representation:

$$\frac{4(2^8\times 2^3)}{9!} = \frac{8192}{\sum_{k=0}^{\infty} \frac{(9-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}} \quad \text{for } ((n_0 \notin \mathbb{Z} \text{ or } n_0 \geq 0) \text{ and } n_0 \to 9)$$

Open code

- $\mathbb{Z}$ is the set of integers
- More information

Enlarge Data Customize A Plaintext Interactive

Integral representations:

$$\frac{4(2^8 \times 2^3)}{9!} = \frac{8192}{\int_0^\infty e^{-t} t^9 \, dt}$$

Open code

$$\frac{4(2^8 \times 2^3)}{9!} = \frac{8192}{\int_0^1 \log^9\left(\frac{1}{t}\right) dt}$$

Open code

$$\frac{4(2^8 \times 2^3)}{9!} = \frac{8192}{\int_1^\infty e^{-t} t^9 \, dt + \sum_{k=0}^\infty \frac{(-1)^k}{(10+k)k!}}$$

Open code

- $\log(x)$ is the natural logarithm

From the sum of eqs. (4.44) and (4.45), we obtain:

(4*2^8*8)/9! + 8/3!

Input:

$$\frac{4 \times 2^8 \times 8}{9!} + \frac{8}{3!}$$

Open code

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\frac{3844}{2835}$$

Decimal approximation:

- More digits

1.355908289241622574955908289241622574955908289241622574955...

Open code

Series representation:

$$\frac{4(2^8 \times 8)}{9!} + \frac{8}{3!} = \frac{8\left(1024 \sum_{k=0}^\infty \frac{(3-n_0)^k \Gamma^{(k)}(1+n_0)}{k!} + \sum_{k=0}^\infty \frac{(9-n_0)^k \Gamma^{(k)}(1+n_0)}{k!}\right)}{\left(\sum_{k=0}^\infty \frac{(3-n_0)^k \Gamma^{(k)}(1+n_0)}{k!}\right) \sum_{k=0}^\infty \frac{(9-n_0)^k \Gamma^{(k)}(1+n_0)}{k!}}$$

for ($(n_0 \geq 0$ or $n_0 \notin \mathbb{Z})$ and $n_0 \to 3$ and $n_0 \to 9$)

Integral representations:

$$\frac{4(2^8 \times 8)}{9!} + \frac{8}{3!} = \frac{8\left(1024 \int_0^1 \log^3\left(\frac{1}{t}\right) dt + \int_0^1 \log^9\left(\frac{1}{t}\right) dt\right)}{\left(\int_0^1 \log^3\left(\frac{1}{t}\right) dt\right) \int_0^1 \log^9\left(\frac{1}{t}\right) dt}$$

Open code

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$$\frac{4(2^8 \times 8)}{9!} + \frac{8}{3!} = \frac{8\left(1024 \int_0^\infty e^{-t}\, t^3\, dt + \int_0^\infty e^{-t}\, t^9\, dt\right)}{\left(\int_0^\infty e^{-t}\, t^3\, dt\right) \int_0^\infty e^{-t}\, t^9\, dt}$$

Open code

$$\frac{4(2^8 \times 8)}{9!} + \frac{8}{3!} = \frac{8\left(1024 \int_1^\infty e^{-t}\, t^3\, dt + \int_1^\infty e^{-t}\, t^9\, dt + 1024 \sum_{k=0}^\infty \frac{(-1)^k}{(4+k)k!} + \sum_{k=0}^\infty \frac{(-1)^k}{(10+k)k!}\right)}{\left(\int_1^\infty e^{-t}\, t^3\, dt + \sum_{k=0}^\infty \frac{(-1)^k}{(4+k)k!}\right)\left(\int_1^\infty e^{-t}\, t^9\, dt + \sum_{k=0}^\infty \frac{(-1)^k}{(10+k)k!}\right)}$$

Open code

- $\log(x)$ is the natural logarithm
  - More information

1/ (((((4*2^8*8)/9! + 8/3!))))

Input:

$$\frac{1}{\frac{4 \times 2^8 \times 8}{9!} + \frac{8}{3!}}$$

Open code

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\frac{2835}{3844}$$

Decimal approximation:

- More digits

0.7375130072840790842872008324661810613943808532778355879 29...

0.737513....

Series representation:

$$\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}} = \frac{\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(3-n_0)^{k_1}(9-n_0)^{k_2}\Gamma^{(k_1)}(1+n_0)\Gamma^{(k_2)}(1+n_0)}{k_1!k_2!}}{8\left(1024\sum_{k=0}^{\infty}\frac{(3-n_0)^k\Gamma^{(k)}(1+n_0)}{k!}+\sum_{k=0}^{\infty}\frac{(9-n_0)^k\Gamma^{(k)}(1+n_0)}{k!}\right)}$$

for $((n_0 \geq 0 \text{ or } n_0 \notin \mathbb{Z}) \text{ and } n_0 \to 3 \text{ and } n_0 \to 9)$

- $\mathbb{Z}$ is the set of integers
  - More information

Enlarge Data Customize A Plaintext Interactive

Integral representation:

$$\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}} = \int_0^1\int_0^1 \log^3\left(\frac{1}{t_1}\right)\log^9\left(\frac{1}{t_2}\right)dt_2\,dt_1$$

Open code

- $\log(x)$ is the natural logarithm
  - More information

2.025^2((((((1/ (((((4*2^8*8)/9! + 8/3!)))))))))^3

Where 2,025 is the mean of two Hausdorff dimensions 2 and 2.05

Input:

$$2.025^2\left(\frac{1}{\frac{4\times 2^8\times 8}{9!}+\frac{8}{3!}}\right)^3$$

Open code

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.644974264364960895159374555878602603790214589543770016205...

1.64497426436... ≅ ζ (2)

Series representation:

$$2.025^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3 = \frac{7.45899\times 10^{-12}\left(\sum_{k=0}^{\infty}\frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}\right)^3\left(\sum_{k=0}^{\infty}\frac{(9-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}\right)^3}{\left(\sum_{k=0}^{\infty}\frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}+0.000976563\sum_{k=0}^{\infty}\frac{(9-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}\right)^3}$$

for (($n_0 \geq 0$ or $n_0 \notin \mathbb{Z}$) and $n_0 \to 3$ and $n_0 \to 9$)

- $\mathbb{Z}$ is the set of integers

Integral representations:

$$2.025^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3 = \frac{7.45899\times 10^{-12}\left(\int_0^1\log^3\left(\frac{1}{t}\right)dt\right)^3\left(\int_0^1\log^9\left(\frac{1}{t}\right)dt\right)^3}{\left(\int_0^1\log^3\left(\frac{1}{t}\right)dt+0.000976563\int_0^1\log^9\left(\frac{1}{t}\right)dt\right)^3}$$

Open code

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$$2.025^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3 = \frac{7.45899\times 10^{-12}\left(\int_0^\infty e^{-t}\,t^3\,dt\right)^3\left(\int_0^\infty e^{-t}\,t^9\,dt\right)^3}{\left(\int_0^\infty e^{-t}\,t^3\,dt+0.000976563\int_0^\infty e^{-t}\,t^9\,dt\right)^3}$$

Open code

$$2.025^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3 = \left(7.45899\times 10^{-12}\left(\int_1^\infty e^{-t}\,t^3\,dt+\sum_{k=0}^{\infty}\frac{(-1)^k}{(4+k)\,k!}\right)^3\left(\int_1^\infty e^{-t}\,t^9\,dt+\sum_{k=0}^{\infty}\frac{(-1)^k}{(10+k)\,k!}\right)^3\right)\Big/ \left(\int_1^\infty e^{-t}\,t^3\,dt+0.000976563\int_1^\infty e^{-t}\,t^9\,dt+\sum_{k=0}^{\infty}\frac{(-1)^k}{(4+k)\,k!}+0.000976563\sum_{k=0}^{\infty}\frac{(-1)^k}{(10+k)\,k!}\right)^3$$

Open code

- $\log(x)$ is the natural logarithm

sqrt((((((((((6*2.025^2((((((1/ (((((4*2^8*8)/9! + 8/3!))))))))))^3))))))))))

Input:

$$\sqrt{6\times 2.025^2\left(\frac{1}{\frac{4\times 2^8\times 8}{9!}+\frac{8}{3!}}\right)^3}$$

Open code

- $n!$ is the factorial function

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Result:

- More digits

3.14163...

Series representations:

- More

$$\sqrt{6\times 2.025^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} = \sqrt{-1+\frac{0.0480542\,(3!)^3\,(9!)^3}{(1024\times 3!+9!)^3}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+\frac{0.0480542\,(3!)^3\,(9!)^3}{(1024\times 3!+9!)^3}\right)^{-k}$$

Open code

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$$\sqrt{6\times 2.025^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} = \sqrt{-1+\frac{0.0480542\,(3!)^3\,(9!)^3}{(1024\times 3!+9!)^3}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+\frac{0.0480542\,(3!)^3\,(9!)^3}{(1024\times 3!+9!)^3}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$\sqrt{6\times 2.025^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} = \sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{0.0480542\,(3!)^3\,(9!)^3}{(1024\times 3!+9!)^3}-z_0\right)^k z_0^{-k}}{k!}$$

for not $((z_0\in\mathbb{R}$ and $-\infty<z_0\leq 0))$

Open code

- $\binom{n}{m}$ is the binomial coefficient
- $\mathbb{R}$ is the set of real numbers
- More information

Integral representations:

$$\sqrt{6\times 2.025^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3}=\sqrt{\frac{24.6037}{\left(\frac{8}{\int_0^1 \log^3\left(\frac{1}{t}\right)dt}+\frac{8192}{\int_0^1 \log^9\left(\frac{1}{t}\right)dt}\right)^3}}$$

Open code

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$$\sqrt{6\times 2.025^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3}=\sqrt{\frac{24.6037}{\left(\frac{8}{\int_0^\infty e^{-t}\,t^3\,dt}+\frac{8192}{\int_0^\infty e^{-t}\,t^9\,dt}\right)^3}}$$

Open code

$$\sqrt{6\times 2.025^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3}=\sqrt{\frac{24.6037}{\left(\frac{8}{\int_1^\infty e^{-t}\,t^3\,dt+\sum_{k=0}^\infty \frac{(-1)^k}{(4+k)k!}}+\frac{8192}{\int_1^\infty e^{-t}\,t^9\,dt+\sum_{k=0}^\infty \frac{(-1)^k}{(10+k)k!}}\right)^3}}$$

Open code

- $\log(x)$ is the natural logarithm

2sqrt(((((((((6*2.025^2((((((1/ (((((4*2^8*8)/9! + 8/3!)))))))))^3))))))))))

Input:

$$2\sqrt{6\times 2.025^2\left(\frac{1}{\frac{4\times 2^8\times 8}{9!}+\frac{8}{3!}}\right)^3}$$

Open code

- $n!$ is the factorial function

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Result:

- More digits

6.28326...

6.28326... ≈ 2π

Series representations:

- More

$$2\sqrt{6\times 2.025^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} =$$

$$2\sqrt{-1+\frac{0.0480542\,(3!)^3\,(9!)^3}{(1024\times 3!+9!)^3}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+\frac{0.0480542\,(3!)^3\,(9!)^3}{(1024\times 3!+9!)^3}\right)^{-k}$$

Open code

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$$2\sqrt{6\times 2.025^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} =$$

$$2\sqrt{-1+\frac{0.0480542\,(3!)^3\,(9!)^3}{(1024\times 3!+9!)^3}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+\frac{0.0480542\,(3!)^3\,(9!)^3}{(1024\times 3!+9!)^3}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$2\sqrt{6\times 2.025^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} = 2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{0.0480542\,(3!)^3\,(9!)^3}{(1024\times 3!+9!)^3}-z_0\right)^k z_0^{-k}}{k!}$$

for not $((z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0))$

Open code

- $\binom{n}{m}$ is the binomial coefficient
- $\mathbb{R}$ is the set of real numbers
- More information

Integral representations:

$$2\sqrt{6\times 2.025^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} = 2\sqrt{\frac{24.6037}{\left(\frac{8}{\int_0^1 \log^3\left(\frac{1}{t}\right)dt}+\frac{8192}{\int_0^1 \log^9\left(\frac{1}{t}\right)dt}\right)^3}}$$

Open code

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$$2\sqrt{6\times 2.025^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} = 2\sqrt{\frac{24.6037}{\left(\frac{8}{\int_0^\infty e^{-t}\,t^3\,dt}+\frac{8192}{\int_0^\infty e^{-t}\,t^9\,dt}\right)^3}}$$

Open code

$$2\sqrt{6\times 2.025^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} =$$
$$2\sqrt{\frac{24.6037}{\left(\frac{8}{\int_1^\infty e^{-t}\,t^3\,dt+\sum_{k=0}^\infty \frac{(-1)^k}{(4+k)\,k!}}+\frac{8192}{\int_1^\infty e^{-t}\,t^9\,dt+\sum_{k=0}^\infty \frac{(-1)^k}{(10+k)\,k!}}\right)^3}}$$

Open code

- $\log(x)$ is the natural logarithm
- More information

sqrt((((((((((6*((27*3)/(24+16))^2((((((1/ (((((4*2^8*8)/9! + 8/3!)))))))))))^3))))))))))

Input:

$$\sqrt{6\left(\frac{27\times 3}{24+16}\right)^2\left(\frac{1}{\frac{4\times 2^8\times 8}{9!}+\frac{8}{3!}}\right)^3}$$

Open code

- $n!$ is the factorial function

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Exact result:

$$\frac{413\,343\sqrt{\frac{105}{2}}}{953\,312}$$

Decimal approximation:

- More digits

3.141631039156215965170161394547128827371265620726214614628...

Open code

Series representations:

- More

$$\sqrt{6\left(\frac{27\times 3}{24+16}\right)^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} = \sqrt{-1+\frac{19683}{800\left(\frac{8}{3!}+\frac{8192}{9!}\right)^3}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+\frac{19683}{800\left(\frac{8}{3!}+\frac{8192}{9!}\right)^3}\right)^{-k}$$

Open code

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$$\sqrt{6\left(\frac{27\times 3}{24+16}\right)^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} = \sqrt{-1+\frac{19683}{800\left(\frac{8}{3!}+\frac{8192}{9!}\right)^3}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+\frac{19683}{800\left(\frac{8}{3!}+\frac{8192}{9!}\right)^3}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$\sqrt{6\left(\frac{27\times 3}{24+16}\right)^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} = \sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{19683}{800\left(\frac{8}{3!}+\frac{8192}{9!}\right)^3}-z_0\right)^k z_0^{-k}}{k!}$$

for not $((z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0))$

Open code

- $\binom{n}{m}$ is the binomial coefficient
- $\mathbb{R}$ is the set of real numbers
- More information

Integral representations:

$$\sqrt{6\left(\frac{27\times 3}{24+16}\right)^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} = \sqrt{\frac{19683}{800\left(\frac{8}{\int_0^1 \log^3\left(\frac{1}{t}\right)dt}+\frac{8192}{\int_0^1 \log^9\left(\frac{1}{t}\right)dt}\right)^3}}$$

Open code

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$$\sqrt{6\left(\frac{27\times 3}{24+16}\right)^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} = \sqrt{\frac{19683}{800\left(\frac{8}{\int_0^\infty e^{-t}\,t^3\,dt}+\frac{8192}{\int_0^\infty e^{-t}\,t^9\,dt}\right)^3}}$$

Open code

$$\sqrt{6\left(\frac{27\times 3}{24+16}\right)^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} =$$
$$\sqrt{\frac{19683}{800\left(\frac{8}{\int_1^\infty e^{-t}\,t^3\,dt+\sum_{k=0}^\infty \frac{(-1)^k}{(4+k)k!}}+\frac{8192}{\int_1^\infty e^{-t}\,t^9\,dt+\sum_{k=0}^\infty \frac{(-1)^k}{(10+k)k!}}\right)^3}}$$

Open code

- $\log(x)$ is the natural logarithm
  - More information

2sqrt((((((((((6*((27*3)/(24+16))^2((((((1/ (((((4*2^8*8)/9! + 8/3!))))))))))^3))))))))))

Input:

$$2\sqrt{6\left(\frac{27\times 3}{24+16}\right)^2\left(\frac{1}{\frac{4\times 2^8\times 8}{9!}+\frac{8}{3!}}\right)^3}$$

Open code

- $n!$ is the factorial function

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Exact result:

$$\frac{413\,343\sqrt{\frac{105}{2}}}{476\,656}$$

Decimal approximation:

- More digits

6.283262078312431930340322789094257654742531241452429229256...

Open code

6.283262.... ≈ 2π

Continued fraction:

- Linear form

$$6+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{66+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{16+\cfrac{1}{1+\cfrac{1}{13+\cfrac{1}{26+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$2\sqrt{6\left(\frac{27\times3}{24+16}\right)^2\left(\frac{1}{\frac{4(2^8\times8)}{9!}+\frac{8}{3!}}\right)^3}=$$

$$2\sqrt{-1+\frac{19\,683}{800\left(\frac{8}{3!}+\frac{8192}{9!}\right)^3}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+\frac{19\,683}{800\left(\frac{8}{3!}+\frac{8192}{9!}\right)^3}\right)^{-k}$$

Open code

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$$2\sqrt{6\left(\frac{27\times 3}{24+16}\right)^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} =$$

$$2\sqrt{-1+\frac{19683}{800\left(\frac{8}{3!}+\frac{8192}{9!}\right)^3}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+\frac{19683}{800\left(\frac{8}{3!}+\frac{8192}{9!}\right)^3}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$2\sqrt{6\left(\frac{27\times 3}{24+16}\right)^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} = 2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{19683}{800\left(\frac{8}{3!}+\frac{8192}{9!}\right)^3}-z_0\right)^k z_0^{-k}}{k!}$$

for not $((z_0\in\mathbb{R}$ and $-\infty<z_0\leq 0))$

Open code

- $\binom{n}{m}$ is the binomial coefficient
- $\mathbb{R}$ is the set of real numbers
- More information

Integral representations:

$$2\sqrt{6\left(\frac{27\times 3}{24+16}\right)^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} = 2\sqrt{\frac{19683}{800\left(\frac{8}{\int_0^1\log^3\left(\frac{1}{t}\right)dt}+\frac{8192}{\int_0^1\log^9\left(\frac{1}{t}\right)dt}\right)^3}}$$

Open code

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$$2\sqrt{6\left(\frac{27\times 3}{24+16}\right)^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} = 2\sqrt{\frac{19683}{800\left(\frac{8}{\int_0^\infty e^{-t}t^3\,dt}+\frac{8192}{\int_0^\infty e^{-t}t^9\,dt}\right)^3}}$$

Open code

$$2\sqrt{6\left(\frac{27\times 3}{24+16}\right)^2\left(\frac{1}{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}}\right)^3} = 2\sqrt{\frac{19683}{800\left(\frac{8}{\int_1^\infty e^{-t}\,t^3\,dt+\sum_{k=0}^\infty\frac{(-1)^k}{(4+k)\,k!}}+\frac{8192}{\int_1^\infty e^{-t}\,t^9\,dt+\sum_{k=0}^\infty\frac{(-1)^k}{(10+k)\,k!}}\right)^3}}$$

Open code

- $\log(x)$ is the natural logarithm
- More information

From (4.46), we obtain:

sin(2*sqrt(2))/((2sqrt(2*2))

Input:

$$\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}$$

Open code

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Exact result:

$$\frac{1}{4}\sin\left(2\sqrt{2}\right)$$

Decimal approximation:

- More digits

0.077017935590761258033409983710248309654579876103525785354...

Open code

Property:

$\frac{1}{4}\sin\left(2\sqrt{2}\right)$ is a transcendental number

Open code

Continued fraction:

- Linear form

$$\cfrac{1}{12+\cfrac{1}{1+\cfrac{1}{61+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{45+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{\sin(2\sqrt{2})}{2\sqrt{2}\times 2} = \frac{1}{4}\sum_{k=0}^{\infty}\frac{(-1)^k\, 2^{3/2+3k}}{(1+2k)!}$$

Open code

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$$\frac{\sin(2\sqrt{2})}{2\sqrt{2}\times 2} = \frac{1}{2}\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(2\sqrt{2}\right)$$

Open code

$$\frac{\sin(2\sqrt{2})}{2\sqrt{2}\times 2} = \frac{1}{4}\sum_{k=0}^{\infty}\frac{(-1)^k\left(2\sqrt{2}-\frac{\pi}{2}\right)^{2k}}{(2k)!}$$

Open code

- $n!$ is the factorial function
- $J_n(z)$ is the Bessel function of the first kind
- More information

Integral representations:

$$\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}} = \frac{1}{\sqrt{2}} \int_0^1 \cos\left(2\sqrt{2}\, t\right) dt$$

$$\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}} = -\frac{i}{4\sqrt{2\pi}} \int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{e^{-2/s+s}}{s^{3/2}}\, ds \quad \text{for } \gamma > 0$$

$$\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}} = -\frac{i}{8\sqrt{\pi}} \int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{2^{1/2-s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}\, ds \quad \text{for } 0 < \gamma < 1$$

Multiple-argument formulas:

- More

$$\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}} = \frac{1}{2} \cos\left(\sqrt{2}\right) \sin\left(\sqrt{2}\right)$$

Open code

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$$\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}} = \frac{1}{4}\left(3\sin\left(\frac{2\sqrt{2}}{3}\right) - 4\sin^3\left(\frac{2\sqrt{2}}{3}\right)\right)$$

Open code

$$\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}} = \frac{1}{2}\prod_{k=0}^{1} \sin\left(\sqrt{2} + \frac{k\pi}{2}\right)$$

Open code

21 * sin(2*sqrt(2))/((2sqrt(2*2))

Input:

$$21 \times \frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}$$

Open code

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Exact result:

$$\frac{21}{4}\sin\left(2\sqrt{2}\right)$$

Decimal approximation:

- More digits

1.617376647405986418701609657915214502746177398174041492440...

Open code

This result is a very good approximation to the value of the golden ratio 1,618033988749...

Property:

$\frac{21}{4}\sin\left(2\sqrt{2}\right)$ is a transcendental number

Alternate forms:

$$\frac{21}{2}\sin\left(\sqrt{2}\right)\cos\left(\sqrt{2}\right)$$

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$$\frac{21}{8} i e^{-2 i \sqrt{2}} - \frac{21}{8} i e^{2 i \sqrt{2}}$$

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{157+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{6+\cfrac{1}{2+\cfrac{1}{13+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}$$

Open code

Series representations:

- More

$$\frac{21\sin\left(2\sqrt{2}\right)}{2\sqrt{2\times 2}} = \frac{21}{4}\sum_{k=0}^{\infty}\frac{(-1)^k\, 2^{3/2+3k}}{(1+2k)!}$$

Open code

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$$\frac{21\sin\left(2\sqrt{2}\right)}{2\sqrt{2\times 2}} = \frac{21}{2}\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(2\sqrt{2}\right)$$

Open code

$$\frac{21\sin(2\sqrt{2})}{2\sqrt{2}\times 2} = \frac{21}{4}\sum_{k=0}^{\infty}\frac{(-1)^k\left(2\sqrt{2}-\frac{\pi}{2}\right)^{2k}}{(2k)!}$$

Open code

- $n!$ is the factorial function
- $J_n(z)$ is the Bessel function of the first kind
- More information

Integral representations:

$$\frac{21\sin(2\sqrt{2})}{2\sqrt{2}\times 2} = \frac{21}{\sqrt{2}}\int_0^1\cos\left(2\sqrt{2}\,t\right)dt$$

Open code

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$$\frac{21\sin(2\sqrt{2})}{2\sqrt{2}\times 2} = -\frac{21\,i}{4\sqrt{2\pi}}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-2/s+s}}{s^{3/2}}\,ds \quad \text{for } \gamma > 0$$

Open code

$$\frac{21\sin(2\sqrt{2})}{2\sqrt{2}\times 2} = -\frac{21\,i}{8\sqrt{\pi}}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{2^{1/2-s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}\,ds \quad \text{for } 0 < \gamma < 1$$

Open code

- $\Gamma(x)$ is the gamma function
-

Multiple-argument formulas:

- More

$$\frac{21\sin(2\sqrt{2})}{2\sqrt{2}\times 2} = \frac{21}{2}\cos\left(\sqrt{2}\right)\sin\left(\sqrt{2}\right)$$

Open code

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$$\frac{21\sin(2\sqrt{2})}{2\sqrt{2}\times 2} = \frac{21}{4}\left(3\sin\left(\frac{2\sqrt{2}}{3}\right) - 4\sin^3\left(\frac{2\sqrt{2}}{3}\right)\right)$$

Open code

$$\frac{21\sin(2\sqrt{2})}{2\sqrt{2\times 2}} = \frac{21}{2}\prod_{k=0}^{1}\sin\left(\sqrt{2}+\frac{k\pi}{2}\right)$$

Open code

From the sum of 4.44, 4.45 and 4.46, we obtain:

(4*2^8*8)/9! + 8/3! + sin(2*sqrt(2))/((2sqrt(2*2))

Input:

$$\frac{4\times 2^8\times 8}{9!} + \frac{8}{3!} + \frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}$$

Open code

- $n!$ is the factorial function

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Exact result:

$$\frac{3844}{2835} + \frac{1}{4}\sin\left(2\sqrt{2}\right)$$

Decimal approximation:

- More digits

1.432926224832383832989318272951870884610488165345148360310...

Open code

Property:

$\frac{3844}{2835} + \frac{1}{4}\sin\left(2\sqrt{2}\right)$ is a transcendental number

Series representations:

- More

$$\frac{4(2^8\times 8)}{9!} + \frac{8}{3!} + \frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}} = \frac{3844}{2835} + \frac{1}{4}\sum_{k=0}^{\infty}\frac{(-1)^k\, 2^{3/2+3k}}{(1+2k)!}$$

Open code

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$$\frac{4(2^8\times 8)}{9!} + \frac{8}{3!} + \frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}} = \frac{3844}{2835} + \frac{1}{2}\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(2\sqrt{2}\right)$$

Open code

$$\frac{4(2^8\times 8)}{9!} + \frac{8}{3!} + \frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}} = \frac{3844}{2835} + \frac{1}{4}\sum_{k=0}^{\infty}\frac{(-1)^k\left(2\sqrt{2}-\frac{\pi}{2}\right)^{2k}}{(2k)!}$$

Integral representations:

$$\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}=\frac{3844}{2835}+\frac{1}{\sqrt{2}}\int_0^1\cos\left(2\sqrt{2}\,t\right)dt$$

Open code

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$$\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}=\frac{3844}{2835}-\frac{i}{4\sqrt{2\pi}}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{-2/s+s}}{s^{3/2}}\,ds \quad \text{for } \gamma>0$$

Open code

$$\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}=\frac{3844}{2835}-\frac{i}{8\sqrt{\pi}}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{2^{1/2-s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}\,ds \quad \text{for } 0<\gamma<1$$

Open code

Multiple-argument formulas:

- More

$$\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}=\frac{3844}{2835}+\frac{1}{2}\cos\left(\sqrt{2}\right)\sin\left(\sqrt{2}\right)$$

Open code

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$$\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}=\frac{3844}{2835}+\frac{1}{4}\left(3\sin\left(\frac{2\sqrt{2}}{3}\right)-4\sin^3\left(\frac{2\sqrt{2}}{3}\right)\right)$$

Open code

$$\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}=\frac{3844}{2835}+\frac{1}{2}\prod_{k=0}^{1}\sin\left(\sqrt{2}+\frac{k\pi}{2}\right)$$

Open code

-55+10^3*(((((4*2^8*8)/9! + 8/3! + sin(2*sqrt(2))/((2sqrt(2*2))))))

Input:

$$-55+10^3\left(\frac{4\times 2^8\times 8}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)$$

Open code

- $n!$ is the factorial function

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Exact result:

$$1000\left(\frac{3844}{2835}+\frac{1}{4}\sin\left(2\sqrt{2}\right)\right)-55$$

Decimal approximation:

- More digits

1377.926224832383832989318272951870884610488165345148360310...

Open code

this result 1377.926... is very near to the rest mass of Sigma baryon 1382.8

Property:

$-55 + 1000\left(\frac{3844}{2835} + \frac{1}{4}\sin\left(2\sqrt{2}\right)\right)$ is a transcendental number

Open code

Series representations:

- More

$$-55 + 10^3\left(\frac{4(2^8 \times 8)}{9!} + \frac{8}{3!} + \frac{\sin(2\sqrt{2})}{2\sqrt{2}\times 2}\right) = \frac{737615}{567} + 250\sum_{k=0}^{\infty}\frac{(-1)^k\, 2^{3/2+3k}}{(1+2k)!}$$

Open code

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$$-55 + 10^3\left(\frac{4(2^8 \times 8)}{9!} + \frac{8}{3!} + \frac{\sin(2\sqrt{2})}{2\sqrt{2}\times 2}\right) = \frac{737615}{567} + 500\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(2\sqrt{2}\right)$$

Open code

$$-55 + 10^3\left(\frac{4(2^8 \times 8)}{9!} + \frac{8}{3!} + \frac{\sin(2\sqrt{2})}{2\sqrt{2}\times 2}\right) = \frac{737615}{567} + 250\sum_{k=0}^{\infty}\frac{(-1)^k\left(2\sqrt{2} - \frac{\pi}{2}\right)^{2k}}{(2k)!}$$

Open code

- $J_n(z)$ is the Bessel function of the first kind

Integral representations:

$$-55 + 10^3\left(\frac{4(2^8 \times 8)}{9!} + \frac{8}{3!} + \frac{\sin(2\sqrt{2})}{2\sqrt{2}\times 2}\right) = \frac{737615}{567} + 500\sqrt{2}\int_0^1 \cos\left(2\sqrt{2}\,t\right)dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$-55 + 10^3\left(\frac{4(2^8 \times 8)}{9!} + \frac{8}{3!} + \frac{\sin(2\sqrt{2})}{2\sqrt{2}\times 2}\right) = \frac{737615}{567} - 125\,i\sqrt{\frac{2}{\pi}}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-2/s+s}}{s^{3/2}}\,ds \quad \text{for } \gamma > 0$$

Open code

$$-55+10^3\left(\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=\frac{737615}{567}-\frac{125\,i}{\sqrt{\pi}}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{2^{1/2-s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}\,ds$$

for $0<\gamma<1$

Open code

Multiple-argument formulas:

- More

$$-55+10^3\left(\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=-55+1000\left(\frac{3844}{2835}+\frac{1}{2}\cos\left(\sqrt{2}\right)\sin\left(\sqrt{2}\right)\right)$$

Open code

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$$-55+10^3\left(\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=$$
$$-55+1000\left(\frac{3844}{2835}+\frac{1}{4}\left(3\sin\left(\frac{2\sqrt{2}}{3}\right)-4\sin^3\left(\frac{2\sqrt{2}}{3}\right)\right)\right)$$

Open code

$$-55+10^3\left(\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=\frac{737615}{567}+500\prod_{k=0}^{1}\sin\left(\sqrt{2}+\frac{k\pi}{2}\right)$$

1.0814135^2 * ((((((4*2^8*8)/9! + 8/3! + sin(2*sqrt(2))/((2sqrt(2*2)))))))

Where 1.0814135 is a Ramanujan mock theta function

Input interpretation:

$$1.0814135^2\left(\frac{4\times 2^8\times 8}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)$$

Open code

- $n!$ is the factorial function

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Result:

- More digits

1.6757430...

1.6757430... is a golden number very near to the neutron mass

Series representations:

$$1.08141^2\left(\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=\left(9580.18\left(\exp\left(i\pi\left\lfloor\frac{\arg(4-x)}{2\pi}\right\rfloor\right)\sqrt{x}\right.\right.$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}(4-x)^{k_1}x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}\Gamma^{(k_2)}(1+n_0)}{k_1!k_2!}+$$

$$0.000976563\exp\left(i\pi\left\lfloor\frac{\arg(4-x)}{2\pi}\right\rfloor\right)\sqrt{x}$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}(4-x)^{k_1}x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}(9-n_0)^{k_2}\Gamma^{(k_2)}(1+n_0)}{k_1!k_2!}+$$

$$0.00012207\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_2!k_3!}(-1)^{k_1}J_{1+2k_1}\left(2\sqrt{2}\right)$$

$$\left.\left.(3-n_0)^{k_2}(9-n_0)^{k_3}\Gamma^{(k_2)}(1+n_0)\Gamma^{(k_3)}(1+n_0)\right)\right)\Big/$$

$$\left(\exp\left(i\pi\left\lfloor\frac{\arg(4-x)}{2\pi}\right\rfloor\right)\sqrt{x}\left(\sum_{k=0}^{\infty}\frac{(-1)^k(4-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right.$$

$$\left.\left(\sum_{k=0}^{\infty}\frac{(3-n_0)^k\Gamma^{(k)}(1+n_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(9-n_0)^k\Gamma^{(k)}(1+n_0)}{k!}\right)$$

for ($x\in\mathbb{R}$ and ($n_0\notin\mathbb{Z}$ or $n_0\geq 0$) and $x<0$ and $n_0\to 3$ and $n_0\to 9$)

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$$1.08141^2 \left(\frac{4\,(2^8 \times 8)}{9!} + \frac{8}{3!} + \frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right) = \left(9580.18 \left(\exp\left(i\pi \left\lfloor \frac{\arg(4-x)}{2\pi} \right\rfloor\right) \sqrt{x} \sum_{k_1=0}^{\infty} \sum_{k_2=0}^{\infty} \frac{(-1)^{k_1} (4-x)^{k_1} x^{-k_1} \left(-\frac{1}{2}\right)_{k_1} (3-n_0)^{k_2} \Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!} + 0.000976563 \exp\left(i\pi \left\lfloor \frac{\arg(4-x)}{2\pi} \right\rfloor\right) \sqrt{x} \sum_{k_1=0}^{\infty} \sum_{k_2=0}^{\infty} \frac{(-1)^{k_1} (4-x)^{k_1} x^{-k_1} \left(-\frac{1}{2}\right)_{k_1} (9-n_0)^{k_2} \Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!} + 0.0000610352 \sum_{k_1=0}^{\infty} \sum_{k_2=0}^{\infty} \sum_{k_3=0}^{\infty} \left((-1)^{k_1}\, 2^{1+2k_1} \sqrt{2}^{\,1+2k_1} (3-n_0)^{k_2} (9-n_0)^{k_3} \Gamma^{(k_2)}(1+n_0)\, \Gamma^{(k_3)}(1+n_0)\right) \Big/ ((1+2k_1)!\,k_2!\,k_3!)\right)\right) \Big/ \left(\exp\left(i\pi \left\lfloor \frac{\arg(4-x)}{2\pi} \right\rfloor\right) \sqrt{x} \left(\sum_{k=0}^{\infty} \frac{(-1)^k (4-x)^k x^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right) \left(\sum_{k=0}^{\infty} \frac{(3-n_0)^k \Gamma^{(k)}(1+n_0)}{k!}\right) \sum_{k=0}^{\infty} \frac{(9-n_0)^k \Gamma^{(k)}(1+n_0)}{k!}\right)$$

for ($x \in \mathbb{R}$ and ($n_0 \notin \mathbb{Z}$ or $n_0 \geq 0$) and $x < 0$ and $n_0 \to 3$ and $n_0 \to 9$)

$$1.08141^2 \left(\frac{4(2^8 \times 8)}{9!} + \frac{8}{3!} + \frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right) =$$

$$\left(1.16946 \left(\frac{1}{z_0}\right)^{-1/2 \lfloor \arg(4-z_0)/(2\pi)\rfloor} z_0^{-1-1/2 \lfloor \arg(4-z_0)/(2\pi)\rfloor} \left(8192 \left(\frac{1}{z_0}\right)^{1/2 \lfloor \arg(4-z_0)/(2\pi)\rfloor} z_0^{1+1/2 \lfloor \arg(4-z_0)/(2\pi)\rfloor} \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty} \frac{(-1)^{k_1} \left(-\frac{1}{2}\right)_{k_1} (3-n_0)^{k_2} (4-z_0)^{k_1} z_0^{-k_1} \Gamma^{(k_2)}(1+n_0)}{k_1!\, k_2!} + 8 \left(\frac{1}{z_0}\right)^{1/2 \lfloor \arg(4-z_0)/(2\pi)\rfloor} z_0^{1+1/2 \lfloor \arg(4-z_0)/(2\pi)\rfloor} \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty} \frac{(-1)^{k_1} \left(-\frac{1}{2}\right)_{k_1} (9-n_0)^{k_2} (4-z_0)^{k_1} z_0^{-k_1} \Gamma^{(k_2)}(1+n_0)}{k_1!\, k_2!} + \sqrt{z_0} \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty} \frac{1}{k_2!\, k_3!} (-1)^{k_1} J_{1+2k_1}\left(2\sqrt{2}\right) (3-n_0)^{k_2} (9-n_0)^{k_3} \Gamma^{(k_2)}(1+n_0)\, \Gamma^{(k_3)}(1+n_0)\right)\right) \Big/ \left(\left(\sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (4-z_0)^k z_0^{-k}}{k!}\right)\left(\sum_{k=0}^{\infty} \frac{(3-n_0)^k \Gamma^{(k)}(1+n_0)}{k!}\right) \sum_{k=0}^{\infty} \frac{(9-n_0)^k \Gamma^{(k)}(1+n_0)}{k!}\right)$$

for $((n_0 \geq 0 \text{ or } n_0 \notin \mathbb{Z}) \text{ and } n_0 \to 3 \text{ and } n_0 \to 9)$

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$$1.08141^2\left(\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=$$

$$\left(0.584728\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} z_0^{-1-1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor}\right.$$

$$\left(16\,384\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} z_0^{1+1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor}\right.$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}(4-z_0)^{k_1} z_0^{-k_1}\Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!}+$$

$$16\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} z_0^{1+1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor}$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}\left(-\frac{1}{2}\right)_{k_1}(9-n_0)^{k_2}(4-z_0)^{k_1} z_0^{-k_1}\Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!}+$$

$$\sqrt{z_0}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\left((-1)^{k_1}\,2^{1+2k_1}\sqrt{2}^{1+2k_1}(3-n_0)^{k_2}(9-n_0)^{k_3}\right.$$

$$\left.\left.\left.\Gamma^{(k_2)}(1+n_0)\,\Gamma^{(k_3)}(1+n_0)\right)\Big/\left((1+2k_1)!\,k_2!\,k_3!\right)\right)\right)\Big/$$

$$\left(\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(4-z_0)^k z_0^{-k}}{k!}\right)\left(\sum_{k=0}^{\infty}\frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}\right)\right.$$

$$\left.\sum_{k=0}^{\infty}\frac{(9-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}\right)$$

for $((n_0 \ge 0$ or $n_0 \notin \mathbb{Z})$ and $n_0 \to 3$ and $n_0 \to 9)$

Integral representations:

- More

$$1.08141^2\left(\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=$$

$$\left(1.16946\left(\int_0^1\int_0^1\int_0^1\cos\left(2\sqrt{2}\,t_1\right)\log^3\left(\frac{1}{t_2}\right)\log^9\left(\frac{1}{t_3}\right)dt_3\,dt_2\,dt_1+\right.\right.$$

$$\left.\left.8192\sqrt{4}\int_0^1\log^3\left(\frac{1}{t}\right)dt+8\sqrt{4}\int_0^1\log^9\left(\frac{1}{t}\right)dt\right)\right)\Big/$$

$$\left(\left(\int_0^1\log^3\left(\frac{1}{t}\right)dt\right)\left(\int_0^1\log^9\left(\frac{1}{t}\right)dt\right)\sqrt{4}\right)$$

Open code

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$$1.08141^2\left(\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=\frac{1.16946\sqrt{2}}{\sqrt{4}}\int_0^1\cos\left(2t\sqrt{2}\right)dt+\frac{9.35564}{\int_1^\infty e^{-t}t^3\,dt+\sum_{k=0}^\infty\frac{(-1)^k}{(4+k)k!}}+\frac{9580.18}{\int_1^\infty e^{-t}t^9\,dt+\sum_{k=0}^\infty\frac{(-1)^k}{(10+k)k!}}$$

Open code

$$1.08141^2\left(\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=\left(1.16946\left(\left(\int_0^\infty e^{-t}t^3\,dt\right)\left(\int_0^\infty e^{-t}t^9\,dt\right)\left(\int_0^1\cos\left(2t\sqrt{2}\right)dt\right)\sqrt{2}+8192\sqrt{4}\int_0^\infty e^{-t}t^3\,dt+8\sqrt{4}\int_0^\infty e^{-t}t^9\,dt\right)\right)/\left(\left(\int_0^\infty e^{-t}t^3\,dt\right)\left(\int_0^\infty e^{-t}t^9\,dt\right)\sqrt{4}\right)$$

Open code

- $\log(x)$ is the natural logarithm

Multiple-argument formulas:

- More

$$1.08141^2\left(\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=\frac{9.35564}{3!}+\frac{9580.18}{9!}+\frac{1.16946\cos(\sqrt{2})\sin(\sqrt{2})}{\sqrt{4}}$$

Open code

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$$1.08141^2\left(\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=\frac{1.16946\cos(\sqrt{2})\sin(\sqrt{2})}{\sqrt{4}}+\left(\frac{0.779637}{\frac{1}{2}!\times 1!}+\frac{4.15806}{\frac{7}{2}!\times 4!}\right)\sqrt{\pi}$$

Open code

$$1.08141^2\left(\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=\frac{1.75418\sin\left(\frac{2\sqrt{2}}{3}\right)}{\sqrt{4}}-\frac{2.33891\sin^3\left(\frac{2\sqrt{2}}{3}\right)}{\sqrt{4}}+\left(\frac{0.779637}{\frac{1}{2}!\times 1!}+\frac{4.15806}{\frac{7}{2}!\times 4!}\right)\sqrt{\pi}$$

1.0864055^3 ((((((4*2^8*8)/9! + 8/3! - sin(2*sqrt(2))/((2sqrt(2*2)))))))

Where 1.0864055 is a Ramanujan mock theta function

Input interpretation:

$$1.0864055^3 \left(\frac{4\times 2^8 \times 8}{9!} + \frac{8}{3!} - \frac{\sin(2\sqrt{2})}{2\sqrt{2}\times 2}\right)$$

Open code

$n!$ is the factorial function

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Result:

- More digits

1.6398691...

1.6398691... ≈ ζ (2)

Series representations:

$$1.08641^3 \left(\frac{4(2^8\times 8)}{9!} + \frac{8}{3!} - \frac{\sin(2\sqrt{2})}{2\sqrt{2}\times 2}\right) = \left(10504.3 \left(\exp\left(i\pi \left\lfloor \frac{\arg(4-x)}{2\pi} \right\rfloor\right)\sqrt{x} \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty} \frac{(-1)^{k_1}(4-x)^{k_1} x^{-k_1} \left(-\frac{1}{2}\right)_{k_1} (3-n_0)^{k_2} \Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!} + 0.000976563 \exp\left(i\pi \left\lfloor \frac{\arg(4-x)}{2\pi} \right\rfloor\right)\sqrt{x} \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty} \frac{(-1)^{k_1}(4-x)^{k_1} x^{-k_1} \left(-\frac{1}{2}\right)_{k_1} (9-n_0)^{k_2} \Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!} - 0.00012207 \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty} \frac{1}{k_2!\,k_3!} (-1)^{k_1} J_{1+2k_1}(2\sqrt{2}) (3-n_0)^{k_2} (9-n_0)^{k_3} \Gamma^{(k_2)}(1+n_0)\Gamma^{(k_3)}(1+n_0)\right)\right) \Bigg/ \left(\exp\left(i\pi \left\lfloor \frac{\arg(4-x)}{2\pi} \right\rfloor\right)\sqrt{x} \left(\sum_{k=0}^{\infty} \frac{(-1)^k (4-x)^k x^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right) \left(\sum_{k=0}^{\infty} \frac{(3-n_0)^k \Gamma^{(k)}(1+n_0)}{k!}\right) \sum_{k=0}^{\infty} \frac{(9-n_0)^k \Gamma^{(k)}(1+n_0)}{k!}\right)$$

for ($x \in \mathbb{R}$ and ($n_0 \notin \mathbb{Z}$ or $n_0 \geq 0$) and $x < 0$ and $n_0 \to 3$ and $n_0 \to 9$)

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$$1.08641^3 \left(\frac{4(2^8 \times 8)}{9!} + \frac{8}{3!} - \frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right) = \Bigg(10504.3 \Bigg(\exp\left(i\pi \left\lfloor \frac{\arg(4-x)}{2\pi} \right\rfloor\right)\sqrt{x}$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty} \frac{(-1)^{k_1} (4-x)^{k_1} x^{-k_1} \left(-\frac{1}{2}\right)_{k_1} (3-n_0)^{k_2} \Gamma^{(k_2)}(1+n_0)}{k_1! k_2!} +$$

$$0.000976563 \exp\left(i\pi \left\lfloor \frac{\arg(4-x)}{2\pi} \right\rfloor\right)\sqrt{x}$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty} \frac{(-1)^{k_1} (4-x)^{k_1} x^{-k_1} \left(-\frac{1}{2}\right)_{k_1} (9-n_0)^{k_2} \Gamma^{(k_2)}(1+n_0)}{k_1! k_2!} -$$

$$0.0000610352$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty} \Big((-1)^{k_1} 2^{1+2k_1} \sqrt{2}^{1+2k_1} (3-n_0)^{k_2} (9-n_0)^{k_3}$$

$$\Gamma^{(k_2)}(1+n_0)\Gamma^{(k_3)}(1+n_0)\Big) \Big/ ((1+2k_1)! k_2! k_3!)\Bigg)\Bigg) \Big/$$

$$\left(\exp\left(i\pi \left\lfloor \frac{\arg(4-x)}{2\pi} \right\rfloor\right)\sqrt{x} \left(\sum_{k=0}^{\infty} \frac{(-1)^k (4-x)^k x^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)\right.$$

$$\left(\sum_{k=0}^{\infty} \frac{(3-n_0)^k \Gamma^{(k)}(1+n_0)}{k!}\right)$$

$$\left.\sum_{k=0}^{\infty} \frac{(9-n_0)^k \Gamma^{(k)}(1+n_0)}{k!}\right)$$

for ($x \in \mathbb{R}$ and ($n_0 \notin \mathbb{Z}$ or $n_0 \geq 0$) and

$x < 0$

and

$n_0 \to 3$

and

$n_0 \to 9$)

$$1.08641^3 \left(\frac{4\,(2^8 \times 8)}{9!} + \frac{8}{3!} - \frac{\sin(2\sqrt{2})}{2\sqrt{2 \times 2}}\right) =$$

$$-\left(\left(1.28226 \left(\frac{1}{z_0}\right)^{-1/2 \lfloor \arg(4-z_0)/(2\pi) \rfloor} z_0^{-1-1/2 \lfloor \arg(4-z_0)/(2\pi) \rfloor} \left(-8192 \left(\frac{1}{z_0}\right)^{1/2 \lfloor \arg(4-z_0)/(2\pi) \rfloor} z_0^{1+1/2 \lfloor \arg(4-z_0)/(2\pi) \rfloor} \sum_{k_1=0}^{\infty} \sum_{k_2=0}^{\infty} \frac{(-1)^{k_1} \left(-\frac{1}{2}\right)_{k_1} (3-n_0)^{k_2} (4-z_0)^{k_1} z_0^{-k_1} \Gamma^{(k_2)}(1+n_0)}{k_1!\, k_2!} - 8 \left(\frac{1}{z_0}\right)^{1/2 \lfloor \arg(4-z_0)/(2\pi) \rfloor} z_0^{1+1/2 \lfloor \arg(4-z_0)/(2\pi) \rfloor} \sum_{k_1=0}^{\infty} \sum_{k_2=0}^{\infty} \frac{(-1)^{k_1} \left(-\frac{1}{2}\right)_{k_1} (9-n_0)^{k_2} (4-z_0)^{k_1} z_0^{-k_1} \Gamma^{(k_2)}(1+n_0)}{k_1!\, k_2!} + \sqrt{z_0} \sum_{k_1=0}^{\infty} \sum_{k_2=0}^{\infty} \sum_{k_3=0}^{\infty} \frac{1}{k_2!\, k_3!} (-1)^{k_1} J_{1+2k_1}\left(2\sqrt{2}\right) (3-n_0)^{k_2} (9-n_0)^{k_3} \Gamma^{(k_2)}(1+n_0)\, \Gamma^{(k_3)}(1+n_0)\right)\right) \Big/ \left(\left(\sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (4-z_0)^k z_0^{-k}}{k!}\right)\left(\sum_{k=0}^{\infty} \frac{(3-n_0)^k \Gamma^{(k)}(1+n_0)}{k!}\right) \sum_{k=0}^{\infty} \frac{(9-n_0)^k \Gamma^{(k)}(1+n_0)}{k!}\right)\right)$$

for $((n_0 \geq 0 \text{ or } n_0 \notin \mathbb{Z}) \text{ and } n_0 \to 3 \text{ and } n_0 \to 9)$

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$$1.08641^3 \left(\frac{4 (2^8 \times 8)}{9!} + \frac{8}{3!} - \frac{\sin(2\sqrt{2})}{2\sqrt{2 \times 2}}\right) =$$

$$-\left(\left(0.64113 \left(\frac{1}{z_0}\right)^{-1/2 \lfloor \arg(4-z_0)/(2\pi)\rfloor} z_0^{-1-1/2 \lfloor \arg(4-z_0)/(2\pi)\rfloor} \left(-16\,384 \left(\frac{1}{z_0}\right)^{1/2 \lfloor \arg(4-z_0)/(2\pi)\rfloor} z_0^{1+1/2 \lfloor \arg(4-z_0)/(2\pi)\rfloor} \sum_{k_1=0}^{\infty} \sum_{k_2=0}^{\infty} \frac{(-1)^{k_1} \left(-\frac{1}{2}\right)_{k_1} (3-n_0)^{k_2} (4-z_0)^{k_1} z_0^{-k_1} \Gamma^{(k_2)}(1+n_0)}{k_1! k_2!} - 16 \left(\frac{1}{z_0}\right)^{1/2 \lfloor \arg(4-z_0)/(2\pi)\rfloor} z_0^{1+1/2 \lfloor \arg(4-z_0)/(2\pi)\rfloor} \sum_{k_1=0}^{\infty} \sum_{k_2=0}^{\infty} \frac{(-1)^{k_1} \left(-\frac{1}{2}\right)_{k_1} (9-n_0)^{k_2} (4-z_0)^{k_1} z_0^{-k_1} \Gamma^{(k_2)}(1+n_0)}{k_1! k_2!} + \sqrt{z_0} \sum_{k_1=0}^{\infty} \sum_{k_2=0}^{\infty} \sum_{k_3=0}^{\infty} \left((-1)^{k_1} 2^{1+2k_1} \sqrt{2}^{1+2k_1} (3-n_0)^{k_2} (9-n_0)^{k_3} \Gamma^{(k_2)}(1+n_0) \Gamma^{(k_3)}(1+n_0)\right) / ((1+2k_1)! k_2! k_3!)\right)\right) / \left(\left(\sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (4-z_0)^k z_0^{-k}}{k!}\right) \left(\sum_{k=0}^{\infty} \frac{(3-n_0)^k \Gamma^{(k)}(1+n_0)}{k!}\right) \sum_{k=0}^{\infty} \frac{(9-n_0)^k \Gamma^{(k)}(1+n_0)}{k!}\right)\right)$$

for $((n_0 \geq 0$ or $n_0 \notin \mathbb{Z})$ and $n_0 \to 3$ and $n_0 \to 9)$

Integral representations:

- More

$$1.08641^3 \left(\frac{4 (2^8 \times 8)}{9!} + \frac{8}{3!} - \frac{\sin(2\sqrt{2})}{2\sqrt{2 \times 2}}\right) =$$

$$-\left(\left(1.28226 \left(\int_0^1 \int_0^1 \int_0^1 \cos\left(2\sqrt{2}\, t_1\right) \log^3\left(\frac{1}{t_2}\right) \log^9\left(\frac{1}{t_3}\right) dt_3\, dt_2\, dt_1 - 8192\sqrt{4} \int_0^1 \log^3\left(\frac{1}{t}\right) dt - 8\sqrt{4} \int_0^1 \log^9\left(\frac{1}{t}\right) dt\right)\right) / \left(\left(\int_0^1 \log^3\left(\frac{1}{t}\right) dt\right) \left(\int_0^1 \log^9\left(\frac{1}{t}\right) dt\right) \sqrt{4}\right)\right)$$

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$$1.08641^3\left(\frac{4\,(2^8\times 8)}{9!}+\frac{8}{3!}-\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=-\frac{1.28226\sqrt{2}}{\sqrt{4}}\int_0^1\cos\left(2\,t\sqrt{2}\right)dt+\frac{10.2581}{\int_1^\infty e^{-t}\,t^3\,dt+\sum_{k=0}^\infty\frac{(-1)^k}{(4+k)k!}}+\frac{10504.3}{\int_1^\infty e^{-t}\,t^9\,dt+\sum_{k=0}^\infty\frac{(-1)^k}{(10+k)k!}}$$

Open code

$$1.08641^3\left(\frac{4\,(2^8\times 8)}{9!}+\frac{8}{3!}-\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=-\left(\left(1.28226\left(\left(\int_0^\infty e^{-t}\,t^3\,dt\right)\left(\int_0^\infty e^{-t}\,t^9\,dt\right)\left(\int_0^1\cos\left(2\,t\sqrt{2}\right)dt\right)\sqrt{2}-8192\sqrt{4}\int_0^\infty e^{-t}\,t^3\,dt-8\sqrt{4}\int_0^\infty e^{-t}\,t^9\,dt\right)\right)\Big/\left(\left(\int_0^\infty e^{-t}\,t^3\,dt\right)\left(\int_0^\infty e^{-t}\,t^9\,dt\right)\sqrt{4}\right)\right)$$

Open code

- $\log(x)$ is the natural logarithm

Multiple-argument formulas:

- More

$$1.08641^3\left(\frac{4\,(2^8\times 8)}{9!}+\frac{8}{3!}-\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=\frac{10.2581}{3!}+\frac{10504.3}{9!}-\frac{1.28226\cos(\sqrt{2})\sin(\sqrt{2})}{\sqrt{4}}$$

Open code

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$$1.08641^3\left(\frac{4\,(2^8\times 8)}{9!}+\frac{8}{3!}-\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=-\frac{1.28226\cos(\sqrt{2})\sin(\sqrt{2})}{\sqrt{4}}+\left(\frac{0.85484}{\frac{1}{2}!\times 1!}+\frac{4.55914}{\frac{7}{2}!\times 4!}\right)\sqrt{\pi}$$

Open code

$$1.08641^3\left(\frac{4\,(2^8\times 8)}{9!}+\frac{8}{3!}-\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=-\frac{1.92339\sin\left(\frac{2\sqrt{2}}{3}\right)}{\sqrt{4}}+\frac{2.56452\sin^3\left(\frac{2\sqrt{2}}{3}\right)}{\sqrt{4}}+\left(\frac{0.85484}{\frac{1}{2}!\times 1!}+\frac{4.55914}{\frac{7}{2}!\times 4!}\right)\sqrt{\pi}$$

1.0864055^2 * -((((((4*2^8*8)/9! - 8/3! - sin(2*sqrt(2))/((2sqrt(2*2)))))))

Where 1.0864055 is a Ramanujan mock theta function

Input interpretation:

$$1.0864055^2 \times (-1)\left(\frac{4\times 2^8\times 8}{9!}-\frac{8}{3!}-\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)$$

Open code

- $n!$ is the factorial function

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Result:

- More digits

1.6379603...

1.6379603... ≈ ζ (2)

Series representations:

$$1.08641^2\,(-1)\left(\frac{4\,(2^8\times 8)}{9!}-\frac{8}{3!}-\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=-\left(\left(9668.83\left(\exp\left(i\pi\left\lfloor\frac{\arg(4-x)}{2\pi}\right\rfloor\right)\sqrt{x}\right.\right.\right.$$
$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}(4-x)^{k_1}x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}\Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!}-$$
$$0.000976563\exp\left(i\pi\left\lfloor\frac{\arg(4-x)}{2\pi}\right\rfloor\right)\sqrt{x}$$
$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}(4-x)^{k_1}x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}(9-n_0)^{k_2}\Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!}-$$
$$0.00012207\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_2!\,k_3!}(-1)^{k_1}J_{1+2k_1}\left(2\sqrt{2}\right)$$
$$\left.\left.\left.(3-n_0)^{k_2}(9-n_0)^{k_3}\Gamma^{(k_2)}(1+n_0)\Gamma^{(k_3)}(1+n_0)\right)\right)\right/$$
$$\left(\exp\left(i\pi\left\lfloor\frac{\arg(4-x)}{2\pi}\right\rfloor\right)\sqrt{x}\left(\sum_{k=0}^{\infty}\frac{(-1)^k(4-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right.$$
$$\left.\left(\sum_{k=0}^{\infty}\frac{(3-n_0)^k\Gamma^{(k)}(1+n_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(9-n_0)^k\Gamma^{(k)}(1+n_0)}{k!}\right)$$

for ($x \in \mathbb{R}$ and ($n_0 \notin \mathbb{Z}$ or $n_0 \geq 0$)
and
$x < 0$
and
$n_0 \to 3$
and
$n_0 \to 9$)

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$$1.08641^2\,(-1)\left(\frac{4\,(2^8\times 8)}{9!}-\frac{8}{3!}-\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=-\Bigg(\Bigg(9668.83\left(\exp\left(i\,\pi\left\lfloor\frac{\arg(4-x)}{2\,\pi}\right\rfloor\right)\sqrt{x}\right.$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}\,(4-x)^{k_1}\,x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}\,\Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!}-$$

$$0.000976563\exp\left(i\,\pi\left\lfloor\frac{\arg(4-x)}{2\,\pi}\right\rfloor\right)\sqrt{x}$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}\,(4-x)^{k_1}\,x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}(9-n_0)^{k_2}\,\Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!}-$$

$$0.0000610352$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\Big((-1)^{k_1}\,2^{1+2k_1}\,\sqrt{2}^{\,1+2k_1}\,(3-n_0)^{k_2}\,(9-n_0)^{k_3}$$

$$\left.\Gamma^{(k_2)}(1+n_0)\,\Gamma^{(k_3)}(1+n_0)\Big)\Big/\left((1+2\,k_1)!\,k_2!\,k_3!\right)\right)\Bigg)\Bigg/$$

$$\left(\exp\left(i\,\pi\left\lfloor\frac{\arg(4-x)}{2\,\pi}\right\rfloor\right)\sqrt{x}\left(\sum_{k=0}^{\infty}\frac{(-1)^k\,(4-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right.$$

$$\left(\sum_{k=0}^{\infty}\frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}\right)$$

$$\left.\sum_{k=0}^{\infty}\frac{(9-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}\right)$$

for ($x\in\mathbb{R}$ and ($n_0\notin\mathbb{Z}$ or $n_0\geq 0$)
and
$x<$
0 and $n_0\to$
3 and $n_0\to$
9)

$$1.08641^2 (-1)\left(\frac{4(2^8 \times 8)}{9!} - \frac{8}{3!} - \frac{\sin(2\sqrt{2})}{2\sqrt{2 \times 2}}\right) =$$

$$\left(1.18028\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} z_0^{-1-1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor}\right.$$

$$\left(-8192\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} z_0^{1+1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor}\right.$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}(4-z_0)^{k_1} z_0^{-k_1}\Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!} +$$

$$8\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} z_0^{1+1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor}$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}\left(-\frac{1}{2}\right)_{k_1}(9-n_0)^{k_2}(4-z_0)^{k_1} z_0^{-k_1}\Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!} +$$

$$\sqrt{z_0}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_2!\,k_3!}(-1)^{k_1} J_{1+2k_1}\left(2\sqrt{2}\right)(3-n_0)^{k_2}$$

$$\left.\left.(9-n_0)^{k_3}\Gamma^{(k_2)}(1+n_0)\Gamma^{(k_3)}(1+n_0)\right)\right) /$$

$$\left(\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(4-z_0)^k z_0^{-k}}{k!}\right)\left(\sum_{k=0}^{\infty}\frac{(3-n_0)^k\Gamma^{(k)}(1+n_0)}{k!}\right)\right.$$

$$\left.\sum_{k=0}^{\infty}\frac{(9-n_0)^k\Gamma^{(k)}(1+n_0)}{k!}\right)$$

for $((n_0 \geq 0 \text{ or } n_0 \notin \mathbb{Z}) \text{ and } n_0 \to 3 \text{ and } n_0 \to 9)$

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$$1.08641^2 (-1)\left(\frac{4(2^8\times 8)}{9!}-\frac{8}{3!}-\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=$$

$$\left(0.590138\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} z_0^{-1-1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor}\right.$$
$$\left(-16384\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} z_0^{1+1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor}\right.$$
$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}(4-z_0)^{k_1} z_0^{-k_1}\Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!}+$$
$$16\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} z_0^{1+1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor}$$
$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}\left(-\frac{1}{2}\right)_{k_1}(9-n_0)^{k_2}(4-z_0)^{k_1} z_0^{-k_1}\Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!}+$$
$$\sqrt{z_0}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\left((-1)^{k_1} 2^{1+2k_1}\sqrt{2}^{1+2k_1}(3-n_0)^{k_2}(9-n_0)^{k_3}\right.$$
$$\left.\left.\left.\Gamma^{(k_2)}(1+n_0)\Gamma^{(k_3)}(1+n_0)\right)\Big/((1+2k_1)!\,k_2!\,k_3!)\right)\right)\Big/$$
$$\left(\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(4-z_0)^k z_0^{-k}}{k!}\right)\left(\sum_{k=0}^{\infty}\frac{(3-n_0)^k\Gamma^{(k)}(1+n_0)}{k!}\right)\right.$$
$$\left.\sum_{k=0}^{\infty}\frac{(9-n_0)^k\Gamma^{(k)}(1+n_0)}{k!}\right)$$

for $((n_0 \geq 0 \text{ or } n_0 \notin \mathbb{Z}) \text{ and } n_0 \to 3 \text{ and } n_0 \to 9)$

Integral representations:

- More

$$1.08641^2 (-1)\left(\frac{4(2^8\times 8)}{9!}-\frac{8}{3!}-\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=$$
$$\left(1.18028\left(\int_0^1\int_0^1\int_0^1\cos\left(2\sqrt{2}\,t_1\right)\log^3\left(\frac{1}{t_2}\right)\log^9\left(\frac{1}{t_3}\right)dt_3\,dt_2\,dt_1-\right.\right.$$
$$\left.\left.8192\sqrt{4}\int_0^1\log^3\left(\frac{1}{t}\right)dt+8\sqrt{4}\int_0^1\log^9\left(\frac{1}{t}\right)dt\right)\right)\Big/$$
$$\left(\left(\int_0^1\log^3\left(\frac{1}{t}\right)dt\right)\left(\int_0^1\log^9\left(\frac{1}{t}\right)dt\right)\sqrt{4}\right)$$

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$$1.08641^2 (-1)\left(\frac{4(2^8\times 8)}{9!}-\frac{8}{3!}-\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=\frac{1.18028\sqrt{2}}{\sqrt{4}}\int_0^1 \cos\left(2t\sqrt{2}\right)dt+\frac{9.44222}{\int_1^\infty e^{-t}t^3\,dt+\sum_{k=0}^\infty \frac{(-1)^k}{(4+k)k!}}-\frac{9668.83}{\int_1^\infty e^{-t}t^9\,dt+\sum_{k=0}^\infty \frac{(-1)^k}{(10+k)k!}}$$

Open code

$$1.08641^2 (-1)\left(\frac{4(2^8\times 8)}{9!}-\frac{8}{3!}-\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=$$
$$\left(1.18028\left(\left(\int_0^\infty e^{-t}t^3\,dt\right)\left(\int_0^\infty e^{-t}t^9\,dt\right)\left(\int_0^1\cos\left(2t\sqrt{2}\right)dt\right)\sqrt{2}-8192\sqrt{4}\int_0^\infty e^{-t}t^3\,dt+8\sqrt{4}\int_0^\infty e^{-t}t^9\,dt\right)\right)/\left(\left(\int_0^\infty e^{-t}t^3\,dt\right)\left(\int_0^\infty e^{-t}t^9\,dt\right)\sqrt{4}\right)$$

Open code

- $\log(x)$ is the natural logarithm

Multiple-argument formulas:

- More

$$1.08641^2 (-1)\left(\frac{4(2^8\times 8)}{9!}-\frac{8}{3!}-\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=\frac{9.44222}{3!}-\frac{9668.83}{9!}+\frac{1.18028\cos(\sqrt{2})\sin(\sqrt{2})}{\sqrt{4}}$$

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$$1.08641^2 (-1)\left(\frac{4(2^8\times 8)}{9!}-\frac{8}{3!}-\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=\frac{1.18028\cos(\sqrt{2})\sin(\sqrt{2})}{\sqrt{4}}+\left(\frac{0.786851}{\frac{1}{2}!\times 1!}-\frac{4.19654}{\frac{7}{2}!\times 4!}\right)\sqrt{\pi}$$

Open code

$$1.08641^2 (-1)\left(\frac{4(2^8\times 8)}{9!}-\frac{8}{3!}-\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)=\frac{1.77042\sin\left(\frac{2\sqrt{2}}{3}\right)}{\sqrt{4}}-\frac{2.36055\sin^3\left(\frac{2\sqrt{2}}{3}\right)}{\sqrt{4}}+\left(\frac{0.786851}{\frac{1}{2}!\times 1!}-\frac{4.19654}{\frac{7}{2}!\times 4!}\right)\sqrt{\pi}$$

1/2 * ((((((((0.0864055^2 / ((((((4*2^8*8)/9! * 8/3! * sin(2*sqrt(2))/((2sqrt(2*2)))))))))))

Where 0.0864055 is a Ramanujan mock theta function

Input interpretation:

$$\frac{1}{2} \times \frac{0.0864055^2}{\frac{4\times 2^8\times 8}{9!} \times \frac{8}{3!} \times \frac{\sin\left(2\sqrt{2}\right)}{2\sqrt{2\times 2}}}$$

Open code

- $n!$ is the factorial function

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Result:

- More digits

1.61026...

1.61026… is a golden number

Series representations:

$$\frac{0.0864055^2}{\frac{((4\times 2^8\times 8)\, 8\sin(2\sqrt{2}))\, 2}{9!\times 3!\,(2\sqrt{2\times 2})}} = \left(5.69604\times 10^{-8} \exp\left(i\pi\left\lfloor\frac{\arg(4-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_1!\,k_2!\,k_3!}(-1)^{k_1}(4-x)^{k_1} x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}(9-n_0)^{k_3}\,\Gamma^{(k_2)}(1+n_0)\,\Gamma^{(k_3)}(1+n_0)\right)\Big/\left(\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(2\sqrt{2}\right)\right)$$

for ($x \in \mathbb{R}$ and $x < 0$ and $n_0 \to 3$ and not (($n_0 \in \mathbb{Z}$ and $-n_0 > 0$)) and $n_0 \to 9$ and not (($n_0 \in \mathbb{Z}$ and $-n_0 > 0$)))

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$$\frac{0.0864055^2}{\frac{((4\times 2^8\times 8)\, 8\sin(2\sqrt{2}))\, 2}{9!\times 3!\,(2\sqrt{2\times 2})}} = \left(1.13921\times 10^{-7} \exp\left(i\pi\left\lfloor\frac{\arg(4-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_1!\,k_2!\,k_3!}(-1)^{k_1}(4-x)^{k_1} x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}(9-n_0)^{k_3}\,\Gamma^{(k_2)}(1+n_0)\,\Gamma^{(k_3)}(1+n_0)\right)\Big/\left(\sum_{k=0}^{\infty}\frac{(-1)^k\, 2^{1+2k}\,\sqrt{2}^{1+2k}}{(1+2k)!}\right)$$

for ($x \in \mathbb{R}$ and ($n_0 \notin \mathbb{Z}$ or $n_0 \geq 0$) and $x < 0$ and $n_0 \to 3$ and $n_0 \to 9$)

$$\frac{0.0864055^2}{\frac{((4\times 2^8\times 8)8\sin(2\sqrt{2}))2}{9!\times 3!(2\sqrt{2}\times 2)}} = \left(5.69604\times 10^{-8}\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_1!k_2!k_3!}(-1)^{k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}(9-n_0)^{k_3}(4-z_0)^{k_1} z_0^{-k_1}\Gamma^{(k_2)}(1+n_0)\Gamma^{(k_3)}(1+n_0)\right) / \left(\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(2\sqrt{2}\right)\right)$$

for $(n_0 \to 3$ and not $((n_0 \in \mathbb{Z}$ and $-n_0 > 0))$ and $n_0 \to 9$ and not $((n_0 \in \mathbb{Z}$ and $-n_0 > 0)))$

$$\frac{0.0864055^2}{\frac{((4\times 2^8\times 8)8\sin(2\sqrt{2}))2}{9!\times 3!(2\sqrt{2}\times 2)}} = \left(1.13921\times 10^{-7}\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_1!k_2!k_3!}(-1)^{k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}(9-n_0)^{k_3}(4-z_0)^{k_1} z_0^{-k_1}\Gamma^{(k_2)}(1+n_0)\Gamma^{(k_3)}(1+n_0)\right) / \left(\sum_{k=0}^{\infty}\frac{(-1)^k 2^{1+2k}\sqrt{2}^{1+2k}}{(1+2k)!}\right)$$

for $((n_0 \geq 0$ or $n_0 \notin \mathbb{Z})$ and $n_0 \to 3$ and $n_0 \to 9)$

- $\arg(z)$ is the complex argument
- $\lfloor x\rfloor$ is the floor function
- $J_n(z)$ is the Bessel function of the first kind
- $\Gamma(x)$ is the gamma function
- i is the imaginary unit
- $\mathbb{R}$ is the set of real numbers
- $\mathbb{Z}$ is the set of integers
- More information

Integral representations:

- More

$$\frac{0.0864055^2}{\frac{((4\times 2^8\times 8)8\sin(2\sqrt{2}))2}{9!\times 3!(2\sqrt{2}\times 2)}} = \int_0^1\int_0^1 \log^3\left(\frac{1}{t_1}\right)\log^9\left(\frac{1}{t_2}\right)dt_2\,dt_1$$

Open code

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$$\frac{0.0864055^2}{\frac{((4\times 2^8\times 8)8\sin(2\sqrt{2}))2}{9!\times 3!(2\sqrt{2\times 2})}} = \int_0^1\int_0^1 \log^3\left(\frac{1}{t_1}\right)\log^9\left(\frac{1}{t_2}\right)dt_2\,dt_1 \text{ for } \gamma > 0$$

Open code

$$\frac{0.0864055^2}{\frac{((4\times 2^8\times 8)8\sin(2\sqrt{2}))2}{9!\times 3!(2\sqrt{2\times 2})}} = \frac{5.69604\times 10^{-8}\left(\int_0^\infty e^{-t}t^3\,dt\right)\left(\int_0^\infty e^{-t}t^9\,dt\right)\sqrt{4}}{\sqrt{2}\int_0^1\cos(2t\sqrt{2})\,dt}$$

Open code

Multiple-argument formulas:

- More

$$\frac{0.0864055^2}{\frac{((4\times 2^8\times 8)8\sin(2\sqrt{2}))2}{9!\times 3!(2\sqrt{2\times 2})}} = \frac{5.69604\times 10^{-8}\times 3!\times 9!\sqrt{4}}{\cos(\sqrt{2})\sin(\sqrt{2})}$$

Open code

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$$\frac{0.0864055^2}{\frac{((4\times 2^8\times 8)8\sin(2\sqrt{2}))2}{9!\times 3!(2\sqrt{2\times 2})}} = \frac{0.00157484\times \frac{1}{2}!\times 1!\times \frac{7}{2}!\times 4!\sqrt{4}}{\cos(\sqrt{2})\sin(\sqrt{2})\sqrt{\pi}^2}$$

Open code

$$\frac{0.0864055^2}{\frac{((4\times 2^8\times 8)8\sin(2\sqrt{2}))2}{9!\times 3!(2\sqrt{2\times 2})}} = \frac{0.00314968\times \frac{1}{2}!\times 1!\times \frac{7}{2}!\times 4!\sqrt{4}}{\left(3\sin\left(\frac{2\sqrt{2}}{3}\right)-4\sin^3\left(\frac{2\sqrt{2}}{3}\right)\right)\sqrt{\pi}^2}$$

10^3*0.0864055^2 * ((((((4*2^8*8)/9! *1/ (8/3!) *1/ ((((sin(2*sqrt(2))/((2sqrt(2*2))))))))

Input interpretation:

$$10^3\times 0.0864055^2\left(\frac{4\times 2^8\times 8}{9!}\times\frac{1}{\frac{8}{3!}}\times\frac{1}{\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}}\right)$$

Open code

- $n!$ is the factorial function

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Result:

- More digits

1.64127...

1.64127… ≈ ζ (2)

Series representations:

$$\frac{(10^3\times 0.0864055^2)(4\times 2^8\times 8)}{\frac{9!\left(8\sin\left(2\sqrt{2}\right)\right)}{3!\left(2\sqrt{2}\times 2\right)}} = \frac{7645.09\exp\left(i\pi\left\lfloor\frac{\arg(4-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}(4-x)^{k_1}x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}\Gamma^{(k_2)}(1+n_0)}{k_1!k_2!}}{\left(\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(2\sqrt{2}\right)\right)\sum_{k=0}^{\infty}\frac{(9-n_0)^k\Gamma^{(k)}(1+n_0)}{k!}}$$

for ($x \in \mathbb{R}$ and ($n_0 \notin \mathbb{Z}$ or $n_0 \geq 0$) and $x < 0$ and $n_0 \to 3$ and $n_0 \to 9$)

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$$\frac{(10^3\times 0.0864055^2)(4\times 2^8\times 8)}{\frac{9!\left(8\sin\left(2\sqrt{2}\right)\right)}{3!\left(2\sqrt{2}\times 2\right)}} = \frac{15\,290.2\exp\left(i\pi\left\lfloor\frac{\arg(4-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}(4-x)^{k_1}x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}\Gamma^{(k_2)}(1+n_0)}{k_1!k_2!}}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k 2^{1+2k}\sqrt{2}^{1+2k}}{(1+2k)!}\right)\sum_{k=0}^{\infty}\frac{(9-n_0)^k\Gamma^{(k)}(1+n_0)}{k!}}$$

for ($x \in \mathbb{R}$ and ($n_0 \notin \mathbb{Z}$ or $n_0 \geq 0$) and $x < 0$ and $n_0 \to 3$ and $n_0 \to 9$)

$$\frac{(10^3\times 0.0864055^2)(4\times 2^8\times 8)}{\frac{9!\left(8\sin\left(2\sqrt{2}\right)\right)}{3!\left(2\sqrt{2}\times 2\right)}} = \left(7645.09\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}(4-z_0)^{k_1}z_0^{-k_1}\Gamma^{(k_2)}(1+n_0)}{k_1!k_2!}\right)\Big/\left(\left(\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(2\sqrt{2}\right)\right)\sum_{k=0}^{\infty}\frac{(9-n_0)^k\Gamma^{(k)}(1+n_0)}{k!}\right)$$

for (($n_0 \geq 0$ or $n_0 \notin \mathbb{Z}$) and $n_0 \to 3$ and $n_0 \to 9$)

$$\frac{(10^3 \times 0.0864055^2)(4\times 2^8 \times 8)}{\frac{9!\left(8\sin\left(2\sqrt{2}\right)\right)}{3!\left(2\sqrt{2}\times 2\right)}} = \left(15\,290.2\left(\frac{1}{z_0}\right)^{1/2\lfloor \arg(4-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor \arg(4-z_0)/(2\pi)\rfloor} \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}(4-z_0)^{k_1} z_0^{-k_1}\Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!}\right) \Big/ \left(\left(\sum_{k=0}^{\infty}\frac{(-1)^k 2^{1+2k}\sqrt{2}^{1+2k}}{(1+2k)!}\right)\sum_{k=0}^{\infty}\frac{(9-n_0)^k\Gamma^{(k)}(1+n_0)}{k!}\right)$$

for $((n_0 \geq 0 \text{ or } n_0 \notin \mathbb{Z}) \text{ and } n_0 \to 3 \text{ and } n_0 \to 9)$

Integral representations:

- More

$$\frac{(10^3 \times 0.0864055^2)(4\times 2^8 \times 8)}{\frac{9!\left(8\sin\left(2\sqrt{2}\right)\right)}{3!\left(2\sqrt{2}\times 2\right)}} = \frac{7645.09\sqrt{4}\int_0^1 \log^3\left(\frac{1}{t}\right)dt}{\left(\int_0^1\cos\left(2t\sqrt{2}\right)dt\right)\left(\int_0^1\log^9\left(\frac{1}{t}\right)dt\right)\sqrt{2}}$$

Open code

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$$\frac{(10^3 \times 0.0864055^2)(4\times 2^8 \times 8)}{\frac{9!\left(8\sin\left(2\sqrt{2}\right)\right)}{3!\left(2\sqrt{2}\times 2\right)}} = \frac{7645.09\sqrt{4}\int_0^\infty e^{-t}t^3\,dt}{\left(\int_0^\infty e^{-t}t^9\,dt\right)\left(\int_0^1\cos\left(2t\sqrt{2}\right)dt\right)\sqrt{2}}$$

Open code

$$\frac{(10^3 \times 0.0864055^2)(4\times 2^8 \times 8)}{\frac{9!\left(8\sin\left(2\sqrt{2}\right)\right)}{3!\left(2\sqrt{2}\times 2\right)}} = \frac{30\,580.4\,i\,\pi\sqrt{4}\int_0^1\log^3\left(\frac{1}{t}\right)dt}{\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{s-\sqrt{2}^2/s}}{s^{3/2}}\,ds\right)\left(\int_0^1\log^9\left(\frac{1}{t}\right)dt\right)\sqrt{2}\sqrt{\pi}} \quad \text{for } \gamma > 0$$

Open code

- $\log(x)$ is the natural logarithm

Multiple-argument formulas:

- More

$$\frac{(10^3 \times 0.0864055^2)(4\times 2^8 \times 8)}{\frac{9!\left(8\sin\left(2\sqrt{2}\right)\right)}{3!\left(2\sqrt{2}\times 2\right)}} = \frac{7645.09\times 3!\sqrt{4}}{\cos\left(\sqrt{2}\right)9!\sin\left(\sqrt{2}\right)}$$

Open code

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$$\frac{(10^3 \times 0.0864055^2)(4 \times 2^8 \times 8)}{\frac{9!\left(8 \sin\left(2\sqrt{2}\right)\right)}{3!\left(2\sqrt{2 \times 2}\right)}} = \frac{39.8182 \times \frac{1}{2}! \times 1!\sqrt{4}}{\cos\left(\sqrt{2}\right)\frac{7}{2}! \times 4! \sin\left(\sqrt{2}\right)}$$

Open code

$$\frac{(10^3 \times 0.0864055^2)(4 \times 2^8 \times 8)}{\frac{9!\left(8 \sin\left(2\sqrt{2}\right)\right)}{3!\left(2\sqrt{2 \times 2}\right)}} = \frac{79.6364 \times \frac{1}{2}! \times 1!\sqrt{4}}{U_1\left(\cos\left(\sqrt{2}\right)\right)\frac{7}{2}! \times 4! \sin\left(\sqrt{2}\right)}$$

Open code

- $U_n(x)$ is the Chebyshev polynomial of the second kind

2sqrt((((6*((((((10^3*0.0864055^2 * ((((((4*2^8*8)/9! *1/ (8/3!) *1/ ((((sin(2*sqrt(2))/((2sqrt(2*2))))))))))))))))

Input interpretation:

$$2\sqrt{6\left(10^3 \times 0.0864055^2\left(\frac{4 \times 2^8 \times 8}{9!} \times \frac{1}{\frac{8}{3!}} \times \frac{1}{\frac{\sin\left(2\sqrt{2}\right)}{2\sqrt{2 \times 2}}}\right)\right)}$$

Open code

- $n!$ is the factorial function

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Result:

- More digits

6.27618...

6.27618.... ≈ 2π

Series representations:

$$2\sqrt{\frac{6 \times 10^3 \left(0.0864055^2 \left(4 \times 2^8 \times 8\right)\right)}{\frac{9! \times 8 \sin\left(2\sqrt{2}\right)}{3!\left(2\sqrt{2 \times 2}\right)}}} = 2 \exp\left(i \pi \left\lfloor \frac{\arg\left(-x + \frac{91741.1 \times 3! \sqrt{4}}{9! \sin\left(2\sqrt{2}\right)}\right)}{2\pi} \right\rfloor\right) \sqrt{x} \sum_{k=0}^{\infty} \frac{(-1)^k x^{-k} \left(-\frac{1}{2}\right)_k \left(-x + \frac{91741.1 \times 3! \sqrt{4}}{9! \sin\left(2\sqrt{2}\right)}\right)^k}{k!} \quad \text{for } (x \in \mathbb{R} \text{ and } x < 0)$$

Open code

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$$2\sqrt{\frac{6\times 10^3\,(0.0864055^2\,(4\times 2^8\times 8))}{\frac{9!\times 8\sin\left(2\sqrt{2}\right)}{3!\left(2\sqrt{2}\times 2\right)}}} = 2\left(\frac{1}{z_0}\right)^{1/2\left\lfloor \arg\left(\frac{91\,741.1\times 3!\sqrt{4}}{9!\sin\left(2\sqrt{2}\right)}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor \arg\left(\frac{91\,741.1\times 3!\sqrt{4}}{9!\sin\left(2\sqrt{2}\right)}-z_0\right)/(2\pi)\right\rfloor\right)} \sum_{k=0}^{\infty} \frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{91\,741.1\times 3!\sqrt{4}}{9!\sin\left(2\sqrt{2}\right)}-z_0\right)^k z_0^{-k}}{k!}$$

Open code

- $\arg(z)$ is the complex argument
- $\lfloor x\rfloor$ is the floor function
- i is the imaginary unit
- $\mathbb{R}$ is the set of real numbers
- More information

Integral representations:

- More

$$2\sqrt{\frac{6\times 10^3\,(0.0864055^2\,(4\times 2^8\times 8))}{\frac{9!\times 8\sin\left(2\sqrt{2}\right)}{3!\left(2\sqrt{2}\times 2\right)}}} = 2\sqrt{\frac{45\,870.6\sqrt{4}\int_0^1 \log^3\left(\frac{1}{t}\right)dt}{\left(\int_0^1 \cos\left(2t\sqrt{2}\right)dt\right)\left(\int_0^1 \log^9\left(\frac{1}{t}\right)dt\right)\sqrt{2}}}$$

Open code

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$$2\sqrt{\frac{6\times 10^3\,(0.0864055^2\,(4\times 2^8\times 8))}{\frac{9!\times 8\sin\left(2\sqrt{2}\right)}{3!\left(2\sqrt{2}\times 2\right)}}} = 2\sqrt{\frac{45\,870.6\sqrt{4}\int_0^\infty e^{-t}\,t^3\,dt}{\left(\int_0^\infty e^{-t}\,t^9\,dt\right)\left(\int_0^1 \cos\left(2t\sqrt{2}\right)dt\right)\sqrt{2}}}$$

Open code

$$2\sqrt{\frac{6\times 10^3\,(0.0864055^2\,(4\times 2^8\times 8))}{\frac{9!\times 8\sin\left(2\sqrt{2}\right)}{3!\left(2\sqrt{2}\times 2\right)}}} = 2\sqrt{\frac{183\,482.\,i\,\pi\sqrt{4}\int_0^1 \log^3\left(\frac{1}{t}\right)dt}{\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{e^{s-\sqrt{2}^2/s}}{s^{3/2}}\,ds\right)\left(\int_0^1 \log^9\left(\frac{1}{t}\right)dt\right)\sqrt{2}\sqrt{\pi}}} \quad \text{for } \gamma > 0$$

Open code

- $\log(x)$ is the natural logarithm

Multiple-argument formulas:
More

$$2\sqrt{\frac{6\times 10^3\,(0.0864055^2\,(4\times 2^8\times 8))}{\frac{9!\times 8\sin(2\sqrt{2})}{3!\,(2\sqrt{2}\times 2)}}} = 2\sqrt{\frac{1}{9!}}\sqrt{\frac{91\,741.1\times 3!\sqrt{4}}{\sin(2\sqrt{2})}}$$

Open code

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$$2\sqrt{\frac{6\times 10^3\,(0.0864055^2\,(4\times 2^8\times 8))}{\frac{9!\times 8\sin(2\sqrt{2})}{3!\,(2\sqrt{2}\times 2)}}} = 2\sqrt{91\,741.1}\sqrt{\frac{3!\sqrt{4}}{9!\sin(2\sqrt{2})}}$$

Open code

$$2\sqrt{\frac{6\times 10^3\,(0.0864055^2\,(4\times 2^8\times 8))}{\frac{9!\times 8\sin(2\sqrt{2})}{3!\,(2\sqrt{2}\times 2)}}} = 2\sqrt{\frac{238.909\times \frac{1}{2}!\times 1!\sqrt{4}}{\cos(\sqrt{2})\,\frac{7}{2}!\times 4!\sin(\sqrt{2})}}$$

We have also that:

Input:

$$-10^3\left(\frac{4\times 2^8\times 8}{9!}-\frac{8}{3!}-\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)$$

Open code

- $n!$ is the factorial function

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Exact result:

$$-1000\left(-\frac{3716}{2835}-\frac{1}{4}\sin\left(2\sqrt{2}\right)\right)$$

Decimal approximation:
More digits

1387.776313015805349744168361135292401365338253528569877065...

Open code

1387.77631...

This result is very near to the rest mass of Sigma baryon 1387.2

Property:

$$-1000\left(-\frac{3716}{2835}-\frac{1}{4}\sin\left(2\sqrt{2}\right)\right) \text{ is a transcendental number}$$

Series representations:
More

$$-10^3\left(\frac{4\left(2^8\times 8\right)}{9!}-\frac{8}{3!}-\frac{\sin\left(2\sqrt{2}\right)}{2\sqrt{2}\times 2}\right)=\frac{743200}{567}+250\sum_{k=0}^{\infty}\frac{(-1)^k\, 2^{3/2+3k}}{(1+2k)!}$$

Open code

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$$-10^3\left(\frac{4\left(2^8\times 8\right)}{9!}-\frac{8}{3!}-\frac{\sin\left(2\sqrt{2}\right)}{2\sqrt{2}\times 2}\right)=\frac{743200}{567}+500\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(2\sqrt{2}\right)$$

Open code

$$-10^3\left(\frac{4\left(2^8\times 8\right)}{9!}-\frac{8}{3!}-\frac{\sin\left(2\sqrt{2}\right)}{2\sqrt{2}\times 2}\right)=\frac{743200}{567}+250\sum_{k=0}^{\infty}\frac{(-1)^k\left(2\sqrt{2}-\frac{\pi}{2}\right)^{2k}}{(2k)!}$$

Open code

- $J_n(z)$ is the Bessel function of the first kind

Integral representations:

$$-10^3\left(\frac{4\left(2^8\times 8\right)}{9!}-\frac{8}{3!}-\frac{\sin\left(2\sqrt{2}\right)}{2\sqrt{2}\times 2}\right)=\frac{743200}{567}+500\sqrt{2}\int_0^1\cos\left(2\sqrt{2}\,t\right)dt$$

Open code

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$$-10^3\left(\frac{4\left(2^8\times 8\right)}{9!}-\frac{8}{3!}-\frac{\sin\left(2\sqrt{2}\right)}{2\sqrt{2}\times 2}\right)=\frac{743200}{567}-125\,i\sqrt{\frac{2}{\pi}}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-2/s+s}}{s^{3/2}}\,ds \quad \text{for } \gamma>0$$

Open code

$$-10^3\left(\frac{4\left(2^8\times 8\right)}{9!}-\frac{8}{3!}-\frac{\sin\left(2\sqrt{2}\right)}{2\sqrt{2}\times 2}\right)=\frac{743200}{567}-\frac{125\,i}{\sqrt{\pi}}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{2^{1/2-s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}\,ds$$

for $0<\gamma<1$

Open code

- $\Gamma(x)$ is the gamma function

144-8+10^6*((((((4*2^8*8)/9! * 8/3! * sin(2*sqrt(2))/((2sqrt(2*2)))))))

Input:

$$144-8+10^6\left(\frac{4\times 2^8\times 8}{9!}\times\frac{8}{3!}\times\frac{\sin\left(2\sqrt{2}\right)}{2\sqrt{2\times 2}}\right)$$

Open code

- $n!$ is the factorial function

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Exact result:

$$136+\frac{12\,800\,000\sin(2\sqrt{2})}{1701}$$

Decimal approximation:

- More digits

2454.235333478528166555315206328461760325978634039106531534...

Open code

2454.2353...

This result is very near to the rest mass of charmed Sigma baryon 2453.98

Property:

$$136+\frac{12\,800\,000\sin(2\sqrt{2})}{1701}$$ is a transcendental number

Series representations:

- More

$$144-8+\frac{10^6(4\times 2^8\times 8)(8\sin(2\sqrt{2}))}{9!(3!(2\sqrt{2}\times 2))}=136+\frac{12\,800\,000\sum_{k=0}^{\infty}\frac{(-1)^k 2^{3/2+3k}}{(1+2k)!}}{1701}$$

Open code

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$$144-8+\frac{10^6(4\times 2^8\times 8)(8\sin(2\sqrt{2}))}{9!(3!(2\sqrt{2}\times 2))}=136+\frac{25\,600\,000\sum_{k=0}^{\infty}(-1)^k J_{1+2k}(2\sqrt{2})}{1701}$$

Open code

$$144-8+\frac{10^6(4\times 2^8\times 8)(8\sin(2\sqrt{2}))}{9!(3!(2\sqrt{2}\times 2))}=136+\frac{12\,800\,000\sum_{k=0}^{\infty}\frac{(-1)^k\left(2\sqrt{2}-\frac{\pi}{2}\right)^{2k}}{(2k)!}}{1701}$$

Open code

- $J_n(z)$ is the Bessel function of the first kind

Integral representations:

$$144-8+\frac{10^6(4\times 2^8\times 8)(8\sin(2\sqrt{2}))}{9!(3!(2\sqrt{2}\times 2))}=136+\frac{25\,600\,000\sqrt{2}}{1701}\int_0^1\cos\left(2\sqrt{2}\,t\right)dt$$

Open code

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$$144-8+\frac{10^6(4\times 2^8\times 8)(8\sin(2\sqrt{2}))}{9!(3!(2\sqrt{2\times 2}))}=$$

$$136-\frac{6400000\, i\sqrt{\frac{2}{\pi}}}{1701}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-2/s+s}}{s^{3/2}}\,ds \quad \text{for } \gamma>0$$

Open code

$$144-8+\frac{10^6(4\times 2^8\times 8)(8\sin(2\sqrt{2}))}{9!(3!(2\sqrt{2\times 2}))}=136-\frac{6400000\, i}{1701\sqrt{\pi}}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{2^{1/2-s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}\,ds$$

for $0<\gamma<1$

Open code

- $\Gamma(x)$ is the gamma function

10*(-0.0864055)+89+10^4*((((((4*2^8*8)/9! *1/ (8/3!) *1/ ((((sin(2*sqrt(2))/((2sqrt(2*2))))))))))

Input interpretation:

$$10\times(-0.0864055)+89+10^4\left(\frac{4\times 2^8\times 8}{9!}\times\frac{1}{\frac{8}{3!}}\times\frac{1}{\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}}\right)$$

Open code

- $n!$ is the factorial function

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Result:

- More digits

2286.48323...

2286.48323...

This result is practically equal to the rest mass of charmed Lambda baryon 2286.46

Series representations:

$$10(-1)\,0.0864055+89+\frac{10^4\,(4\times 2^8\times 8)}{\frac{9!\left(8\sin\left(2\sqrt{2}\right)\right)}{3!\left(2\sqrt{2\times 2}\right)}} = \left(1.024\times 10^7\left(\exp\left(i\pi\left\lfloor\frac{\arg(4-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}(4-x)^{k_1}x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}\,\Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!} + 8.60703\times 10^{-6}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}J_{1+2k_1}\left(2\sqrt{2}\right)(9-n_0)^{k_2}\,\Gamma^{(k_2)}(1+n_0)}{k_2!}\right)\right) \Big/ \left(\left(\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(2\sqrt{2}\right)\right)\sum_{k=0}^{\infty}\frac{(9-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}\right)$$

for ($x \in \mathbb{R}$ and ($n_0 \notin \mathbb{Z}$ or $n_0 \geq 0$) and $x < 0$ and $n_0 \to 3$ and $n_0 \to 9$)

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$$10(-1)\,0.0864055+89+\frac{10^4\,(4\times 2^8\times 8)}{\frac{9!\left(8\sin\left(2\sqrt{2}\right)\right)}{3!\left(2\sqrt{2\times 2}\right)}} = \left(2.048\times 10^7\left(\exp\left(i\pi\left\lfloor\frac{\arg(4-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}(4-x)^{k_1}x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}\,\Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!} + 4.30351\times 10^{-6}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}2^{1+2k_1}\sqrt{2}^{\,1+2k_1}(9-n_0)^{k_2}\,\Gamma^{(k_2)}(1+n_0)}{(1+2k_1)!\,k_2!}\right)\right) \Big/ \left(\left(\sum_{k=0}^{\infty}\frac{(-1)^k 2^{1+2k}\sqrt{2}^{\,1+2k}}{(1+2k)!}\right)\sum_{k=0}^{\infty}\frac{(9-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}\right)$$

for ($x \in \mathbb{R}$ and ($n_0 \notin \mathbb{Z}$ or $n_0 \geq 0$) and $x < 0$ and $n_0 \to 3$ and $n_0 \to 9$)

$$10(-1)\,0.0864055+89+\frac{10^4\,(4\times 2^8\times 8)}{\frac{9!\left(8\sin\left(2\sqrt{2}\right)\right)}{3!\left(2\sqrt{2}\times 2\right)}} =$$

$$\left(1.024\times 10^7\left(8.60703\times 10^{-6}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}\,J_{1+2k_1}(2\sqrt{2})\,(9-n_0)^{k_2}\,\Gamma^{(k_2)}(1+n_0)}{k_2!}+\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}\,(4-z_0)^{k_1}\,z_0^{-k_1}\,\Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!}\right)\right)\Big/\left(\left(\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(2\sqrt{2}\right)\right)\sum_{k=0}^{\infty}\frac{(9-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}\right)$$

for $((n_0\geq 0 \text{ or } n_0\notin\mathbb{Z}) \text{ and } n_0\to 3 \text{ and } n_0\to 9)$

$$10(-1)\,0.0864055+89+\frac{10^4\,(4\times 2^8\times 8)}{\frac{9!\left(8\sin\left(2\sqrt{2}\right)\right)}{3!\left(2\sqrt{2}\times 2\right)}} = \left(2.048\times 10^7\left(4.30351\times 10^{-6}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}\,2^{1+2k_1}\,\sqrt{2}^{\,1+2k_1}\,(9-n_0)^{k_2}\,\Gamma^{(k_2)}(1+n_0)}{(1+2k_1)!\,k_2!}+\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}\left(-\frac{1}{2}\right)_{k_1}(3-n_0)^{k_2}\,(4-z_0)^{k_1}\,z_0^{-k_1}\,\Gamma^{(k_2)}(1+n_0)}{k_1!\,k_2!}\right)\right)\Big/\left(\left(\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{1+2k}\,\sqrt{2}^{\,1+2k}}{(1+2k)!}\right)\sum_{k=0}^{\infty}\frac{(9-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}\right)$$

for $((n_0\geq 0 \text{ or } n_0\notin\mathbb{Z}) \text{ and } n_0\to 3 \text{ and } n_0\to 9)$

Integral representations:

- More

$$10(-1)\,0.0864055+89+\frac{10^4\,(4\times 2^8\times 8)}{\frac{9!\left(8\sin\left(2\sqrt{2}\right)\right)}{3!\left(2\sqrt{2}\times 2\right)}} =$$

$$\frac{1.024\times 10^7\left(8.60703\times 10^{-6}\left(\int_0^{\infty}e^{-t}\,t^9\,dt\right)\left(\int_0^1\cos\left(2t\sqrt{2}\right)dt\right)\sqrt{2}+\sqrt{4}\int_0^{\infty}e^{-t}\,t^3\,dt\right)}{\left(\int_0^{\infty}e^{-t}\,t^9\,dt\right)\left(\int_0^1\cos\left(2t\sqrt{2}\right)dt\right)\sqrt{2}}$$

Open code

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$$10(-1)\,0.0864055 + 89 + \frac{10^4\,(4\times 2^8\times 8)}{\frac{9!\,(8\sin(2\sqrt{2}))}{3!\,(2\sqrt{2\times 2})}} =$$

$$\frac{88.1359\left(\int_0^1\int_0^1 \cos(2\sqrt{2}\,t_1)\log^9\left(\frac{1}{t_2}\right)dt_2\,dt_1 + 116\,184.\sqrt{4}\int_0^1\log^3\left(\frac{1}{t}\right)dt\right)}{\left(\int_0^1\cos(2\,t\sqrt{2})\,dt\right)\left(\int_0^1\log^9\left(\frac{1}{t}\right)dt\right)\sqrt{2}}$$

Open code

$$10(-1)\,0.0864055 + 89 + \frac{10^4\,(4\times 2^8\times 8)}{\frac{9!\,(8\sin(2\sqrt{2}))}{3!\,(2\sqrt{2\times 2})}} =$$

$$\left(4.096\times 10^7\left(i\pi\sqrt{4}\int_0^1\log^3\left(\frac{1}{t}\right)dt + 2.15176\times 10^{-6}\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{s-\sqrt{2}^2/s}}{s^{3/2}}\,ds\right)\left(\int_0^1\log^9\left(\frac{1}{t}\right)dt\right)\sqrt{2}\sqrt{\pi}\right)\right) \Big/ \left(\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{s-\sqrt{2}^2/s}}{s^{3/2}}\,ds\right)\left(\int_0^1\log^9\left(\frac{1}{t}\right)dt\right)\sqrt{2}\sqrt{\pi}\right) \text{ for } \gamma > 0$$

Open code

- $\log(x)$ is the natural logarithm

Now, we integrate the above sum of results:

2integrate((((((4*2^8*8)/9! + 8/3! + sin(2*sqrt(2))/((2sqrt(2*2)))))))x

Indefinite integral:

$$2\int\left(\frac{4\times 2^8\times 8}{9!} + \frac{8}{3!} + \frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}\right)x\,dx = 2\left(\frac{1922\,x^2}{2835} + \frac{1}{8}x^2\sin(2\sqrt{2})\right) + \text{constant}$$

Open code

- $n!$ is the factorial function

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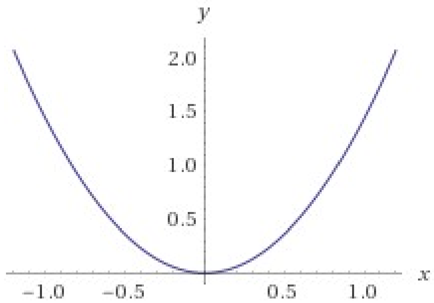
Plot:



(x from −1.2 to 1.2)

For x = 1.08094974 that is a Ramanujan mock theta function result, we obtain:

2 ((1922 1.08094974^2)/2835 + 1/8 1.08094974^2 sin(2 sqrt(2)))

Input interpretation:

$$2\left(\frac{1922\times 1.08094974^2}{2835}+\frac{1}{8}\times 1.08094974^2\sin\left(2\sqrt{2}\right)\right)$$

Open code

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Result:

- More digits

1.67430600...

1.674306… is very near to the neutron mass

Series representations:

- More

$$2\left(\frac{1922\times 1.08095^2}{2835}+\frac{1}{8}\times 1.08095^2\sin\left(2\sqrt{2}\right)\right)=1.58431+0.584226\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(2\sqrt{2}\right)$$

Open code

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$$2\left(\frac{1922\times 1.08095^2}{2835}+\frac{1}{8}\times 1.08095^2\sin\left(2\sqrt{2}\right)\right)=1.58431+0.292113\sum_{k=0}^{\infty}\frac{(-1)^k\, 2^{1+2k}\sqrt{2}^{1+2k}}{(1+2k)!}$$

Open code

$$2\left(\frac{1922\times 1.08095^2}{2835}+\frac{1}{8}\times 1.08095^2\sin\left(2\sqrt{2}\right)\right)=1.58431+0.292113\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{\pi}{2}+2\sqrt{2}\right)^{2k}}{(2k)!}$$

Open code

- $J_n(z)$ is the Bessel function of the first kind
- $n!$ is the factorial function

Integral representations:

$$2\left(\frac{1922\times 1.08095^2}{2835}+\frac{1}{8}\times 1.08095^2 \sin\left(2\sqrt{2}\right)\right)=$$
$$1.58431+0.584226\sqrt{2}\int_0^1 \cos\left(2t\sqrt{2}\right)dt$$

Open code

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$$2\left(\frac{1922\times 1.08095^2}{2835}+\frac{1}{8}\times 1.08095^2 \sin\left(2\sqrt{2}\right)\right)=$$
$$1.58431+\frac{0.146057\sqrt{2}\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{s-\sqrt{2}^2/s}}{s^{3/2}}\,ds \quad \text{for } \gamma>0$$

Open code

$$2\left(\frac{1922\times 1.08095^2}{2835}+\frac{1}{8}\times 1.08095^2 \sin\left(2\sqrt{2}\right)\right)=$$
$$1.58431+\frac{0.146057\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(s)\sqrt{2}^{1-2s}}{\Gamma\left(\frac{3}{2}-s\right)}\,ds \quad \text{for } 0<\gamma<1$$

Open code

- i is the imaginary unit
- $\Gamma(x)$ is the gamma function
- More information

-2integrate((((((4*2^8*8)/9! - 8/3! - sin(2*sqrt(2))/((2sqrt(2*2)))))))x

Indefinite integral:

$$-2\int\left(\frac{4\times 2^8\times 8}{9!}-\frac{8}{3!}-\frac{\sin\left(2\sqrt{2}\right)}{2\sqrt{2\times 2}}\right)x\,dx=$$
$$-2\left(-\frac{1858x^2}{2835}-\frac{1}{8}x^2\sin\left(2\sqrt{2}\right)\right)+\text{constant}$$

Open code

- $n!$ is the factorial function

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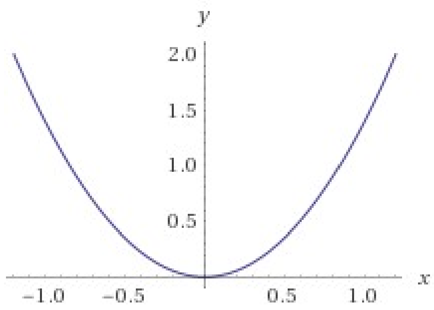
Plot:



(x from −1.2 to 1.2)

For x = 1.0864055 as above, we obtain:

-2 (-(1858 1.0864055^2)/2835 - 1/8 1.0864055^2 sin(2 sqrt(2)))

Input interpretation:

$$-2\left(-\frac{1858\times 1.0864055^2}{2835}-\frac{1}{8}\times 1.0864055^2\sin\left(2\sqrt{2}\right)\right)$$

Open code

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Result:

- More digits

1.6379603...

1.6379603... ≈ ζ (2)

Series representations:

- More

$$-2\left(-\frac{1858\times 1.08641^2}{2835}-\frac{1}{8}\times 1.08641^2\sin\left(2\sqrt{2}\right)\right)=$$
$$1.54706+0.590138\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(2\sqrt{2}\right)$$

Open code

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$$-2\left(-\frac{1858\times 1.08641^2}{2835}-\frac{1}{8}\times 1.08641^2\sin\left(2\sqrt{2}\right)\right)=$$
$$1.54706+0.295069\sum_{k=0}^{\infty}\frac{(-1)^k\, 2^{1+2k}\sqrt{2}^{1+2k}}{(1+2k)!}$$

Open code

$$-2\left(-\frac{1858\times 1.08641^2}{2835}-\frac{1}{8}\times 1.08641^2\sin\left(2\sqrt{2}\right)\right)=$$
$$1.54706+0.295069\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{\pi}{2}+2\sqrt{2}\right)^{2k}}{(2k)!}$$

Open code

- $J_n(z)$ is the Bessel function of the first kind
- $n!$ is the factorial function

Integral representations:

$$-2\left(-\frac{1858\times 1.08641^2}{2835}-\frac{1}{8}\times 1.08641^2\sin\left(2\sqrt{2}\right)\right)=1.54706+0.590138\sqrt{2}\int_0^1\cos\left(2t\sqrt{2}\right)dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$-2\left(-\frac{1858\times 1.08641^2}{2835}-\frac{1}{8}\times 1.08641^2\sin\left(2\sqrt{2}\right)\right)=1.54706+\frac{0.147535\sqrt{2}\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{s-\sqrt{2}^2/s}}{s^{3/2}}ds \quad \text{for } \gamma>0$$

Open code

$$-2\left(-\frac{1858\times 1.08641^2}{2835}-\frac{1}{8}\times 1.08641^2\sin\left(2\sqrt{2}\right)\right)=1.54706+\frac{0.147535\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(s)\sqrt{2}^{1-2s}}{\Gamma\left(\frac{3}{2}-s\right)}ds \quad \text{for } 0<\gamma<1$$

Open code

- i is the imaginary unit
- $\Gamma(x)$ is the gamma function

2sqrt((((((6*((((-2 (-(1858 1.0864055^2)/2835 - 1/8 1.0864055^2 sin(2 sqrt(2))))))))))))

Input interpretation:

$$2\sqrt{6\left(-2\left(-\frac{1858\times 1.0864055^2}{2835}-\frac{1}{8}\times 1.0864055^2\sin\left(2\sqrt{2}\right)\right)\right)}$$

Open code

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Result:

- More digits

6.2698523...

6.2698523... ≈ 2π

Series representations:

- More

$$2\sqrt{6(-2)\left(-\frac{1858\times 1.08641^2}{2835}-\frac{1}{8}\times 1.08641^2\sin\left(2\sqrt{2}\right)\right)}=$$
$$2\sqrt{9.28235+3.54083\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(2\sqrt{2}\right)}$$

Open code

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$$2\sqrt{6(-2)\left(-\frac{1858\times 1.08641^2}{2835}-\frac{1}{8}\times 1.08641^2\sin\left(2\sqrt{2}\right)\right)}=$$
$$2\sqrt{9.28235+1.77042\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{1+2k}\,\sqrt{2}^{1+2k}}{(1+2k)!}}$$

Open code

$$2\sqrt{6(-2)\left(-\frac{1858\times 1.08641^2}{2835}-\frac{1}{8}\times 1.08641^2\sin\left(2\sqrt{2}\right)\right)}=$$
$$2\sqrt{8.28235+1.77042\sin\left(2\sqrt{2}\right)}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(8.28235+1.77042\sin\left(2\sqrt{2}\right)\right)^{-k}$$

Open code

- $J_n(z)$ is the Bessel function of the first kind
- $n!$ is the factorial function
- $\binom{n}{m}$ is the binomial coefficient

Integral representations:

$$2\sqrt{6(-2)\left(-\frac{1858\times 1.08641^2}{2835}-\frac{1}{8}\times 1.08641^2\sin\left(2\sqrt{2}\right)\right)}=$$
$$2\sqrt{9.28235+3.54083\sqrt{2}\int_0^1\cos\left(2t\sqrt{2}\right)dt}$$

Open code

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$$2\sqrt{6(-2)\left(-\frac{1858\times 1.08641^2}{2835}-\frac{1}{8}\times 1.08641^2\sin\left(2\sqrt{2}\right)\right)} =$$

$$2\sqrt{9.28235+\frac{0.885208\sqrt{2}\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{s-\sqrt{2}^2/s}}{s^{3/2}}\,ds} \quad \text{for } \gamma>0$$

Open code

$$2\sqrt{6(-2)\left(-\frac{1858\times 1.08641^2}{2835}-\frac{1}{8}\times 1.08641^2\sin\left(2\sqrt{2}\right)\right)} =$$

$$2\sqrt{9.28235+\frac{0.885208\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(s)\sqrt{2}^{1-2s}}{\Gamma\left(\frac{3}{2}-s\right)}\,ds} \quad \text{for } 0<\gamma<1$$

Open code

- i is the imaginary unit
- $\Gamma(x)$ is the gamma function
- More information

10^3 * 1.0864055^4 integrate((((((4*2^8*8)/9!)) * (8/3!) * sin(2*sqrt(2))/((2sqrt(2*2)))))))x

Input interpretation:

$$10^3\times 1.0864055^4\int\left(\frac{4\times 2^8\times 8}{9!}\times\frac{8}{3!}\times\frac{\sin\left(2\sqrt{2}\right)}{2\sqrt{2\times 2}}\right)x\,dx$$

Open code

- $n!$ is the factorial function

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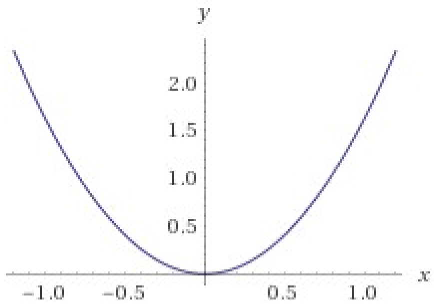
Result:

$$1.61471\,x^2$$

Plot:



(x from −1.2 to 1.2)

For x = 1, we obtain:

Input interpretation:

1.61471×1^2

Open code

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Result:

1.61471

1.61471 is a golden number

integrate((((((4*2^8*8)/9!)) * 1/(8/3!) * 1/((((((sin(2*sqrt(2))/((2sqrt(2*2)))))))))))x

Indefinite integral:

$$\int \frac{(4 \times 2^8 \times 8)\, x}{\frac{9! \times 8 \sin(2\sqrt{2})}{3!\,(2\sqrt{2 \times 2})}}\, dx = \frac{32}{945}\, x^2 \csc(2\sqrt{2}) + \text{constant}$$

Open code

- $n!$ is the factorial function
- $\csc(x)$ is the cosecant function

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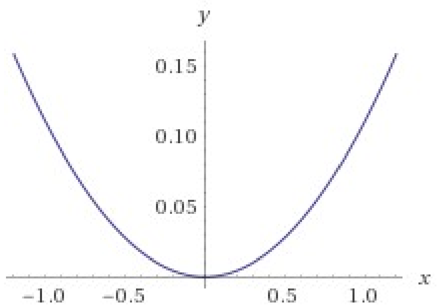
Plot of the integral:



(x from −1.2 to 1.2)

1.0864055 / integrate((((((4*2^8*8)/9!)) * 1/(8/3!) * 1/((((((sin(2*sqrt(2))/((2sqrt(2*2)))))))))))x

Input interpretation:

$$\frac{1.0864055}{\int \left(\frac{4 \times 2^8 \times 8}{9!} \times \frac{1}{\frac{8}{3!}} \times \frac{1}{\frac{\sin(2\sqrt{2})}{2\sqrt{2 \times 2}}}\right) x\, dx}$$

Open code

- $n!$ is the factorial function

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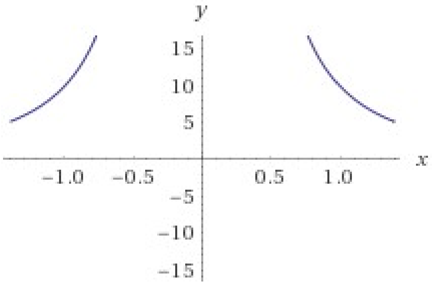
Result:

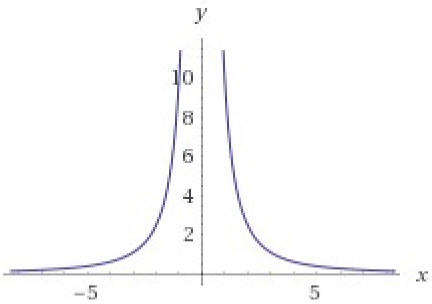
$$\frac{9.88384}{x^2}$$

Plots:



(x from -1.4 to 1.4)

Open code



(x from -8.3 to 8.3)

For x = 1, we obtain:

Input interpretation:

$$\frac{9.88384}{1^2}$$

Open code

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Result:

9.88384

And:

Input interpretation:

$$\frac{1}{6} \times \frac{9.88384}{1^2}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.6473066666666666666666666666666666666666666666666666666...

Open code

Repeating decimal:

$1.64730\overline{6}$ (period 1)

1.647306... ≈ ζ (2)

2sqrt((9.88384/1^2))

Input interpretation:

$$2\sqrt{\frac{9.88384}{1^2}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

6.28772...

6.28772... ≈ 2π

Now, we have that:

A trivialization of the real spin bundle $\mathcal{E} \to \partial\Sigma$ is given by any nonzero section of $\mathcal{E}$. For example, if Σ is the upper half z plane, then $\mathcal{E} \to \partial\Sigma$ can be trivialized by $\psi = \pm\sqrt{\mathrm{d}z}$, and if Σ is the lower half z plane, then $\mathcal{E} \to \partial\Sigma$ can be trivialized by $\psi = \pm\mathrm{i}\sqrt{\mathrm{d}z}$.

The factors discussed so far combine to $2 \cdot \frac{1}{2}\sqrt{2}/g_{\mathrm{st}} = \sqrt{2}/g_{\mathrm{st}}$. In addition, in [3] it was found convenient to include a factor of $1/\sqrt{2}$ for every boundary puncture. Thus, let Σ be a disc with m boundary punctures and n bulk punctures labeled by integers $d_1, \ldots, d_n$; let $\overline{\mathcal{M}}$ be the compactified moduli space of conformal structures on Σ. Then refining eqn. (3.1), the general disc amplitude is

$$\langle \tau_{d_1}\tau_{d_2}\ldots\tau_{d_n}\sigma^m\rangle_D = \frac{2^{(1-m)/2}}{g_{\mathrm{st}}}\int_{\overline{\mathcal{M}}} \psi_1^{d_1}\psi_2^{d_2}\cdots\psi_n^{d_n}. \qquad (3.37)$$

In interpreting eqn. (3.37), we consider the boundary punctures to be inequivalent and labeled, and we sum over all possible cyclic orderings. For example, let us compute $\langle\sigma\sigma\sigma\rangle$, which receives a contribution only from a disc with three boundary punctures labeled 1,2,3. There are two cyclic orderings (namely 123 and 132), and for each cyclic ordering, $\overline{\mathcal{M}}$ is just a point, with $\int_{\overline{\mathcal{M}}} 1 = 1$. So after settting $g_{\mathrm{st}} = 1$, eqn. (3.37) with $n = 0$, $m = 3$, and including a factor of 2 from the sum over cyclic orderings, gives

$$\langle\sigma^3\rangle = 1. \qquad (3.38)$$

Getting this formula was the motivation to include a factor $1/\sqrt{2}$ for each boundary puncture. Another simple formula is

$$\langle\tau_0\sigma\rangle = 1. \qquad (3.39)$$

This is again easy because the moduli space is a point. With boundary punctures only, eqn. (3.38) is the only nonzero amplitude, for dimensional reasons, and similarly (3.39) is the only additional nonzero disc amplitude with insertions of σ and τ_0 only.

Setting $z = x + iy$, we take a smooth disc D to be the closed upper half-plane $y \geq 0$ plus a point at infinity. On the left hand side of eqn. (3.44), we see a distinguished bulk puncture that we place at $z_1 = x_1 + iy_1$, $y_1 > 0$, and a distinguished boundary puncture that we place at x_0. In the present case, there is a convenient section λ of $\mathcal{L}_1$ that is everywhere nonzero along the boundary, but whose restriction to the boundary is not a pullback. To construct it, rather as before, we set

$$\rho = (\overline{z}_1 - x_0)\frac{\mathrm{d}z}{(z - \overline{z}_1)(z - x_0)}. \tag{3.45}$$

This 1-form is regular and nonzero throughout D, except at the boundary point x_0. Evaluating ρ at $z = z_1$, we get a section λ of $\mathcal{L}_1$ that is regular and nonzero as long as D is smooth.

From the eq, (3.37), we obtain:

(((((1/2 * integrate (-11+26i)(-11+26i)))))

Indefinite integral:

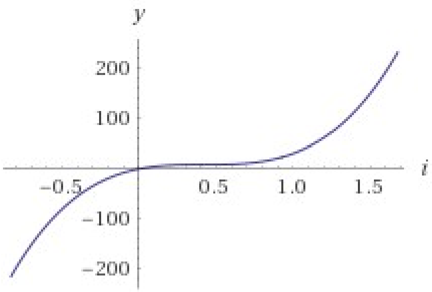
- Step-by-step solution

$$\frac{1}{2}\int(-11+26\,i)(-11+26\,i)\,di = \frac{1}{2}\left(\frac{676\,i^3}{3} - 286\,i^2 + 121\,i\right) + \text{constant}$$

Open code

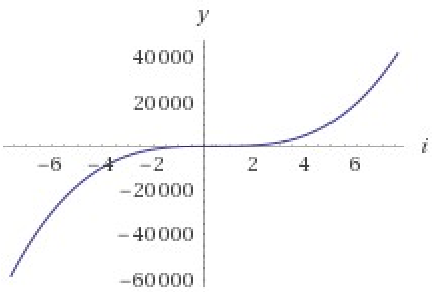
Enlarge Data Customize A Plaintext Interactive

Plots:



(i from -0.8 to 1.7)

Open code



(i from -7.6 to 7.6)

Open code

Values:

- More

i	1	2	3	4	5
$\frac{1}{2}\left(\frac{676 i^3}{3} - 286 i^2 + 121 i\right)$	$\frac{181}{6}$	$\frac{1351}{3}$	$\frac{3873}{2}$	$\frac{15494}{3}$	$\frac{64865}{6}$
approximation	30.1667	450.333	1936.5	5164.67	10810.8

Enlarge Data Customize A Plaintext Interactive

Alternate forms:

- More

$$i\left(i\left(\frac{338 i}{3} - 143\right) + \frac{121}{2}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{1}{156}(26 i - 11)^3 + \frac{1331}{156}$$

$$\frac{1}{6} i (26 i (26 i - 33) + 363)$$

Open code

Expanded form:

$$\frac{338 i^3}{3} - 143 i^2 + \frac{121 i}{2}$$

Open code

Input:

$$\frac{1}{2}\left(121 i - 286 i^2 + \frac{1}{3}(676 i^3)\right)$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

$$143 - \frac{313 i}{6}$$

Decimal approximation:

- More digits

$143 - 52.16666666666666666666666666666666666666666666666666\ldots i$

Open code

Polar coordinates:

- Exact form

$r \approx 152.218$ (radius), $\theta \approx -20.0421°$ (angle)

Open code

(((((1/2 * integrate (-11+26i)(-11+26i))))))^1/10

Input:

$$\sqrt[10]{\frac{1}{2}\int(-11+26\,i)(-11+26\,i)\,di}$$

Open code

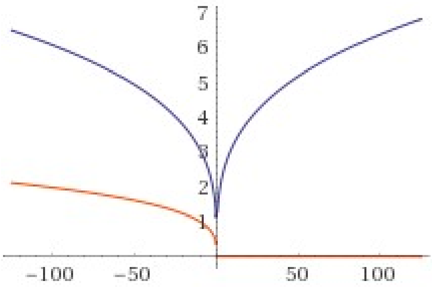
Enlarge Data Customize A Plaintext Interactive

Exact result:

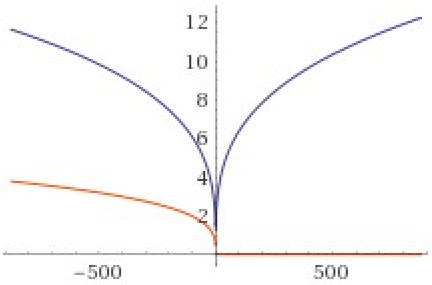
$$\frac{\sqrt[10]{\frac{676\,i^3}{3}-286\,i^2+121\,i}}{\sqrt[10]{2}}$$

Plots:

- Complex-valued plots



Open code



Open code

Input:

$$\frac{\sqrt[10]{121\,i-286\,i^2+\frac{1}{3}\left(676\,i^3\right)}}{\sqrt[10]{2}}$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\sqrt[10]{143-\frac{313\,i}{6}}$$

Decimal approximation:

- More digits

1.651889088469143590179671085092333398852388699461380056... − 0.05780666003342019006478349983589530106814253320763244775... i

Open code

Polar coordinates:

- Exact form

$r \approx 1.6529$ (radius), $\theta \approx -2.00421°$ (angle)

Open code

1.6529 is a golden number

sqrt(((((((6*(((((1/2 * integrate (-11+26i)(-11+26i))))))^1/10)))))))

Input:

$$\sqrt{6 \sqrt[10]{\frac{1}{2} \int (-11+26\,i)(-11+26\,i)\,d\,i}}$$

Open code

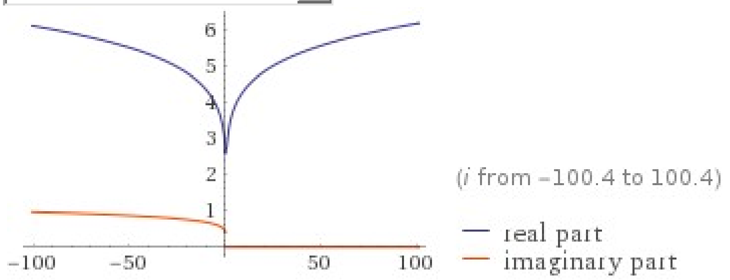
Enlarge Data Customize A Plaintext Interactive

Exact result:

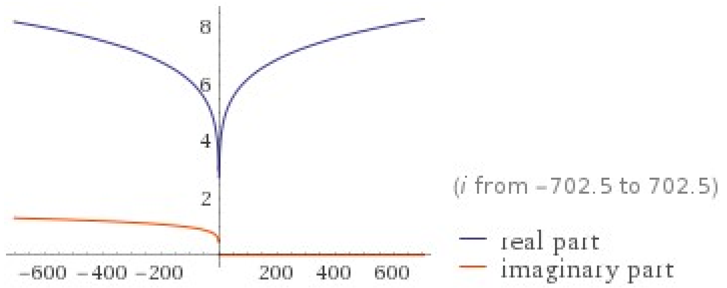
$$2^{9/20} \sqrt{3} \sqrt[20]{\frac{676\,i^3}{3} - 286\,i^2 + 121\,i}$$

Plots:

- Complex-valued plots



Open code



Input:

$$2^{9/20} \sqrt{3} \sqrt[20]{121\,i - 286\,i^2 + \frac{1}{3}(676\,i^3)}$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$6^{9/20}\sqrt[20]{858-313\,i}$$

Decimal approximation:

- More digits

$3.1487089347224931949919918455110866921770980716315674\ldots - 0.055076535715278707922746420775338369776921555253016698\ldots\,i$

Open code

Polar coordinates:

- Exact form

$r \approx 3.14919$ (radius), $\theta \approx -1.0021°$ (angle)

Open code

2sqrt(((((((6*(((((1/2 * integrate (-11+26i)(-11+26i))))))^1/10)))))))

Input:

$$2\sqrt{6\sqrt[10]{\frac{1}{2}\int(-11+26\,i)(-11+26\,i)\,di}}$$

Open code

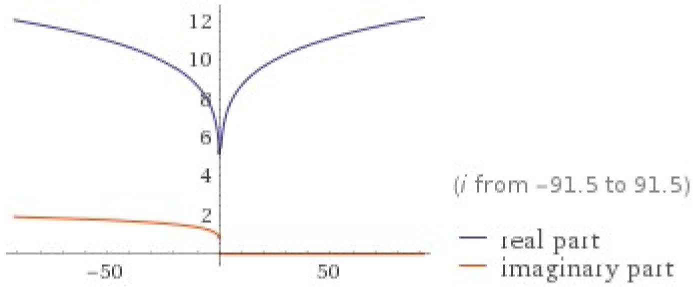
Enlarge Data Customize A Plaintext Interactive

Exact result:

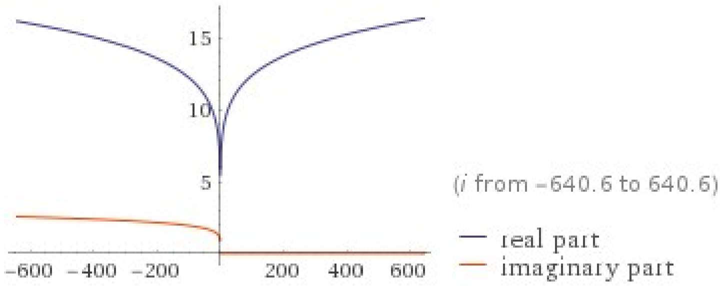
$$2\times 2^{9/20}\sqrt{3}\sqrt[20]{\frac{676\,i^3}{3}-286\,i^2+121\,i}$$

Plots:

- Complex-valued plots



Open code



Input:

$$2\times 2^{9/20}\sqrt{3}\sqrt[20]{121\,i-286\,i^2+\frac{1}{3}(676\,i^3)}$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$2\times 6^{9/20}\sqrt[20]{858-313\,i}$$

Decimal approximation:

- More digits

6.2974178694449863899839836910221733843541961432631348883... – 0.11015307143055741584549284155067673955384311050603339784... i

Open code

Polar coordinates:

- Exact form

$r\approx 6.29838$ (radius), $\theta\approx -1.0021°$ (angle)

Open code

6.29838 ≈ 2π

And also:

(11+2/5)(((((1/2 * integrate (-11+26i)(-11+26i))))))

Input:

$$\left(11+\frac{2}{5}\right)\left(\frac{1}{2}\int(-11+26\,i)(-11+26\,i)\,di\right)$$

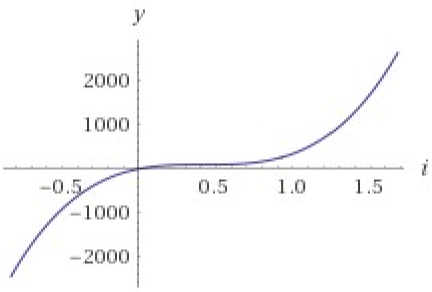
Open code

Enlarge Data Customize A Plaintext Interactive

Result:

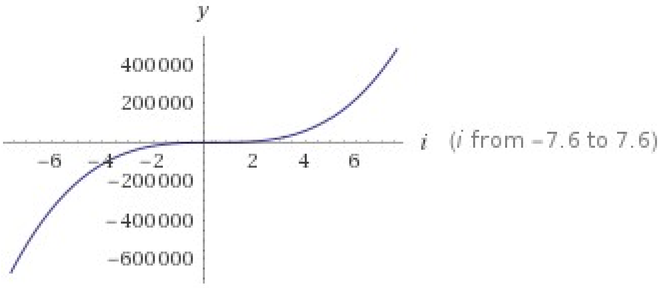
$$\frac{57}{10}\left(\frac{676\,i^3}{3}-286\,i^2+121\,i\right)$$

Plots:



(i from −0.8 to 1.7)

Open code



Values:

- More

i	1	2	3	4	5
$\frac{57}{10}\left(\frac{676 i^3}{3} - 286 i^2 + 121 i\right)$	$\frac{3439}{10}$	$\frac{25669}{5}$	$\frac{220761}{10}$	$\frac{294386}{5}$	$\frac{246487}{2}$
approximation	343.9	5133.8	22076.1	58877.2	123244.

Enlarge Data Customize A Plaintext Interactive

Alternate forms:

- More

$$i\left(i\left(\frac{6422 i}{5} - \frac{8151}{5}\right) + \frac{6897}{10}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{19}{260}(26 i - 11)^3 + \frac{25289}{260}$$

$$\frac{19}{10} i (26 i (26 i - 33) + 363)$$

Open code

Expanded form:

$$\frac{6422 i^3}{5} - \frac{8151 i^2}{5} + \frac{6897 i}{10}$$

Open code

Input:

$$\frac{57}{10}\left(121 i - 286 i^2 + \frac{1}{3}(676 i^3)\right)$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

$$\frac{8151}{5} - \frac{5947 i}{10}$$

Decimal form:

$1630.2 - 594.7\, i$

Open code

Polar coordinates:

- Exact form

$r \approx 1735.29$ (radius), $\theta \approx -20.0421°$ (angle)

Open code

1735.29

This result is very near to the mass of candidate glueball $f_0(1710)$ meson.

((((((11+2/5)(((((1/2 * integrate (-11+26i)(-11+26i))))))))))^1/15

Input:

$$\sqrt[15]{\left(11+\frac{2}{5}\right)\left(\frac{1}{2}\int(-11+26\, i)(-11+26\, i)\, d i\right)}$$

Open code

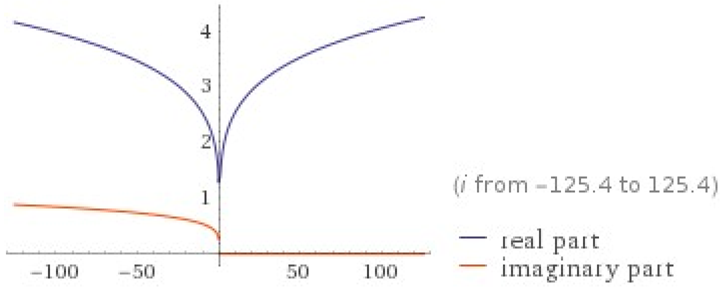
Enlarge Data Customize A Plaintext Interactive

Exact result:

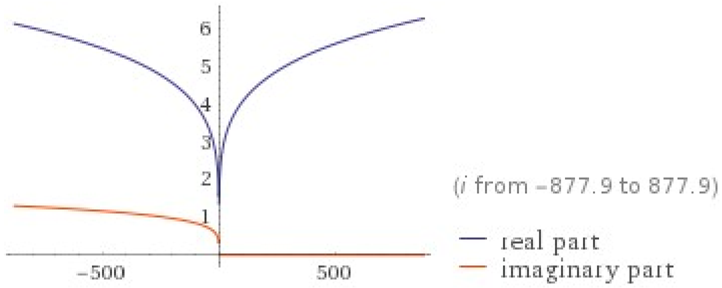
$$\sqrt[15]{\frac{57}{10}}\ \sqrt[15]{\frac{676\, i^3}{3} - 286\, i^2 + 121\, i}$$

Plots:

- Complex-valued plots



Open code



Input:

$$\sqrt[15]{\frac{57}{10}}\ \sqrt[15]{121\, i - 286\, i^2 + \frac{1}{3}(676\, i^3)}$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\sqrt[15]{\frac{8151}{5} - \frac{5947\,i}{10}}$$

Decimal approximation:

- More digits

1.643765962506599947835544629450361919094321156926439112... − 0.03833957272097536291454267848236148922247343760813562250... i

Open code

Polar coordinates:

- Exact form

$r \approx 1.64421$ (radius), $\theta \approx -1.33614°$ (angle)

1.64421 ≈ ζ (2)

sqrt((((((6*(((((11.4(((((1/2 * integrate (-11+26i)(-11+26i))))))))))^1/15)))))))

Input:

$$\sqrt{6\sqrt[15]{11.4\left(\frac{1}{2}\int(-11+26\,i)(-11+26\,i)\,di\right)}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

$$2.5958\sqrt[30]{\frac{676\,i^3}{3} - 286\,i^2 + 121\,i}$$

Input interpretation:

$$2.5958\sqrt[30]{121\,i - 286\,i^2 + \frac{1}{3}(676\,i^3)}$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

3.14069... − 0.0366221... i

Polar coordinates:

$r = 3.1409$ (radius), $\theta = -0.668069°$ (angle)

Open code

2*sqrt((((((6*(((((11.4(((((1/2 * integrate (-11+26i)(-11+26i))))))))))^1/15)))))))

Input:

$$2\sqrt{6\sqrt[15]{11.4\left(\frac{1}{2}\int(-11+26\,i)(-11+26\,i)\,di\right)}}$$

Open code

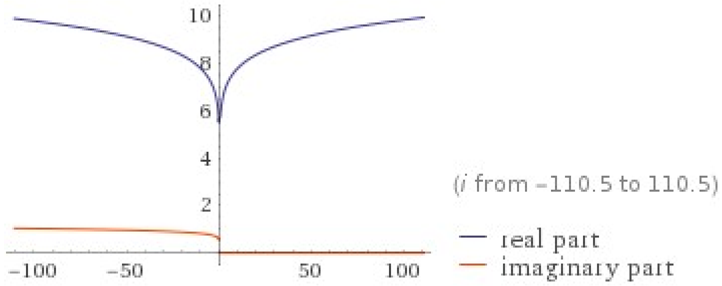
Enlarge Data Customize A Plaintext Interactive

Result:

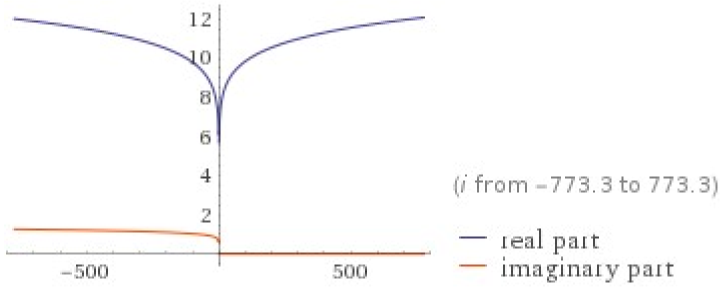
$$5.1916 \sqrt[30]{\frac{676 i^3}{3} - 286 i^2 + 121 i}$$

Plots:

- Complex-valued plots



Open code



Open code

Input interpretation:

$$5.1916 \sqrt[30]{121 i - 286 i^2 + \frac{1}{3} (676 i^3)}$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

6.28138… −
0.0732442… i

Polar coordinates:

$r = 6.2818$ (radius), $\theta = -0.668069°$ (angle)

Open code

6.2818 ≈ 2π

Matrix integrals are governed by Virasoro constraints that are associated to the vector fields $L_n \sim -\mathrm{Tr}\,\Phi^{n+1}\frac{\partial}{\partial\Phi}$. Though these constraints can be deduced directly from that representation of L_n, a fuller understanding with details that we will need below can be obtained by diagonalizing the matrix as $\Phi = U\Lambda U^{-1}$, with U unitary and $\Lambda = \mathrm{diag}(\lambda_1, \lambda_2, \cdots, \lambda_N)$. The integral over U cancels the factor of $1/\mathrm{vol}(U(N))$ in the definition of the matrix integral, and the integral becomes

$$Z = \int \mathrm{d}^N\lambda \prod_{I<J}(\lambda_I - \lambda_J)^2 \exp\left(-\sum_I \frac{1}{g_{st}} W(\lambda_I)\right). \tag{4.6}$$

If x_i, $i = 1, \ldots, d$ are the critical points of the polynomial $W(x)$, then the critical points of the matrix function $\mathrm{Tr}\,W(\Phi)$ are found by setting each λ_I equal to one of the x_i. A critical point is labeled by the number N_i of eigenvalues with $\lambda_I = x_i$. (Note that the eigenvalues λ_I are only defined up to permutation.) The large N limit is taken is such a way that the "filling fractions"

$$\mu_i = g_{st} N_i, \qquad i = 1, \ldots, d, \tag{4.7}$$

are all kept finite. These parameters characterize the saddle-points, and together with the coefficients of the polynomial $W(x)$ play the role of moduli of the matrix model. (In our application, because it only involves a local portion of the spectral curve, we will not really see these parameters.)

To derive the Virasoro constraints on the matrix integral, one can start with

$$0 = \int \mathrm{d}^N\lambda \sum_K \frac{\partial}{\partial\lambda_K}\left(\frac{1}{x-\lambda_K}\prod_{I<J}(\lambda_I-\lambda_J)^2 \exp\left(-\sum_I \frac{1}{g_{st}}W(\lambda_I)\right)\right). \tag{4.8}$$

This implies the identity

$$\left\langle \left(\sum_K \frac{1}{x-\lambda_K}\right)^2 - \frac{1}{g_{st}}\sum_K \frac{W'(\lambda_K)}{x-\lambda_K}\right\rangle = 0, \tag{4.9}$$

where the symbol $\langle\cdots\rangle$ is defined by

$$\langle A\rangle = \frac{1}{Z}\int \mathrm{d}^N\lambda\, A \prod_{I<J}(\lambda_I-\lambda_J)^2 \exp\left(-\sum_I \frac{1}{g_{st}}W(\lambda_I)\right). \tag{4.10}$$

From (4.8), we have the following results:

For $\lambda = 1$; $\lambda_K = 8$; $\lambda_I = 3$; $\lambda_J = 5$; $g_{st} = 1$; $x = 10$ and $W = 12.59+20.74$

integrate (derivative 1/8 * 2 exp(3*(((12.59+20.74)i)))

Indefinite integral:

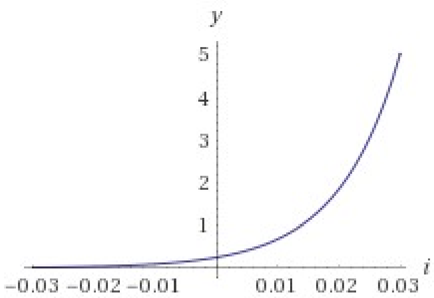
- Approximate form
- Step-by-step solution

$$\int \frac{\partial}{\partial i}\left(\frac{2}{8}\exp(3\,((12.59+20.74)\,i))\right)di = 0.25\,e^{99.99\,i} + \text{constant}$$

Open code

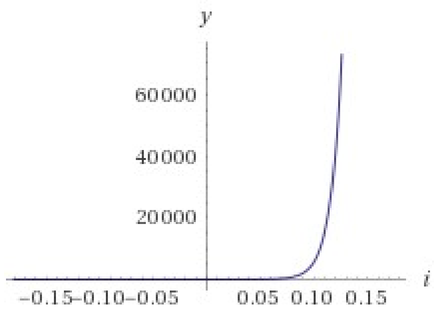
Enlarge Data Customize A Plaintext Interactive

Plots of the integral:



(i from −0.03 to 0.03)

Open code



(i from −0.2 to 0.2)

0.25 e^(99.99 i)

Input:

$0.25\, e^{99.99\, i}$

Open code

- i is the imaginary unit

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Result:

- More digits

$0.214303\ldots -$
$0.128741\ldots\, i$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 0.25$ (radius), $\theta = -30.995°$ (angle)

Open code

0.25 = ¼

Note that:

Pi * 1.0864055^9 * 0.25 e^(99.99 i)

Where 1.0864055 is a Ramanujan mock theta function

Input interpretation:

$\pi \times 1.0864055^9 \times 0.25\, e^{99.99\, i}$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$1.41940\ldots -$
$0.852695\ldots i$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 1.65584$ (radius), $\theta = -30.995°$ (angle)

Open code

We note that, the result 1,65584... is practically equal to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164{,}2696$ i.e. 1,65578...

Indeed:

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots \Rightarrow$$

$$\int \frac{\partial}{\partial i}\left(\frac{2}{8}\exp(3\,((12.59+20.74)\,i))\right) di = 0.25\,e^{99.99\,i} + \text{constant}$$

$$\Rightarrow \pi \times 1.0864055^9 \times 0.25\,e^{99.99\,i}$$

$$= 1.65584$$

Thence:

Pi * 1.0864055^9 * integrate (derivative 1/8 * 2 exp(3*(((12.59+20.74)i)))

Input interpretation:

$$\pi \times 1.0864055^9 \int \frac{\partial}{\partial i}\left(\frac{1}{8}\times 2\exp(3\,((12.59+20.74)\,i))\right) di$$

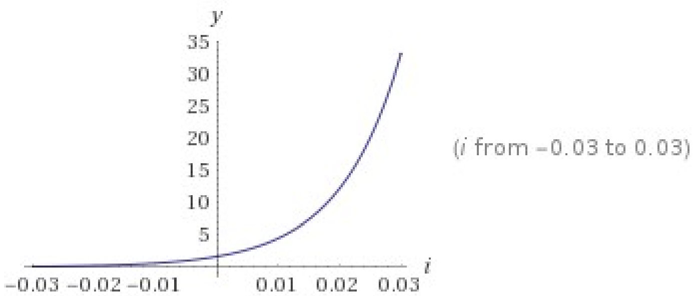
Open code

Enlarge Data Customize A Plaintext Interactive

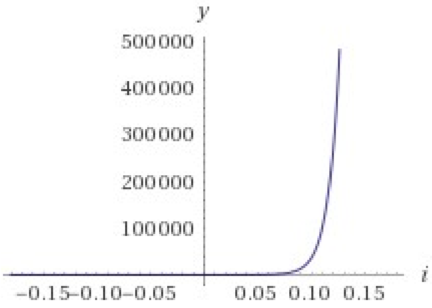
Result:

$1.65584\,e^{99.99\,i}$

Plots:



Open code



1.65584 e^(99.99 i)

Input interpretation:

$1.65584\, e^{99.99 i}$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.41941... −
0.852697... i

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 1.65584$ (radius), $\theta = -30.995°$ (angle)

1.65584

Furthermore, for:

For $\lambda = 1$; $\lambda_K = 8$; $\lambda_I = 3$; $\lambda_J = 5$; $g_{st} = 1$; $x = 10$ and $W = (-1/2+\sqrt{-3})$

integrate (derivative 1/8 * 2 exp(3*((((-1i+sqrt(-3))/2))))

Indefinite integral:

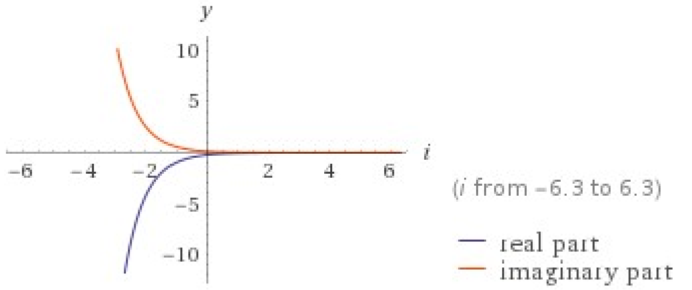
- Approximate form
- Step-by-step solution

$$\int \frac{\partial}{\partial i}\left(\frac{2}{8} \exp\left(\frac{3}{2}\left(-i+\sqrt{-3}\right)\right)\right) di = \frac{1}{4} e^{3/2 i \left(\sqrt{3}+i i\right)} + \text{constant}$$

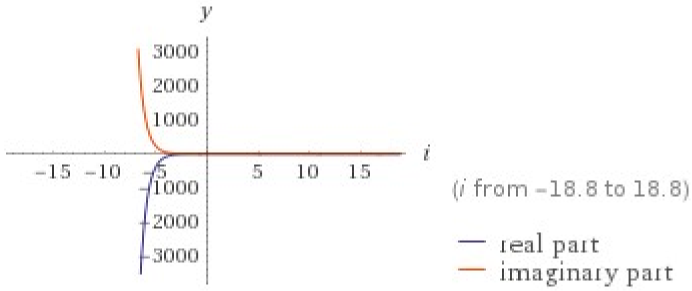
Open code

Enlarge Data Customize A Plaintext Interactive

Plots of the integral:



Open code



Open code

1/4 e^(3/2 i (sqrt(3) + i i))

Input:

$\frac{1}{4} e^{3/2\, i \left(\sqrt{3} + i\, i\right)}$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Exact result:

$\frac{1}{4} e^{3/2\, i \left(\sqrt{3} - 1\right)}$

Decimal approximation:

- More digits

0.11382744389956026463030856384462854445999600229450602590... + 0.22258327209224969225840699369718538235222415105651739842... i

(using the principal branch of the logarithm for complex exponentiation)

Open code

Property:

$\frac{1}{4} e^{3/2\, i \left(-1 + \sqrt{3}\right)}$ is a transcendental number

Open code

Polar coordinates:

- Exact form

$r \approx 0.25$ (radius), $\theta \approx 62.9151°$ (angle)

0.25 = ¼

Continued fraction:

- Linear form

$$\cfrac{1}{(2-4i)+\cfrac{1}{(-1-2i)+\cfrac{1}{(5-i)+\cfrac{1}{-3+\cfrac{1}{(-1-2i)+\cfrac{1}{(2+4i)+\cfrac{1}{(-2-i)+\cfrac{1}{6i+\cfrac{1}{(2+i)+\cfrac{1}{(6-i)+\cfrac{1}{\cdots}}}}}}}}}}}$$

(using the Hurwitz expansion)

Series representations:

- More

$$\frac{1}{4} e^{3/2 i \left(\sqrt{3}+i i\right)} = \frac{1}{4} e^{\frac{3}{2} i \left(i^2+\sqrt{2} \sum_{k=0}^{\infty} 2^{-k} \binom{\frac{1}{2}}{k}\right)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{1}{4} e^{3/2 i \left(\sqrt{3}+i i\right)} = \frac{1}{4} \exp\left(\frac{3}{2} i \left(i^2+\sqrt{2} \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

Open code

$$\frac{1}{4} e^{3/2 i \left(\sqrt{3}+i i\right)} = \frac{1}{4} \exp\left(\frac{3}{4} i \left(2 i^2 + \frac{\sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 2^{-s} \Gamma\left(-\frac{1}{2}-s\right) \Gamma(s)}{\sqrt{\pi}}\right)\right)$$

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\Gamma(x)$ is the gamma function
- $\operatorname{Res}_{z=z_0} f$ is a complex residue
- More information

-0.08181636+1.0864055^23 * (((((1/4 e^(3/2 i (sqrt(3) + i i))))) where -0.08181636 and 1.0864055 are Ramanujan mock theta functions

Input interpretation:

$$-0.08181636+1.0864055^{23}\left(\frac{1}{4}e^{3/2\,i\left(\sqrt{3}+i\,i\right)}\right)$$

Open code

- i is the imaginary unit

Result:

- More digits

0.6838895... +
1.497295... i

(using the principal branch of the logarithm for complex exponentiation)

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Polar coordinates:

$r = 1.64609$ (radius), $\theta = 65.4515°$ (angle)

Open code

1.64609 ≈ ζ (2)

2sqrt[6*(((((((-0.08181636+1.0864055^23 * (((((1/4 e^(3/2 i (sqrt(3) + i i)))))))))]

Input interpretation:

$$2\sqrt{6\left(-0.08181636+1.0864055^{23}\left(\frac{1}{4}e^{3/2\,i\left(\sqrt{3}+i\,i\right)}\right)\right)}$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

5.287694... +
3.397993... i

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 6.28538$ (radius), $\theta = 32.7257°$ (angle)

6.28538 ≈ 2π

Series representations:

- More

$$2\sqrt{6\left(-0.0818164+\frac{1}{4}\times 1.08641^{23}\,e^{3/2\,i\left(\sqrt{3}+i\,i\right)}\right)}=$$

$$2\sqrt{-1.4909+10.0904\,e^{3/2\,i\left(i^2+\sqrt{3}\right)}}\sum_{k=0}^{\infty}\left(-1.4909+10.0904\,e^{3/2\,i\left(i^2+\sqrt{3}\right)}\right)^{-k}\binom{\frac{1}{2}}{k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$2\sqrt{6\left(-0.0818164+\frac{1}{4}\times 1.08641^{23}\, e^{3/2\, i\left(\sqrt{3}+i\, i\right)}\right)} =$$

$$2\sqrt{-1.4909+10.0904\, e^{3/2\, i\left(i^2+\sqrt{3}\right)}}$$

$$\sum_{k=0}^{\infty} \frac{(-1)^k \left(-1.4909+10.0904\, e^{3/2\, i\left(i^2+\sqrt{3}\right)}\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$2\sqrt{6\left(-0.0818164+\frac{1}{4}\times 1.08641^{23}\, e^{3/2\, i\left(\sqrt{3}+i\, i\right)}\right)} =$$

$$2\sqrt{z_0}\sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(-0.490898+10.0904\, e^{3/2\, i\left(i^2+\sqrt{3}\right)}-z_0\right)^k z_0^{-k}}{k!}$$

for not $((z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0))$

Open code

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\mathbb{R}$ is the set of real numbers
- More information

From the (4.6),

$$Z=\int \mathrm{d}^N\lambda \prod_{I<J}(\lambda_I-\lambda_J)^2 \exp\left(-\sum_I \frac{1}{g_{\mathrm{st}}} W(\lambda_I)\right)$$

we obtain, for $\lambda_I = 3$; $\lambda_J = 5$; $g_{st} = 1$; $x = 10$ and W = 12.59+20.74

integrate (4 exp(3*(((12.59+20.74)i)))

Indefinite integral:

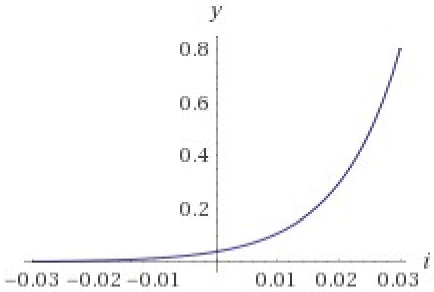
- Approximate form
- Step-by-step solution

$$\int 4\exp(3\,((12.59+20.74)\, i))\, di = 0.040004\, e^{99.99\, i} + \text{constant}$$

Open code

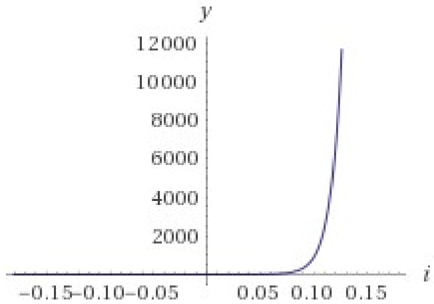
Enlarge Data Customize A Plaintext Interactive

Plots of the integral:



(i from −0.03 to 0.03)

Open code



(i from −0.2 to 0.2)

Input:

$0.040004\, e^{99.99\, i}$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$0.0342919\ldots -$
$0.0206006\ldots\, i$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 0.040004$ (radius), $\theta = -30.995°$ (angle)

Open code

About 1/25

377 + 55 + 21 - (((10^5 * 0.040004 e^(99.99 i))))

Input:

$377 + 55 + 21 - 10^5 \times 0.040004\, e^{99.99\, i}$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-2976.19\ldots +$
$2060.06\ldots\, i$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 3619.61$ (radius), $\theta = 145.31°$ (angle)

3619.61 near to the rest mass of double charmed Xi baryon 3621.40

Series representations:

- More

$$377 + 55 + 21 - 10^5 \left(0.040004\, e^{99.99\, i}\right) = 453 - 4000.4 \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{99.99\, i}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$377 + 55 + 21 - 10^5 \left(0.040004\, e^{99.99\, i}\right) = 453 - 4000.4 \left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{99.99\, i}$$

Open code

$$377 + 55 + 21 - 10^5 \left(0.040004\, e^{99.99\, i}\right) = 453 - 4000.4 \left(\frac{\sum_{k=0}^{\infty} \frac{-1+k+z}{k!}}{z}\right)^{99.99\, i}$$

Open code

- $n!$ is the factorial function
  - More information

41 * integrate (4 exp(3*(((12.59+20.74)i)))

Input:

$$41 \int 4 \exp(3\,((12.59 + 20.74)\, i))\, di$$

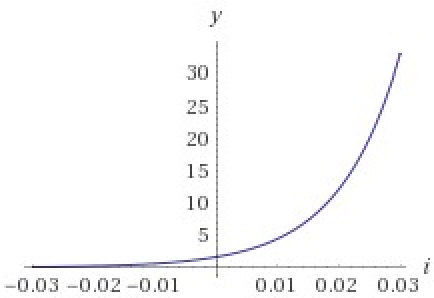
Open code

Enlarge Data Customize A Plaintext Interactive

Result:

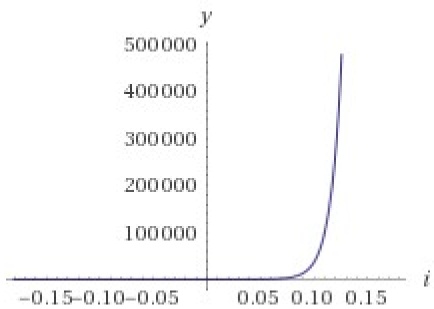
$$1.64016\, e^{99.99 i}$$

Plots:



(i from −0.03 to 0.03)

Open code



(i from −0.2 to 0.2)

Open code

Input interpretation:

$1.64016\, e^{99.99 i}$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$1.40597... -$
$0.844622...\, i$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 1.64016$ (radius), $\theta = -30.995°$ (angle)

Open code

1.64016 ≈ ζ (2)

2*sqrt(((((6 * 1.64016 e^(99.99 i))))))

Input interpretation:

$2\sqrt{6 \times 1.64016\, e^{99.99 i}}$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$6.04595... -$
$1.67641...\, i$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 6.27406$ (radius), $\theta = -15.4975°$ (angle)

Open code

6.27406 ≈ 2π

Series representations:

- More

$$2\sqrt{6 \times 1.64016\, e^{99.99 i}} = 2\sqrt{-1 + 9.84096\, e^{99.99 i}} \sum_{k=0}^{\infty} \left(-1 + 9.84096\, e^{99.99 i}\right)^{-k} \binom{\frac{1}{2}}{k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$2\sqrt{6 \times 1.64016\, e^{99.99 i}} = 2\sqrt{-1 + 9.84096\, e^{99.99 i}} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-1 + 9.84096\, e^{99.99 i}\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$2\sqrt{6 \times 1.64016\, e^{99.99 i}} = 2\sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(9.84096\, e^{99.99 i} - z_0\right)^k z_0^{-k}}{k!}$$

for not $((z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0))$

Open code

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\mathbb{R}$ is the set of real numbers
- More information

And for $\lambda_I = 3$; $\lambda_J = 5$; $g_{st} = 1$; $x = 10$ and $W = (-1/2+\sqrt{-3})$

integrate (4 * exp(3*((((-1i+sqrt(-3))/2))))

Indefinite integral:

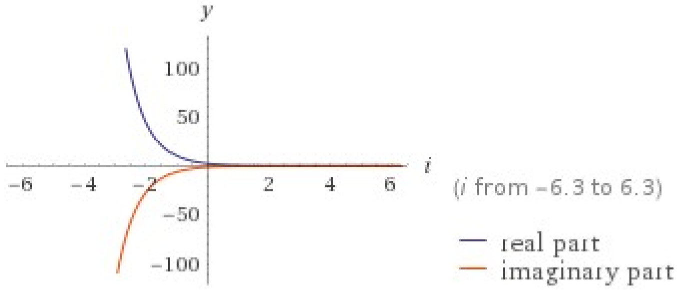
- Approximate form
- Step-by-step solution

$$\int 4 \exp\left(\frac{3}{2}\left(-i + \sqrt{-3}\right)\right) di = -\frac{8}{3} e^{3/2\, i\left(\sqrt{3} + i\, i\right)} + \text{constant}$$

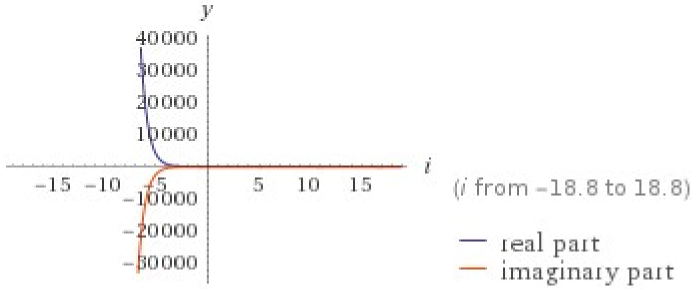
Open code

Enlarge Data Customize A Plaintext Interactive

Plots of the integral:



Open code



Open code

-8/3 e^(3/2 i (sqrt(3) + i i))

Input:

$$-\frac{8}{3}\, e^{3/2\, i\left(\sqrt{3}+i\, i\right)}$$

Open code

- i is the imaginary unit

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Exact result:

$$-\frac{8}{3}\, e^{3/2\, i\left(\sqrt{3}-1\right)}$$

Decimal approximation:

- More digits

$-1.2141594015953094893899580143427044742399573578080642763\ldots - 2.3742215689839967174230079327699774117570576112695189164\ldots\, i$

(using the principal branch of the logarithm for complex exponentiation)

Open code

Property:

$-\frac{8}{3}\, e^{3/2\, i\left(-1+\sqrt{3}\right)}$ is a transcendental number

Open code

Polar coordinates:

- Exact form

$r \approx 2.66667$ (radius), $\theta \approx -117.085°$ (angle)

Open code

34 + 10^3 * -8/3 e^(3/2 i (sqrt(3) + i i))

Input:

$$34 + 10^3 \left(-\frac{8}{3}\right) e^{3/2\, i \left(\sqrt{3} + i\, i\right)}$$

Open code

- i is the imaginary unit

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Exact result:

$$34 - \frac{8000}{3} e^{3/2\, i \left(\sqrt{3} - 1\right)}$$

Decimal approximation:

- More digits

$$-1180.1594015953094893899580143427044742399573578080642763\ldots - 2374.2215689839967174230079327699774117570576112695189164\ldots\, i$$

(using the principal branch of the logarithm for complex exponentiation)

Open code

Property:

$34 - \frac{8000}{3} e^{3/2\, i \left(-1 + \sqrt{3}\right)}$ is a transcendental number

Open code

Polar coordinates:

- Exact form

$r \approx 2651.36$ (radius), $\theta \approx -116.431°$ (angle)

2651.36 near to the rest mass of charmed Xi baryon 2645.9

Series representations:

- More

$$34 + \frac{1}{3}\left(10^3 e^{3/2\, i \left(\sqrt{3} + i\, i\right)}\right)(-8) = 34 - \frac{8000}{3} e^{\frac{3}{2} i \left(i^2 + \sqrt{2} \sum_{k=0}^{\infty} 2^{-k} \binom{\frac{1}{2}}{k}\right)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$34 + \frac{1}{3}\left(10^3 e^{3/2\, i \left(\sqrt{3} + i\, i\right)}\right)(-8) = 34 - \frac{8000}{3} \exp\left(\frac{3}{2} i \left(i^2 + \sqrt{2} \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

Open code

$$34 + \frac{1}{3}\left(10^3 e^{3/2\, i \left(\sqrt{3} + i\, i\right)}\right)(-8) = 34 - \frac{8000}{3} \exp\left(\frac{3}{4} i \left(2 i^2 + \frac{\sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 2^{-s}\, \Gamma\left(-\frac{1}{2} - s\right) \Gamma(s)}{\sqrt{\pi}}\right)\right)$$

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\Gamma(x)$ is the gamma function
- $\operatorname{Res}_{z=z_0} f$ is a complex residue

sqrt(((((-8/3 e^(3/2 i (sqrt(3) + i i)))))))

Input:

$$\sqrt{-\frac{8}{3}\, e^{3/2\, i\left(\sqrt{3}+i\, i\right)}}$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$2\sqrt{-\frac{2}{3}\, e^{3/2\, i\left(\sqrt{3}-1\right)}}$$

Decimal approximation:

- More digits

0.85220515871219565660686348067861594097296637093420303261... −
1.3929870904394584797749951096311078463156628328233604508... i

(using the principal branch of the logarithm for complex exponentiation)

Open code

Property:

$$2\sqrt{-\frac{2}{3}\, e^{3/2\, i\left(-1+\sqrt{3}\right)}}$$ is a transcendental number

Open code

Polar coordinates:

- Exact form

$r \approx 1.63299$ (radius), $\theta \approx -58.5424°$ (angle)

Open code

1.63299 is a golden number, near to ζ (2)

2sqrt(((((((((6 * sqrt(((((-8/3 e^(3/2 i (sqrt(3) + i i))))))))))))))

Input:

$$2\sqrt{6\sqrt{-\frac{8}{3}\, e^{3/2\, i\left(\sqrt{3}+i\, i\right)}}}$$

Open code

- i is the imaginary unit

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$4\sqrt[4]{-6\,e^{3/2\,i\left(\sqrt{3}-1\right)}}$$

Decimal approximation:

- More digits

5.460987076235556580980740949747230829965848500791989742 05... − 3.060956719347576287499787669142734584046917286764282931 42... i

(using the principal branch of the logarithm for complex exponentiation)

Open code

Property:

$$4\sqrt[4]{-6\,e^{3/2\,i\left(-1+\sqrt{3}\right)}}$$ is a transcendental number

Open code

Polar coordinates:

- Exact form

$r \approx 6.26034$ (radius), $\theta \approx -29.2712°$ (angle)

Open code

6.26034, an approximation to 2π

Series representations:

- More

$$2\sqrt{6\sqrt{\frac{1}{3}\,e^{3/2\,i\left(\sqrt{3}+i\,i\right)}\,(-8)}} = 2\sqrt{-1+6\sqrt{-\frac{8}{3}\,e^{3/2\,i\left(i^2+\sqrt{3}\right)}}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+6\sqrt{-\frac{8}{3}\,e^{3/2\,i\left(i^2+\sqrt{3}\right)}}\right)^{-k}$$

Open code

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$$2\sqrt{6\sqrt{\frac{1}{3}\,e^{3/2\,i\left(\sqrt{3}+i\,i\right)}\,(-8)}} = 2\sqrt{-1+6\sqrt{-\frac{8}{3}\,e^{3/2\,i\left(i^2+\sqrt{3}\right)}}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-1+6\sqrt{-\frac{8}{3}\,e^{3/2\,i\left(i^2+\sqrt{3}\right)}}\right)^{-k}}{k!}$$

Open code

$$2\sqrt{6\sqrt{\frac{1}{3}e^{3/2\,i\left(\sqrt{3}+i\,i\right)}(-8)}} = 2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(6\sqrt{-\frac{8}{3}e^{3/2\,i\left(i^2+\sqrt{3}\right)}}-z_0\right)^k z_0^{-k}}{k!}$$

for not $((z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0))$

Open code

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\mathbb{R}$ is the set of real numbers

In conclusion, from the (4.10), we obtain:

$$\langle A\rangle = \frac{1}{Z}\int \mathrm{d}^N\lambda\, A \prod_{I<J}(\lambda_I-\lambda_J)^2 \exp\left(-\sum_I \frac{1}{g_{st}}W(\lambda_I)\right)$$

1 / integrate (4 * exp(3*((((-1i+sqrt(-3))/2))

Input:

$$\frac{1}{\int 4\exp\left(3\left(\frac{1}{2}\left(-i+\sqrt{-3}\right)\right)\right)di}$$

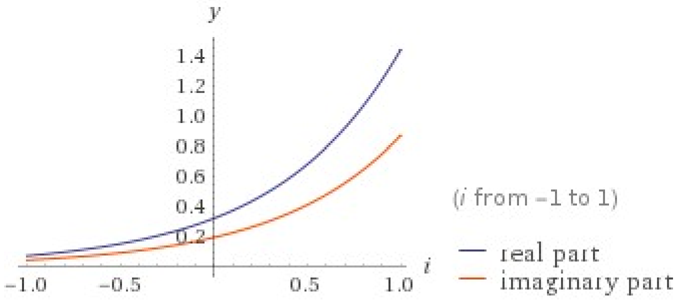
Open code

Enlarge Data Customize A Plaintext Interactive

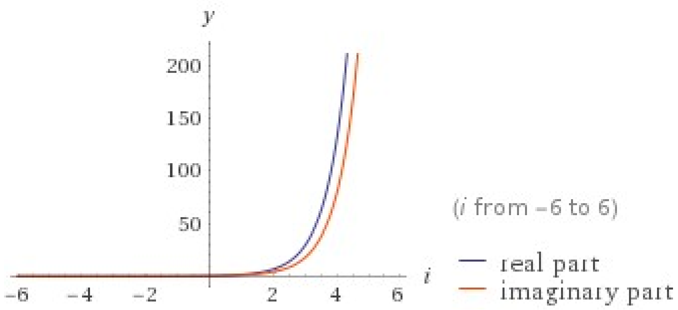
Exact result:

$$-\frac{3}{8}e^{(3i)/2-\left(3i\sqrt{3}\right)/2}$$

Plots:



Open code



-3/8 e^(-(3 i sqrt(3))/2 + (3 i)/2) * integrate (4 * exp(3*((((-1i+sqrt(-3))/2))))

Input:

$$-\frac{3}{8}\, e^{-\frac{1}{2}\left(3\, i \sqrt{3}\right)+\frac{3 i}{2}} \int 4 \exp\left(3\left(\frac{1}{2}\left(-i+\sqrt{-3}\right)\right)\right) d i$$

Open code

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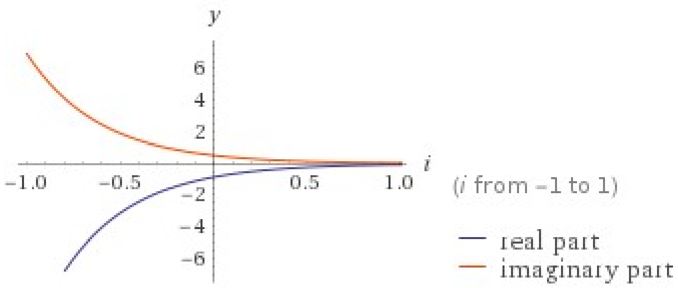
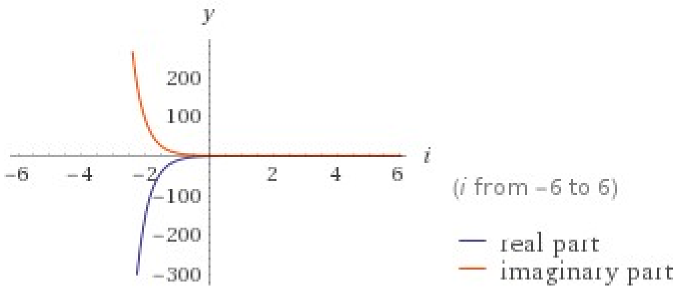
Exact result:

$$e^{-\left(3 \sqrt{3}\, i\right)/2+\left(3\, i \sqrt{3}\right)/2}$$

Plots:



Open code



Open code

e^((3 i sqrt(3))/2 - (3 sqrt(3) i)/2)

Input:

$$\exp\left(\frac{1}{2}\left(3\, i \sqrt{3}\right)-\frac{1}{2}\left(3 \sqrt{3}\, i\right)\right)$$

Open code

- i is the imaginary unit

Result:

1

Integral representation:

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,ds}{(2\,\pi\,i)\,\Gamma(-a)} \quad \text{for } (0<\gamma<-\text{Re}(a) \text{ and } |\arg(z)|<\pi)$$

Open code

- $\Gamma(x)$ is the gamma function
- $\text{Re}(z)$ is the real part of z
- $\arg(z)$ is the complex argument
- $|z|$ is the absolute value of z

Where 1 is the spin of the photon (gauge boson)

Now, we have that:

Introducing also the usual coupling parameters t_i associated to the bulk observables τ_i, and one more parameter v associated to σ, the partition function of 2d topological gravity on a Riemann surface with boundary is then formally

$$Z(t_i; v, w) = \sum_{h=0}^{\infty} \sum_{\Sigma} w^h \left\langle \exp\left(\sum_{i=0}^{\infty} t_i \tau_i + v\sigma\right)\right\rangle_{\Sigma} . \qquad (3.3)$$

What is important is the relationship between the s_n and the corresponding parameters t_n of topological gravity – the parameters that were introduced in eqn. (3.3). This relationship turns out to be

$$t_n = \frac{(2n+1)!!}{2^n} s_n . \qquad (4.36)$$

Thence:

9!!/16 * 8/3!

Input:

$$\frac{9!!}{16} \times \frac{8}{3!}$$

Open code

- $n!!$ is the double factorial function
- $n!$ is the factorial function

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Exact result:

$$\frac{315}{4}$$

Decimal form:

78.75

Alternative representations:

- More

$$\frac{8\times 9!!}{3!\times 16} = \frac{8\times \frac{9}{2}!\times 2^{9/2}\left(\frac{\pi}{2}\right)^{1/4(-1+\cos(9\pi))}}{16\,(1)_3}$$

Open code

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$$\frac{8\times 9!!}{3!\times 16} = \frac{8\times \frac{9}{2}!\times 2^{9/2}\left(\frac{\pi}{2}\right)^{1/4(-1+\cos(9\pi))}}{16\,(2!!\times 3!!)}$$

Open code

$$\frac{8\times 9!!}{3!\times 16} = \frac{8\,\Gamma\left(\frac{11}{2}\right)2^{9/2}\left(\frac{\pi}{2}\right)^{1/4(-1+\cos(9\pi))}}{16\,(1)_3}$$

Open code

- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\Gamma(x)$ is the gamma function

Integral representations:

$$\frac{8\times 9!!}{3!\times 16} = \frac{9!!}{2\int_0^\infty e^{-t}\,t^3\,dt}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{8\times 9!!}{3!\times 16} = \frac{9!!}{2\int_0^1 \log^3\left(\frac{1}{t}\right)dt}$$

Open code

$$\frac{8\times 9!!}{3!\times 16} = \frac{9!!}{2\left(\int_1^\infty e^{-t}\,t^3\,dt + \sum_{k=0}^\infty \frac{(-1)^k}{(4+k)k!}\right)}$$

Open code

- $\log(x)$ is the natural logarithm

-5+10*(((9!!/16 * 8/3!)))

Input:

$$-5+10\left(\frac{9!!}{16}\times\frac{8}{3!}\right)$$

Open code

- $n!!$ is the double factorial function
  - $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\frac{1565}{2}$$

Decimal form:

782.5

782.5

This result is very near to the rest mass of Omega meson 782.65

Integral representations:

$$-5 + \frac{10 \times 9!! \times 8}{16 \times 3!} = -5 + \frac{5 \times 9!!}{\int_0^\infty e^{-t}\, t^3\, dt}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$-5 + \frac{10 \times 9!! \times 8}{16 \times 3!} = -5 + \frac{5 \times 9!!}{\int_0^1 \log^3\left(\frac{1}{t}\right) dt}$$

Open code

$$-5 + \frac{10 \times 9!! \times 8}{16 \times 3!} = -5 + \frac{5 \times 9!!}{\int_1^\infty e^{-t}\, t^3\, dt + \sum_{k=0}^\infty \frac{(-1)^k}{(4+k)\, k!}}$$

Open code

- $\log(x)$ is the natural logarithm

-55+10^3+10(((9!!/16 * 8/3!)))))

Input:

$$-55 + 10^3 + 10\left(\frac{9!!}{16} \times \frac{8}{3!}\right)$$

Open code

- $n!!$ is the double factorial function
  - $n!$ is the factorial function

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Exact result:

$$\frac{3465}{2}$$

Decimal form:

1732.5

Open code

1732.5

This result is very near to the mass of candidate glueball $f_0(1710)$ meson. Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. As a consequence, it is sometimes called a Zagier as a pun on the Gross–Zagier theorem. The number 1728 is one less than the Hardy–Ramanujan number 1729

Integral representations:

$$-55 + 10^3 + \frac{10 \times 9!! \times 8}{16 \times 3!} = 945 + \frac{5 \times 9!!}{\int_0^\infty e^{-t}\, t^3\, dt}$$

Open code

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$$-55 + 10^3 + \frac{10 \times 9!! \times 8}{16 \times 3!} = 945 + \frac{5 \times 9!!}{\int_0^1 \log^3\left(\frac{1}{t}\right) dt}$$

Open code

$$-55 + 10^3 + \frac{10 \times 9!! \times 8}{16 \times 3!} = 945 + \frac{5 \times 9!!}{\int_1^\infty e^{-t}\, t^3\, dt + \sum_{k=0}^\infty \frac{(-1)^k}{(4+k)\,k!}}$$

Open code

- log(x) is the natural logarithm

[-55+10^3+10(((9!!/16 * 8/3!))))))]^1/15

Input:

$$\sqrt[15]{-55 + 10^3 + 10\left(\frac{9!!}{16} \times \frac{8}{3!}\right)}$$

Open code

- n!! is the double factorial function
- n! is the factorial function

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Exact result:

$$3^{2/15} \sqrt[15]{\frac{385}{2}}$$

Decimal approximation:

- More digits

1.644036856871485556036034726373961554006193697523401300593...

1.64403685... ≈ ζ (2)

sqrt((((((6*[-55+10^3+10(((9!!/16 * 8/3!))))))]^1/15)))))))

Input:

$$\sqrt{6\sqrt[15]{-55+10^3+10\left(\frac{9!!}{16}\times\frac{8}{3!}\right)}}$$

Open code

- $n!!$ is the double factorial function
- $n!$ is the factorial function

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Exact result:

$$2^{7/15}\times 3^{17/30}\sqrt[30]{385}$$

Decimal approximation:

- More digits

3.140735764312068538618841541209015558816788901999468150179...

Alternative representations:

- More

$$\sqrt{6\sqrt[15]{-55+10^3+\frac{10\times 9!!\times 8}{16\times 3!}}}=\sqrt{6\sqrt[15]{-55+10^3+\frac{80\times\frac{9}{2}!\times 2^{9/2}\left(\frac{\pi}{2}\right)^{1/4(-1+\cos(9\pi))}}{16\,(1)_3}}}$$

Open code

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$$\sqrt{6\sqrt[15]{-55+10^3+\frac{10\times 9!!\times 8}{16\times 3!}}}=\sqrt{6\sqrt[15]{-55+10^3+\frac{80\times\frac{9}{2}!\times 2^{9/2}\left(\frac{\pi}{2}\right)^{1/4(-1+\cos(9\pi))}}{16\,(2!!\times 3!!)}}}$$

Open code

$$\sqrt{6\sqrt[15]{-55+10^3+\frac{10\times 9!!\times 8}{16\times 3!}}}=\sqrt{6\sqrt[15]{-55+10^3+\frac{80\,\Gamma\left(\frac{11}{2}\right)2^{9/2}\left(\frac{\pi}{2}\right)^{1/4(-1+\cos(9\pi))}}{16\,(1)_3}}}$$

Open code

- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\Gamma(x)$ is the gamma function

Integral representations:

$$\sqrt{6\sqrt[15]{-55+10^3+\frac{10\times 9!!\times 8}{16\times 3!}}}=\sqrt{6\sqrt[15]{945+\frac{5\times 9!!}{\int_0^1\log^3\left(\frac{1}{t}\right)dt}}}$$

Open code

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$$\sqrt{6\sqrt[15]{-55+10^3+\frac{10\times 9!!\times 8}{16\times 3!}}} = \sqrt{6\sqrt[15]{945+\frac{5\times 9!!}{\int_0^\infty e^{-t}\, t^3\, dt}}}$$

Open code

$$\sqrt{6\sqrt[15]{-55+10^3+\frac{10\times 9!!\times 8}{16\times 3!}}} = \sqrt{6\sqrt[15]{945+\frac{5\times 9!!}{\int_1^\infty e^{-t}\, t^3\, dt+\sum_{k=0}^\infty \frac{(-1)^k}{(4+k)k!}}}}$$

Open code

- $\log(x)$ is the natural logarithm
  - More information

2sqrt((((((6*[-55+10^3+10(((9!!/16 * 8/3!))))))]^1/15)))))))

Input:

$$2\sqrt{6\sqrt[15]{-55+10^3+10\left(\frac{9!!}{16}\times\frac{8}{3!}\right)}}$$

Open code

- $n!!$ is the double factorial function
  - $n!$ is the factorial function

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Exact result:

$$2\times 2^{7/15}\times 3^{17/30}\sqrt[30]{385}$$

Decimal approximation:

- More digits

6.2814715286241370772376830824180311176335778039989363003 58...

Open code

6.2814715286… ≈ 2π

Alternative representations:

- More

$$2\sqrt{6\sqrt[15]{-55+10^3+\frac{10\times 9!!\times 8}{16\times 3!}}} = 2\sqrt{6\sqrt[15]{-55+10^3+\frac{80\times \frac{9}{2}!\times 2^{9/2}\left(\frac{\pi}{2}\right)^{1/4(-1+\cos(9\pi))}}{16\,(1)_3}}}$$

Open code

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$$2\sqrt{6\sqrt[15]{-55+10^3+\frac{10\times 9!!\times 8}{16\times 3!}}} = 2\sqrt{6\sqrt[15]{-55+10^3+\frac{80\times \frac{9}{2}!\times 2^{9/2}\left(\frac{\pi}{2}\right)^{1/4(-1+\cos(9\pi))}}{16\,(2!!\times 3!!)}}}$$

Open code

$$2\sqrt{6\sqrt[15]{-55+10^3+\frac{10\times 9!!\times 8}{16\times 3!}}} = 2\sqrt{6\sqrt[15]{-55+10^3+\frac{80\,\Gamma\left(\frac{11}{2}\right)2^{9/2}\left(\frac{\pi}{2}\right)^{1/4(-1+\cos(9\pi))}}{16\,(1)_3}}}$$

Open code

- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\Gamma(x)$ is the gamma function
- More information

Integral representations:

$$2\sqrt{6\sqrt[15]{-55+10^3+\frac{10\times 9!!\times 8}{16\times 3!}}} = 2\sqrt{6\sqrt[15]{945+\frac{5\times 9!!}{\int_0^1 \log^3\left(\frac{1}{t}\right)dt}}}$$

Open code

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$$2\sqrt{6\sqrt[15]{-55+10^3+\frac{10\times 9!!\times 8}{16\times 3!}}} = 2\sqrt{6\sqrt[15]{945+\frac{5\times 9!!}{\int_0^\infty e^{-t}\, t^3\, dt}}}$$

Open code

$$2\sqrt{6\sqrt[15]{-55+10^3+\frac{10\times 9!!\times 8}{16\times 3!}}} = 2\sqrt{6\sqrt[15]{945+\frac{5\times 9!!}{\int_1^\infty e^{-t}\, t^3\, dt+\sum_{k=0}^{\infty}\frac{(-1)^k}{(4+k)k!}}}}$$

Open code

- $\log(x)$ is the natural logarithm

6.62607015+10^3 * exp(((((1/(((9!!/16 * 8/3!))))))

where 6.62607... is the absolute value of the Planck constant

Input interpretation:

$$6.62607015+10^3 \exp\left(\frac{1}{\frac{9!!}{16}\times\frac{8}{3!}}\right)$$

Open code

- $n!!$ is the double factorial function
- $n!$ is the factorial function

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Result:

- More digits

1019.4054500...

1019.40545...

This result is practically equal to the rest mass of Phi meson 1019.445

Alternative representations:

- More

$$6.62607+10^3 \exp\left(\frac{1}{\frac{8\times 9!!}{3!\times 16}}\right) = 6.62607+\exp\left(\frac{1}{\frac{8\times \frac{9}{2}!\times 2^{9/2}\left(\frac{\pi}{2}\right)^{1/4(-1+\cos(9\pi))}}{16(1)_3}}\right)10^3$$

Open code

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$$6.62607 + 10^3 \exp\left(\frac{1}{\frac{8\times 9!!}{3!\times 16}}\right) = 6.62607 + \exp\left(\frac{1}{\frac{8\times \frac{9}{2}!\times 2^{9/2}\left(\frac{\pi}{2}\right)^{1/4(-1+\cos(9\pi))}}{16(2!!\times 3!!)}}\right)10^3$$

Open code

$$6.62607 + 10^3 \exp\left(\frac{1}{\frac{8\times 9!!}{3!\times 16}}\right) = 6.62607 + \exp\left(\frac{1}{\frac{8\,\Gamma\left(\frac{11}{2}\right)2^{9/2}\left(\frac{\pi}{2}\right)^{1/4(-1+\cos(9\pi))}}{16(1)_3}}\right)10^3$$

Open code

- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\Gamma(x)$ is the gamma function
- More information

Integral representations:

$$6.62607 + 10^3 \exp\left(\frac{1}{\frac{8\times 9!!}{3!\times 16}}\right) = 6.62607 + 1000 \exp\left(\frac{2}{9!!}\int_0^\infty e^{-t}\,t^3\,dt\right)$$

Open code

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$$6.62607 + 10^3 \exp\left(\frac{1}{\frac{8\times 9!!}{3!\times 16}}\right) = 6.62607 + 1000 \exp\left(\frac{2}{9!!}\int_0^1 \log^3\left(\frac{1}{t}\right)dt\right)$$

Open code

$$6.62607 + 10^3 \exp\left(\frac{1}{\frac{8\times 9!!}{3!\times 16}}\right) = 6.62607 + 1000 \exp\left(\frac{2\left(\int_1^\infty e^{-t}\,t^3\,dt + \sum_{k=0}^\infty \frac{(-1)^k}{(4+k)k!}\right)}{9!!}\right)$$

Open code

- $\log(x)$ is the natural logarithm

- More information

1/(2e) * 0.0864055 + 1.0864055^2 * 1/Pi * ln((((((((9!!/16 * 8/3!)))))))

Input interpretation:

$$\frac{1}{2e} \times 0.0864055 + 1.0864055^2 \times \frac{1}{\pi} \log\left(\frac{9!!}{16} \times \frac{8}{3!}\right)$$

Open code

- $n!!$ is the double factorial function
- $n!$ is the factorial function
- $\log(x)$ is the natural logarithm

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Result:

- More digits

1.6562771...

We note that, the result 1,6562771... is practically equal to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164{,}2696$ i.e. 1,65578...

Indeed:

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}} + \sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots \Rightarrow$$

$$\Rightarrow \frac{1}{2e} \times 0.0864055 + 1.0864055^2 \times \frac{1}{\pi} \log\left(\frac{9!!}{16} \times \frac{8}{3!}\right)$$

$$= 1.6562771\ldots$$

Alternative representations:

- More

$$\frac{0.0864055}{2e} + \frac{1.08641^2 \log\left(\frac{9!! \times 8}{16 \times 3!}\right)}{\pi} = \frac{0.0864055}{2e} + \frac{\log_e\left(\frac{8 \times 9!!}{16 \times 3!}\right) 1.08641^2}{\pi}$$

Open code

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$$\frac{0.0864055}{2e} + \frac{1.08641^2 \log\left(\frac{9!! \times 8}{16 \times 3!}\right)}{\pi} = \frac{0.0864055}{2e} + \frac{\log(a) \log_a\left(\frac{8 \times 9!!}{16 \times 3!}\right) 1.08641^2}{\pi}$$

Open code

$$\frac{0.0864055}{2e} + \frac{1.08641^2 \log\left(\frac{9!! \times 8}{16 \times 3!}\right)}{\pi} = \frac{0.0864055}{2e} + \frac{\log\left(\frac{8 \times \frac{9}{2}! \times 2^{9/2} \left(\frac{\pi}{2}\right)^{1/4 (-1+\cos(9\pi))}}{16 (1)_3}\right) 1.08641^2}{\pi}$$

Open code

- $\log_b(x)$ is the base- b logarithm
- $(a)_n$ is the Pochhammer symbol (rising factorial)

Integral representations:

- More

$$\frac{0.0864055}{2e} + \frac{1.08641^2 \log\left(\frac{9!! \times 8}{16 \times 3!}\right)}{\pi} = \frac{0.0432028}{e} + \frac{1.18028}{\pi} \int_1^{\frac{9!!}{2 \times 3!}} \frac{1}{t}\, dt$$

Open code

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$$\frac{0.0864055}{2e} + \frac{1.08641^2 \log\left(\frac{9!! \times 8}{16 \times 3!}\right)}{\pi} = \frac{0.0432028}{e} + \frac{1.18028 \log\left(\frac{9!!}{2 \int_0^\infty t^3 \mathcal{A}^{-t}\, dt}\right)}{\pi}$$

Open code

$$\frac{0.0864055}{2e} + \frac{1.08641^2 \log\left(\frac{9!! \times 8}{16 \times 3!}\right)}{\pi} = \frac{0.0432028}{e} + \frac{1.18028 \log\left(\frac{9!!}{2 \int_0^1 \log^3\left(\frac{1}{t}\right) dt}\right)}{\pi}$$

Open code

We note that, from the sum of eqs. (4.44-4.45-4.46), with the Ramanujan mock theta function 1.08232... and the ln of 139504, that is in the following partition function of modular j-function:

$$\begin{aligned} Z_{32}(\tau) &= j^{4/3}(\tau) - 992\, j^{1/3}(\tau) \\ &= q^{-4/3} + 139504\, q^{2/3} + 69332992\, q^{5/3} + 6998296696\, q^{8/3} \\ &\quad + 330022830080\, q^{11/3} + \dots , \end{aligned}$$

we obtain:

-1.08232/(ln 139504)+ sqrt(((((4*2^8*8)/9! + 8/3! + sin(2*sqrt(2))/((2sqrt(2*2))))))

Where -1.08232 is a Ramanujan mock theta function

Input interpretation:

$$-\frac{1.08232}{\log(139504)}+\sqrt{\frac{4\times 2^8\times 8}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}}$$

Open code

- $\log(x)$ is the natural logarithm
- $n!$ is the factorial function

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Result:

- More digits

1.105682...

Series representations:

$$-\frac{1.08232}{\log(139504)}+\sqrt{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}}=$$

$$\left(-1.08232+\log(139503)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-1+\frac{8}{3!}+\frac{8192}{9!}+\frac{\sin(2\sqrt{2})}{2\sqrt{4}}\right)^k}{k!}-\right.$$

$$\left.\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,139503^{-k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-1+\frac{8}{3!}+\frac{8192}{9!}+\frac{\sin(2\sqrt{2})}{2\sqrt{4}}\right)^{k_2}}{k_2!\,k_1}\right)\Bigg/$$

$$\left(\log(139503)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{139503}\right)^k}{k}\right)$$

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$$-\frac{1.08232}{\log(139504)}+\sqrt{\frac{4\left(2^8\times 8\right)}{9!}+\frac{8}{3!}+\frac{\sin\left(2\sqrt{2}\right)}{2\sqrt{2\times 2}}}=$$

$$\left(-1.08232+\exp\left(i\pi\left\lfloor\frac{\arg\left(-x+\frac{8}{3!}+\frac{8192}{9!}+\frac{\sin\left(2\sqrt{2}\right)}{2\sqrt{4}}\right)}{2\pi}\right\rfloor\right)\log(139503)\right.$$

$$\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k x^{-k}\left(-\frac{1}{2}\right)_k\left(-x+\frac{8}{3!}+\frac{8192}{9!}+\frac{\sin\left(2\sqrt{2}\right)}{2\sqrt{4}}\right)^k}{k!}-$$

$$\exp\left(i\pi\left\lfloor\frac{\arg\left(-x+\frac{8}{3!}+\frac{8192}{9!}+\frac{\sin\left(2\sqrt{2}\right)}{2\sqrt{4}}\right)}{2\pi}\right\rfloor\right)\left(\sqrt{x}\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\right.$$

$$\left.\left.\frac{(-1)^{k_1+k_2}\,139503^{-k_1}\,x^{-k_2}\left(-\frac{1}{2}\right)_{k_2}\left(-x+\frac{8}{3!}+\frac{8192}{9!}+\frac{\sin\left(2\sqrt{2}\right)}{2\sqrt{4}}\right)^{k_2}}{k_2!\,k_1}\right)\right)$$

$$\Bigg/\left(\log(139503)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{139503}\right)^k}{k}\right)\text{ for }(x\in\mathbb{R}\text{ and }x<0)$$

$$-\frac{1.08232}{\log(139504)}+\sqrt{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}}=$$

$$\Bigg(-1.08232+\log(139503)\left(\frac{1}{z_0}\right)^{1/2\left\lfloor \arg\left(\frac{8}{3!}+\frac{8192}{9!}+\frac{\sin(2\sqrt{2})}{2\sqrt{4}}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2+1/2\left\lfloor \arg\left(\frac{8}{3!}+\frac{8192}{9!}+\frac{\sin(2\sqrt{2})}{2\sqrt{4}}-z_0\right)/(2\pi)\right\rfloor} \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{8}{3!}+\frac{8192}{9!}+\frac{\sin(2\sqrt{2})}{2\sqrt{4}}-z_0\right)^k z_0^{-k}}{k!}-$$

$$\left(\frac{1}{z_0}\right)^{1/2\left\lfloor \arg\left(\frac{8}{3!}+\frac{8192}{9!}+\frac{\sin(2\sqrt{2})}{2\sqrt{4}}-z_0\right)/(2\pi)\right\rfloor}\Bigg(z_0^{1/2+1/2\left\lfloor \arg\left(\frac{8}{3!}+\frac{8192}{9!}+\frac{\sin(2\sqrt{2})}{2\sqrt{4}}-z_0\right)/(2\pi)\right\rfloor}$$

$$\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,139503^{-k_1}\left(-\frac{1}{2}\right)_{k_2}\left(\frac{8}{3!}+\frac{8192}{9!}+\frac{\sin(2\sqrt{2})}{2\sqrt{4}}-z_0\right)^{k_2} z_0^{-k_2}}{k_2!\,k_1}\Bigg)\Bigg)$$

$$\Bigg/\left(\log(139503)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{139503}\right)^k}{k}\right)$$

- $\arg(z)$ is the complex argument
- $\lfloor x\rfloor$ is the floor function
- $\mathbb{R}$ is the set of real numbers
- More information

Integral representations:

- More

$$-\frac{1.08232}{\log(139504)}+\sqrt{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}}=$$

$$\frac{-1.08232+\log(139504)\sqrt{\frac{8}{\int_0^\infty e^{-t}t^3\,dt}+\frac{8192}{\int_0^\infty e^{-t}t^9\,dt}+\frac{\sqrt{2}}{\sqrt{4}}\int_0^1\cos(2t\sqrt{2})\,dt}}{\log(139504)}$$

Open code

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$$-\frac{1.08232}{\log(139504)}+\sqrt{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}}=$$

$$\frac{-1.08232+\sqrt{\frac{8}{\int_0^1 \log^3\left(\frac{1}{t}\right)dt}+\frac{8192}{\int_0^1 \log^9\left(\frac{1}{t}\right)dt}+\frac{\sqrt{2}}{\sqrt{4}}\int_0^1 \cos(2t\sqrt{2})\,dt}\int_1^{139504}\frac{1}{t}\,dt}{\int_1^{139504}\frac{1}{t}\,dt}$$

Open code

$$-\frac{1.08232}{\log(139504)}+\sqrt{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}}=$$

$$\frac{-1.08232+\sqrt{\frac{8}{\int_0^\infty e^{-t}t^3\,dt}+\frac{8192}{\int_0^\infty e^{-t}t^9\,dt}+\frac{\sqrt{2}}{\sqrt{4}}\int_0^1 \cos(2t\sqrt{2})\,dt}\int_1^{139504}\frac{1}{t}\,dt}{\int_1^{139504}\frac{1}{t}\,dt}$$

Multiple-argument formulas:

- More

$$-\frac{1.08232}{\log(139504)}+\sqrt{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}}=$$

$$-\frac{1.08232}{\log(139504)}+\sqrt{\frac{8}{3!}+\frac{8192}{9!}+\frac{\cos(\sqrt{2})\sin(\sqrt{2})}{\sqrt{4}}}$$

Open code

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$$-\frac{1.08232}{\log(139504)}+\sqrt{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}}=$$

$$-\frac{1.08232}{\log(139504)}+\sqrt{\frac{\cos(\sqrt{2})\sin(\sqrt{2})}{\sqrt{4}}+\frac{2}{9}\left(\frac{3}{\frac{1}{2}!\times 1!}+\frac{16}{\frac{7}{2}!\times 4!}\right)\sqrt{\pi}}$$

Open code

$$-\frac{1.08232}{\log(139504)}+\sqrt{\frac{4(2^8\times 8)}{9!}+\frac{8}{3!}+\frac{\sin(2\sqrt{2})}{2\sqrt{2\times 2}}}=$$

$$-\frac{1.08232}{\log(139504)}+\sqrt{\frac{\cos(\sqrt{2})\sin(\sqrt{2})}{\sqrt{4}}+\frac{2\sqrt{\pi}}{3\times\frac{1}{2}!\times 1!}+\frac{32\sqrt{\pi}}{9\times\frac{7}{2}!\times 4!}}$$

The result 1.105682 is an absolute value very near to the cosmological constant $\Lambda = 1.1056 \times 10^{-52}\ \mathrm{m}^{-2}$,

Now, we have that:

So the correct answer should be

$$Z_{\text{top}}(v) = e^{\frac{1}{g_{st}}(v^3/6+vt_0)}, \tag{4.79}$$

One can now include arbitrary closed string perturbations and use this identification for the full partition functions. This becomes clear by considering the combined Virasoro constraints. If one takes into account the above Laplace transformation, these now take the form

$$L_n^c Z_{\text{top}}(v) = \int dz\, e^{\frac{1}{g_{st}}vz} \left[\frac{1}{4}(n+1)z^n + z^{n+1}\frac{\partial}{\partial z}\right] Z_V(z) \tag{4.80}$$

$$= g_{st}^n \left[-\frac{3}{4}(n+1)\left(\frac{\partial}{\partial v}\right)^n - v\left(\frac{\partial}{\partial v}\right)^{n+1}\right] Z_{\text{top}}(v). \tag{4.81}$$

This is indeed the expression given in [3]. This completes the identification of the double-scaled matrix model with the open-closed topological string partition function.

We obtain from the eq. (4.79):

exp((((0.07701793559^3/(6+0.07701793559*9.997034118)))

Input interpretation:

$$\exp\left(\frac{0.07701793559^3}{6+0.07701793559\times 9.997034118}\right)$$

Open code

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Result:

- More digits

1.0000674846117...

With regard the derivatives in (4.81), we obtain:

d/dx x^4

Derivative:

- Step-by-step solution

$$\frac{d}{dx}(x^4) = 4x^3$$

Open code

d/dx x^5

Derivative:

- Step-by-step solution
$\frac{d}{dx}(x^5) = 5\,x^4$
Open code

Now, for:

y = 0.07701793559 = v; x = 10; t_0 = 9.997034118 = x – y^2/2; n = 4;

$Z_{top} = e^{\left(v^3/(6+vt_0)\right)}$ = 1.0000674846117: we obtain:

(((((-3/4*5 * 4*(0.07701793559)^3)))-(((0.07701793559(5*(0.07701793559)^4))))) * 1.0000674846117

Input interpretation:
$\left(-\frac{3}{4}\times5\times4\times0.07701793559^3 - 0.07701793559\,(5\times0.07701793559^4)\right)\times 1.0000674846117$
Open code

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Result:
- More digits
−0.00686679448189811814039208916251776546694804560386400609...
Open code

-0.00686679448189811814039208916251776546694804560386400609

-1/(((((((((-3/4*5 * 4*(0.07701793559)^3)))-(((0.07701793559(5*(0.07701793559)^4))))) * 1.0000674846117)))))

Input interpretation:
$-\left(1/\left(\left(-\frac{3}{4}\times5\times4\times0.07701793559^3 - 0.07701793559\,(5\times0.07701793559^4)\right)\times 1.0000674846117\right)\right)$
Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits
145.6283572540502440289413383903490941414743989077668605238...

We have that:

[-1/(((((((((-3/4*5 * 4*(0.07701793)^3)))-(((0.07701793(5*(0.07701793)^4))))) * 1.0000674846)))))]-(2*3)

Input interpretation:

$$-\frac{1}{\left(-\frac{3}{4}\times 5\times 4\times 0.07701793^3-0.07701793\left(5\times 0.07701793^4\right)\right)\times 1.0000674846}-2\times 3$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

139.6283890068097816099917851811644851193068450317688973645...

139.628389...

This result is very near to the rest mass of Pion 139.570

And:

[-1/(((((((((-3/4*5 * 4*(0.07701793)^3)))-(((0.07701793(5*(0.07701793)^4))))) * 1.0000674846)))))]-21

Input interpretation:

$$-\frac{1}{\left(-\frac{3}{4}\times 5\times 4\times 0.07701793^3-0.07701793\left(5\times 0.07701793^4\right)\right)\times 1.0000674846}-21$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

124.6283890068097816099917851811644851193068450317688973645...

124.6283

This result is very near to the Higgs boson mass 125.18

10 * -1/(((((((((-3/4*5 * 4*(0.07701793559)^3)))-(((0.07701793559(5*(0.07701793559)^4))))) * 1.0000674846117)))))

Input interpretation:

$$(10\times(-1))\Big/\left(\left(-\frac{3}{4}\times 5\times 4\times 0.07701793559^3-0.07701793559\left(5\times 0.07701793559^4\right)\right)\times 1.0000674846117\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:
- More digits
1456.283572540502440289413383903490941414743989077668605238...

This result 1456.28357... is very near to the mass of Rho meson 1450, that is **1465±25** OUR ESTIMATE – **1446±10** FUKUI 88 SPEC 8.95 π−p → ηπ+π−n (http://pdg.lbl.gov/2018/listings/rpp2018-list-rho-1450.pdf)

Then:

12* -1/(((((((((-3/4*5 * 4*(0.07701793559)^3)))-(((0.07701793559(5*(0.07701793559)^4))))) * 1.0000674846117)))))

Input interpretation:

$$(12\times(-1))/\left(\left(-\frac{3}{4}\times5\times4\times0.07701793559^3-0.07701793559\left(5\times0.07701793559^4\right)\right)\times 1.0000674846117\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits
1747.540287048602928347296060684189129697692786893202326286...

This result is very near to the mass of candidate glueball $f_0(1710)$ meson.

[12* -1/(((((((((-3/4*5 * 4*(0.07701793559)^3)))-(((0.07701793559(5*(0.07701793559)^4))))) * 1.0000674846117)))))]^1/15

Input interpretation:

$$\left((12\times(-1))/\left(\left(-\frac{3}{4}\times5\times4\times0.07701793559^3-0.07701793559\left(5\times0.07701793559^4\right)\right)\times 1.0000674846117\right)\right)\hat{}\,(1/15)$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits
1.6449845113...

1.644984... ≅ ζ (2)

sqrt((((6*[12* -1/(((((((((-3/4*5 * 4*(0.07701793)^3)))-(((0.07701793(5*(0.07701793)^4))))) * 1.0000674846)))))]^1/15))))

Input interpretation:

$$\sqrt{6\sqrt[15]{\frac{12\times(-1)}{\left(-\frac{3}{4}\times5\times4\times0.07701793^3-0.07701793\left(5\times0.07701793^4\right)\right)\times1.0000674846}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

3.141640846925451771550396956202147645544773253345431449666...

3.1416408469254517715503969562021476455447732533454314

2sqrt((((6*[12* -1/(((((((((-3/4*5 * 4*(0.07701793)^3)))-(((0.07701793(5*(0.07701793)^4))))) * 1.0000674846)))))]^1/15))))

Input interpretation:

$$2\sqrt{6\sqrt[15]{\frac{12\times(-1)}{\left(-\frac{3}{4}\times5\times4\times0.07701793^3-0.07701793\left(5\times0.07701793^4\right)\right)\times1.0000674846}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

6.283281693850903543100793912404295291089546506690862899332...

6.2832816938509035431007939124042952910895465066908628 ≈ 2π

Now, we obtain also the following results:

8[-1/(((((((((-3/4*5 * 4*(0.07701793)^3)))-(((0.07701793(5*(0.07701793)^4))))) * 1.0000674846)))))]

Input interpretation:

$$\frac{8\times(-1)}{\left(-\frac{3}{4}\times5\times4\times0.07701793^3-0.07701793\left(5\times0.07701793^4\right)\right)\times1.0000674846}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1165.027112054478252879934281449315880954454760254151178916...

Open code

((((((8[-1/(((((((((-3/4*5 * 4*(0.07701793)^3)))-(((0.07701793(5*(0.07701793)^4)))))
* 1.0000674846)))))]))))))^1/14

Input interpretation:

$$\sqrt[14]{\frac{8\times(-1)}{\left(-\frac{3}{4}\times5\times4\times0.07701793^3-0.07701793\left(5\times0.07701793^4\right)\right)\times1.0000674846}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits
  1.6558615...

We note that, the results 1165.027 and 1,6558615... are practically equals to the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164{,}2696$ and to the 14th root of it, i.e. 1,65578...

Indeed:

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+\ \sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots \Rightarrow$$

$$\Rightarrow \quad \sqrt[14]{\frac{8\times(-1)}{\left(-\frac{3}{4}\times5\times4\times0.07701793^3-0.07701793\left(5\times0.07701793^4\right)\right)\times1.0000674846}}$$

= 1.6558615...

Appendix A

MOCK THETA FUNCTIONS ORDER 7

Mock ϑ-functions (of 7th order)

$$\text{(i)} \quad 1+\frac{q}{1-q^2}+\frac{q^4}{(1-q^3)(1-q^4)}+\frac{q^9}{(1-q^4)(1-q^5)(1-q^6)}+\ldots$$

$$\text{(ii)} \quad \frac{q}{1-q}+\frac{q^4}{(1-q^2)(1-q^3)}+\frac{q^9}{(1-q^3)(1-q^4)(1-q^5)}+\ldots$$

$$\text{(iii)} \quad \frac{1}{1-q}+\frac{q^2}{(1-q^2)(1-q^3)}+\frac{q^6}{(1-q^3)(1-q^4)(1-q^5)}+\ldots$$

From the (iii), we have:

-0.081849047367565973116419938674252971482398018961922

0.0004357345630640457140757853070834281049705616972466

-1.8762261787851325482986508127679968797519452065 × 10^-7

$$-0.081849047367565973116419938674252971482398018961922 + 0.0004357345630640457140757853070834281049705616972466 - 1.8762261787851325482986508127679968797519452065 \times 10^{-7}$$

$-0.08141350042711980591559898323225082017711543245919605$

The result is:

-0.08141350042711980591559898323225082017711543245919605

-0.0814135

From the (ii), we have:

-1.081849047367565973116419938674252971482398018961922 +

0.0761251367814440464022202749466671971676215118725857

-0.000433255719961759072744149660169833646052283127278

Input interpretation:

−1.081849047367565973116419938674252971482398018961922 +
0.0761251367814440464022202749466671971676215118725857 −
0.000433255719961759072744149660169833646052283127278

Open code

Result:

−1.0061571663060836857869438133877556079608287902166143

The result is -1.0061571663…

-1.0061571663060836857869438133877556079608287902166143

The sum of the two mock theta functions (ii) and (iii) is:

-0,0814135 - 1,00615716 = **- 1,08757066**

And

-1 – 0.0814135 = **-1.0814135**

From the (i), we have:

0.9239078+0.000433255+(-1.8754140254243246404383299476354805043847163776 × 10^-7)

Input interpretation:

$0.9239078 + 0.000433255 - 1.8754140254243246404383299476354805043847163776 \times 10^{-7}$

Open code

Enlarge Data Customize A Plaintext Interactive

Result

0.92434086745859745756753595616700523645194956152836224

Open code

The result is

0.92434086745859745756753595616700523645194956152836224

We have also that:

0,9243408 - 1,00615716 = **-0,08181636**; and

-0,08181636 - 1,00615716 = **-1,08797352**

-1 – 0.08181636 = **-1.08181636**

MOCK THETA FUNCTIONS ORDER 3

Mock ϑ-functions

$$\phi(q) = 1 + \frac{q}{1+q^2} + \frac{q^4}{(1+q^2)(1+q^4)} + \ldots$$

$$\psi(q) = \frac{q}{1-q} + \frac{q^4}{(1-q)(1-q^3)} + \frac{q^9}{(1-q)(1-q^3)(1-q^5)} + \ldots$$

$$\chi(q) = 1 + \frac{q}{1-q+q^2} + \frac{q^4}{(1-q+q^2)(1-q^2+q^4)} + \ldots$$

From the partition formula:

from:

THE f(q) MOCK THETA FUNCTION CONJECTURE AND PARTITION RANKS
KATHRIN BRINGMANN AND KEN ONO

Returning to $f(q)$, the problem of estimating its coefficients $\alpha(n)$ has a long history, one which even precedes Dyson's definition of partition ranks. Indeed, Ramanujan's last letter to Hardy already includes the claim that

$$\alpha(n) = (-1)^{n-1}\frac{\exp\left(\pi\sqrt{\frac{n}{6}-\frac{1}{144}}\right)}{2\sqrt{n-\frac{1}{24}}} + O\left(\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{n}{6}-\frac{1}{144}}\right)}{\sqrt{n-\frac{1}{24}}}\right).$$

We have that:

-((((((((((((((exp(Pi*sqrt((16/6-1/144))) / ((2(sqrt(16-1/24)))))))) + exp(Pi/2*sqrt((Pi/6-1/144))) / ((sqrt(16-1/24)))))))

Input:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{16}{6}-\frac{1}{144}}\right)}{2\sqrt{16-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{16-\frac{1}{24}}}\right) \qquad \text{(A)}$$

Open code

Enlarge Data Customize A Plaintext Interactive
Exact result:

$$-\sqrt{\frac{6}{383}}\, e^{\left(\sqrt{383}\,\pi\right)/12} - 2\sqrt{\frac{6}{383}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi}$$

Decimal approximation:
More digits

−21.792160456625474712745942462166244348096753140572326720 7...

Open code

-21.79216....

Or:

-((((((((((((((exp(Pi*sqrt((16/6-1/144))) / ((2(sqrt(16-1/24)))))))) + (0.08333) exp(Pi/2*sqrt((Pi/6-1/144))) / ((sqrt(16-1/24)))))))

Input:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{16}{6}-\frac{1}{144}}\right)}{2\sqrt{16-\frac{1}{24}}}+0.08333\times\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{16-\frac{1}{24}}}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits
  $-21.0824731...$

where 0.08333 is 1/12 = *O*

See link

https://oeis.org/A000025/b000025.txt

q = -21.79216*(-e^(-0.5)) = 13.2176

(((-21.79216*((-e^(-0.5))/((1+21.79216*(-e^(-0.5)))

Input interpretation:

$$-21.79216\left(-\frac{1}{e^{0.5}\left(1+\frac{21.79216\times(-1)}{e^{0.5}}\right)}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits
  $-1.08185...$

((((((-21.79216*((-e^(-0.5))))))^4 / ((1+21.79216*(-e^(-0.5)))(((1+(((((21.79216*(-e^(-0.5))))))^3

Input interpretation:

$$\frac{\left(-\frac{21.79216\times(-1)}{e^{0.5}}\right)^4}{\left(1+\frac{21.79216\times(-1)}{e^{0.5}}\right)\left(1+\left(\frac{21.79216\times(-1)}{e^{0.5}}\right)^3\right)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits
  $1.08232...$

((((((-21.79216*((-e^(-0.5)))))^9 / ((((((1+21.79216*(-e^(-0.5)))(((1+(((21.79216*(-e^(-0.5)))^3)))(((1+(((((21.79216*(-e^(-0.5))))))^5)))))))

Input interpretation:

$$\frac{\left(-\frac{21.79216\times(-1)}{e^{0.5}}\right)^9}{\left(1+\frac{21.79216\times(-1)}{e^{0.5}}\right)\left(\left(1+\left(\frac{21.79216\times(-1)}{e^{0.5}}\right)^3\right)\left(1+\left(\frac{21.79216\times(-1)}{e^{0.5}}\right)^5\right)\right)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits
  −1.08232...

Thence

ψ(q) = -1.08185+1.08232-1.08232 = -1,08185

or:

((((((13.2176)))))^9 / ((((((1-13.2176))(((1-(((13.2176))^3)))(((1-(((13.2176))^5)))))))

Input interpretation:

$$\frac{13.2176^9}{(1-13.2176)\left(1-13.2176^3\right)\left(1-13.2176^5\right)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits
  −1.0823205207118520655936266776732694604126116485067689957 5...

Open code

Approximating the result of q to 13, we obtain:

((((((13)))))^9 / ((((((1-13))(((1-(((13))^3)))(((1-(((13))^5)))))))

Input:

$$\frac{13^9}{(1-13)\left(1-13^3\right)\left(1-13^5\right)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Exact result:

- Step-by-step solution

$$-\frac{10\,604\,499\,373}{9\,784\,286\,784}$$

Decimal approximation:

- More digits

$-1.08382957359153384357708540363242075632111807077628684519\ldots$

Open code

We note that the value obtained is very near to the previous result. Indeed:

(-1.0823205 ≈ -1.0838295)

MOCK THETA FUNCTIONS ORDER 6

We have the following mock theta function:

$$\sigma(q) = \sum_{n \geq 0} \frac{q^{(n+1)(n+2)/2}(-q;q)_n}{(q;q^2)_{n+1}}$$

That is:

Sum_{n >= 0} q^((n+1)(n+2)/2) (1+q)(1+q^2)...(1+q^n)/((1-q)(1-q^3)...(1-q^(2n+1)))

We have that:

sum q^((n+1)(n+2)/2) (1+q)(1+q^2)(1+q^n)))/((1-q)(1-q^3)(1-q^(2n+1))), n = 0 to k

Input interpretation:

$$\sum_{n=0}^{k} \frac{q^{1/2(n+1)(n+2)}(1+q)(1+q^2)(1+q^n)}{(1-q)(1-q^3)(1-q^{2n+1})}$$

Enlarge Data Customize A Plaintext Interactive

Result:

$$\sum_{n=0}^{k} \frac{q^{1/2(n+1)(n+2)}(1+q)(1+q^2)(1+q^n)}{(1-q)(1-q^3)(1-q^{2n+1})}$$

Open code

For q = 0.5 and n = 2, we develop the above formula in the following way:

(((0.5^((2+1)(2+2)/2) (1+0.5)(1+0.5^2)(1+0.5^2)))/(((1-0.5)(1-0.5^3)(1-0.5^(2*2+1)))

Input:

$$\frac{0.5^{(2+1)\times(2+2)/2}(1+0.5)(1+0.5^2)(1+0.5^2)}{(1-0.5)(1-0.5^3)(1-0.5^{2\times 2+1})}$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits
0.086405529953917050691244239631336405529953917050691244239...
Open code
0.0864055...

1+(((0.5^((2+1)(2+2)/2) (1+0.5)(1+0.5^2)(1+0.5^2)))/(((1-0.5)(1-0.5^3)(1-0.5^(2*2+1)))

Input:

$$1+\frac{0.5^{(2+1)\times(2+2)/2}\,(1+0.5)\,(1+0.5^2)\,(1+0.5^2)}{(1-0.5)\,(1-0.5^3)\,(1-0.5^{2\times 2+1})}$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits
1.086405529953917050691244239631336405529953917050691244239...
Open code
1.0864055...

MOCK THETA FUNCTIONS ORDER 3

For $\phi(q)$ q = $-e^{-t}$, t = 0.5 $q^n = -21.79216 * -e^{-0.5}$, we obtain:

$$\phi(q)=1+\frac{q}{1+q^2}+\frac{q^4}{(1+q^2)(1+q^4)}+\ldots$$

$$\psi(q)=\frac{q}{1-q}+\frac{q^4}{(1-q)(1-q^3)}+\frac{q^9}{(1-q)(1-q^3)(1-q^5)}+\ldots$$

$$\chi(q)=1+\frac{q}{1-q+q^2}+\frac{q^4}{(1-q+q^2)(1-q^2+q^4)}+\ldots$$

φ(q) = 1.075226 + 0.00572374 = **1.08094974**

ψ(q) = -1.08185 + 1.08232 – 1.08232 = **– 1.08185**

χ(q) = 1.081345 + 0.00618954 = **1.08753454**

The sum of φ(q) + ψ(q) + χ(q) = **1.08663428** very near to the value 1.08643 already calculated from Ramanujan.

We have also that:

1,08663428 + 1,0864055 = 2,17303978 ÷ 2 = **1,08651989**

With regard the fundamental formula (A), we note that, for n = 64, we obtain:

-((((((((((((((exp(Pi*sqrt((64/6-1/144))) / ((2(sqrt(64-1/24))))))))) + exp(Pi/2*sqrt((Pi/6-1/144))) / ((sqrt(64-1/24))))))))

((((((((((((((exp(Pi*sqrt((64/6-1/144))) / ((2(sqrt(64-1/24))))))))) + exp(Pi/2*sqrt((Pi/6-1/144))) / ((sqrt(64-1/24))))))))

Input:

$$\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{64-\frac{1}{24}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\sqrt{\frac{6}{1535}}\,e^{\left(\sqrt{1535}\,\pi\right)/12}+2\sqrt{\frac{6}{1535}}\,e^{1/2\sqrt{\pi/6-1/144}\,\pi}$$

Decimal approximation:

- More digits

1781.145849977065284715761326442188688403291914158103909474...

Open code

Series representations:

$$\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\,\pi\right)}{\sqrt{64-\frac{1}{24}}}=$$

$$\left(\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+2\exp\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\text{ for not }((z_0\in\mathbb{R}\text{ and }-\infty<z_0\le 0))$$

Enlarge Data Customize A Plaintext Interactive

$$\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\ \pi\right)}{\sqrt{64-\frac{1}{24}}}=$$

$$\left(\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1535}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1535}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+2\exp\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(2\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1535}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1535}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

for ($x\in\mathbb{R}$ and $x<0$)

$$\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\ \pi\right)}{\sqrt{64-\frac{1}{24}}}=$$

$$\left(\left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{1535}{144}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{1535}{144}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+2\exp\left(\frac{1}{2}\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\left(\frac{1}{z_0}\right)^{-1/2\left\lfloor\arg\left(\frac{1535}{24}-z_0\right)/(2\pi)\right\rfloor} z_0^{-1/2-1/2\left\lfloor\arg\left(\frac{1535}{24}-z_0\right)/(2\pi)\right\rfloor}\right)\Big/\left(2\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{24}-z_0\right)^k z_0^{-k}}{k!}\right)$$

And:

[((((((((((((((exp(Pi*sqrt((64/6-1/144))) / ((2(sqrt(64-1/24)))))))) + exp(Pi/2*sqrt((Pi/6-1/144))) / ((sqrt(64-1/24))))))))]^1/15

Input:

$$\sqrt[15]{\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{64-\frac{1}{24}}}}$$

Open code

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Exact result:

$$\sqrt[15]{\sqrt{\frac{6}{1535}}\, e^{\left(\sqrt{1535}\,\pi\right)/12}+2\sqrt{\frac{6}{1535}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi}}$$

Decimal approximation:

- More digits

1.647074710074116187113310708899267057874747458393004340115...

Open code

1.6470747 ≈ ζ (2)

Alternate form:

$$\sqrt[30]{\frac{6}{1535}}\sqrt[15]{e^{\left(\sqrt{1535}\,\pi\right)/12}+2\,e^{1/24\,\pi\sqrt{24\,\pi-1}}}$$

Open code

Series representations:

$$\sqrt[15]{\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\,\pi\right)}{\sqrt{64-\frac{1}{24}}}}=\frac{\sqrt[15]{\frac{\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+2\exp\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{24}-z_0\right)^k z_0^{-k}}{k!}}}}{\sqrt[15]{2}}$$

for not $((z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0))$

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$$\sqrt[15]{\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\,\pi\right)}{\sqrt{64-\frac{1}{24}}}} =$$

$$\frac{1}{\sqrt[15]{2}}\left(\left(\left(\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1535}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1535}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+\right.\right.\right.$$
$$2\exp\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\right.$$
$$\left.\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/$$
$$\left.\left(\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1535}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1535}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\hat{}$$
$$\left.(1/15)\right) \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\sqrt[15]{\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\,\pi\right)}{\sqrt{64-\frac{1}{24}}}} =$$

$$\frac{1}{\sqrt[15]{2}}\left(\left(\left(\left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{1535}{144}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{1535}{144}-z_0\right)/(2\pi)\right\rfloor\right)}\right.\right.\right.\right.\right.$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+$$
$$2\exp\left(\frac{1}{2}\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor\right)}\right.$$
$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$
$$\left.\left(\frac{1}{z_0}\right)^{-1/2\left\lfloor\arg\left(\frac{1535}{24}-z_0\right)/(2\pi)\right\rfloor} z_0^{-1/2-1/2\left\lfloor\arg\left(\frac{1535}{24}-z_0\right)/(2\pi)\right\rfloor}\right)\Big/$$
$$\left.\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\hat{}\,(1/15)\Bigg)$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\Gamma(s)\Gamma(-a-s)}{z^s}\, ds}{(2\pi i)\Gamma(-a)} \quad \text{for } (0 < \gamma < -\text{Re}(a) \text{ and } |\arg(z)| < \pi)$$

Open code

- $\Gamma(x)$ is the gamma function
- $\text{Re}(z)$ is the real part of z
- $|z|$ is the absolute value of z

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We have also that:

[(((((((((((((((exp(Pi*sqrt((64/6-1/144))) / ((2(sqrt(64-1/24))))))) + exp(Pi/2*sqrt((Pi/6-1/144))) / ((sqrt(64-1/24)))))))]^1/3

Input:

$$\sqrt[3]{\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}} + \frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{64-\frac{1}{24}}}}$$

Open code

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Exact result:

$$\sqrt[3]{\sqrt{\frac{6}{1535}}\, e^{\left(\sqrt{1535}\,\pi\right)/12} + 2\sqrt{\frac{6}{1535}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi}}$$

Decimal approximation:

- More digits

12.12178270108431151228756903902653336469451597747139424836...

Open code

Series representations:

$$\sqrt[3]{\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}} + \frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\,\pi\right)}{\sqrt{64-\frac{1}{24}}}} = \frac{\sqrt[3]{\frac{\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+2\exp\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{24}-z_0\right)^k z_0^{-k}}{k!}}}}{\sqrt[3]{2}}$$

for not $((z_0 \in \mathbb{R} \text{ and } -\infty < z_0 \leq 0))$

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$$\sqrt[3]{\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\ \pi\right)}{\sqrt{64-\frac{1}{24}}}} =$$

$$\frac{1}{\sqrt[3]{2}}\left(\left(\left(\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1535}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1535}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+\right.\right.\right.$$

$$2\exp\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\right.$$

$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/$$

$$\left(\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1535}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1535}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\hat{}$$

$$\left.(1/3)\right) \quad \text{for } (x \in \mathbb{R} \text{ and } x < 0)$$

$$\sqrt[3]{\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\;\pi\right)}{\sqrt{64-\frac{1}{24}}}} =$$

$$\frac{1}{\sqrt[3]{2}}\left(\left(\left(\left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{1535}{144}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{1535}{144}-z_0\right)/(2\pi)\right\rfloor\right)} \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+ 2\exp\left(\frac{1}{2}\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor\right)} \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right) \left(\frac{1}{z_0}\right)^{-1/2\left\lfloor\arg\left(\frac{1535}{24}-z_0\right)/(2\pi)\right\rfloor} z_0^{-1/2-1/2\left\lfloor\arg\left(\frac{1535}{24}-z_0\right)/(2\pi)\right\rfloor}\right)/ \left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\wedge(1/3)\right)$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(s)\Gamma(-a-s)}{z^s}\,ds}{(2\pi i)\Gamma(-a)} \quad \text{for } (0<\gamma<-\text{Re}(a) \text{ and } |\arg(z)|<\pi)$$

we note that 12.12178 is a value very near to the black hole entropy 12.1904

Appendix B

On some developements of Ramanujan's formulas

16 *Jan.* 1913.

I. I have found a function which exactly represents the number of prime numbers less than x, "exactly" in the sense that the difference between the function and the actual number of primes is generally 0 or some small finite value even when x becomes infinite. I have got the function in the form of infinite series and have expressed it in two ways.

(1) In terms of Bernoullian numbers*. From this we can easily calculate the number of prime numbers up to 100 millions, with generally no error and in some cases with an error of 1 or 2.

(2) As a definite integral from which we can calculate for all values [see formula 1, p. xxvii, bottom].

II. I have also got expressions to find the actual number of prime numbers of the form $An+B$....

III. I have found out expressions for finding not only irregularly increasing functions but also irregular functions without increase (*e.g.* the number of divisors of natural numbers), not merely the order but the exact form.

IV. ......

$$(2)\quad \int_0^\infty \frac{1}{\left\{1+\left(\frac{x}{a}\right)^2\right\}\left\{1+\left(\frac{x}{a+1}\right)^2\right\}\cdots}\,\frac{dx}{\left\{1+\left(\frac{x}{b}\right)^2\right\}\left\{1+\left(\frac{x}{b+1}\right)^2\right\}\cdots} = \tfrac{1}{2}\sqrt{\pi}\,\frac{\Gamma(a+\frac{1}{2})}{\Gamma(a)}\,\frac{\Gamma(b+\frac{1}{2})}{\Gamma(b)}\,\frac{\Gamma(a+b)}{\Gamma(a+b+\frac{1}{2})}.$$

......

$$(6)\quad \int_0^\infty \tan^{-1}\frac{2nz}{n^2+x^2-z^2}\,\frac{dz}{e^{2\pi z}-1}$$

can be exactly found if $2n$ is any integer.

V. ......

$$(7)\quad \frac{1}{(1^2+2^2)(\sinh 3\pi-\sinh\pi)}+\frac{1}{(2^2+3^2)(\sinh 5\pi-\sinh\pi)} + \frac{1}{(3^2+4^2)(\sinh 7\pi-\sinh\pi)}+\ldots = \frac{1}{2\sinh\pi}\left(\frac{1}{\pi}+\coth\pi-\frac{\pi}{2}\tanh^2\frac{\pi}{2}\right).$$

$$(8)\quad \frac{1}{\left(25+\frac{1^4}{100}\right)(e^{\pi}+1)}+\frac{3}{\left(25+\frac{3^4}{100}\right)(e^{3\pi}+1)}+\frac{5}{\left(25+\frac{5^4}{100}\right)(e^{5\pi}+1)} +\ldots=\frac{\pi}{8}\coth^2\frac{5\pi}{2}-\frac{4689}{11890}.$$

* [See formula 2, p. xxvii, bottom; this formula was given by J. P. Gram, *K. Danske Vidensk. Selsk. Skrifter* (6), vol. II (1881—1886), pp. 185—308.]

(9) $$\frac{1}{1^7\cosh\frac{1}{2}\pi\sqrt{3}}-\frac{1}{3^7\cosh\frac{3}{2}\pi\sqrt{3}}+\ldots=\frac{\pi^7}{23040}.$$

(10) $$\left\{1+\left(\frac{n}{1}\right)^3\right\}\left\{1+\left(\frac{n}{2}\right)^3\right\}\left\{1+\left(\frac{n}{3}\right)^3\right\}\ldots$$

can always be exactly found if n is any integer positive or negative.

(11) $$\frac{2}{3}\int_0^1\frac{\tan^{-1}x}{x}dx-\int_0^{2-\sqrt{3}}\frac{\tan^{-1}x}{x}dx=\frac{\pi}{12}\log(2+\sqrt{3}).$$

VI. ......

(2) $$\frac{\log 1}{\sqrt{1}}-\frac{\log 3}{\sqrt{3}}+\frac{\log 5}{\sqrt{5}}-\ldots=\left(\tfrac{1}{4}\pi-\tfrac{1}{2}\gamma-\tfrac{1}{2}\log 2\pi\right)\left(\frac{1}{\sqrt{1}}-\frac{1}{\sqrt{3}}+\frac{1}{\sqrt{5}}-\ldots\right),$$

where $\gamma = \cdot 5772\ldots$, the Eulerian constant.

......

......

(4) $$\frac{1}{1^3}\left(\coth\pi x+x^2\coth\frac{\pi}{x}\right)+\frac{1}{2^3}\left(\coth 2\pi x+x^2\coth\frac{2\pi}{x}\right)+\frac{1}{3^3}\left(\coth 3\pi x+x^2\coth\frac{3\pi}{x}\right)+\ldots=\frac{\pi^3}{90x^3}(x^4+5x^2+1).$$

(5) $$\frac{1^5}{e^{2\pi}-1}\frac{1}{2500+1^4}+\frac{2^5}{e^{4\pi}-1}\frac{1}{2500+2^4}+\ldots=\frac{123826979}{6306456}-\frac{25\pi}{4}\coth^2 5\pi.$$

......

From the formula (11),

$$\frac{2}{3}\int_0^1\frac{\tan^{-1}x}{x}dx-\int_0^{2-\sqrt{3}}\frac{\tan^{-1}x}{x}dx=\frac{\pi}{12}\log(2+\sqrt{3}).$$

we have:

((Pi/12))*ln(2+sqrt(3))

Input:

$$\frac{\pi}{12}\log\left(2+\sqrt{3}\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Exact result:

$$\frac{1}{12}\pi\log\left(2+\sqrt{3}\right)$$

Decimal approximation:

- More digits

0.34477877117217236067786059022446871953998242554597575679 7...

Open code

Continued fraction:

- Linear form

$$\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{24+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{11+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{4+\cfrac{1}{5+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{4+\cfrac{1}{19+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{1}{12}\log\left(2+\sqrt{3}\right)\pi = \frac{1}{12}\pi\log\left(1+\sqrt{3}\right) - \frac{1}{12}\pi\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{1+\sqrt{3}}\right)^k}{k}$$

Open code

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$$\frac{1}{12}\log\left(2+\sqrt{3}\right)\pi = \frac{1}{6}i\pi^2\left\lfloor\frac{\arg(2+\sqrt{3}-x)}{2\pi}\right\rfloor + \frac{1}{12}\pi\log(x) - \frac{1}{12}\pi\sum_{k=1}^{\infty}\frac{(-1)^k(2+\sqrt{3}-x)^k x^{-k}}{k} \quad \text{for } x<0$$

Open code

$$\frac{1}{12}\log\left(2+\sqrt{3}\right)\pi = \frac{1}{6}i\pi^2\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor + \frac{1}{12}\pi\log(z_0) - \frac{1}{12}\pi\sum_{k=1}^{\infty}\frac{(-1)^k(2+\sqrt{3}-z_0)^k z_0^{-k}}{k}$$

Open code

- $\arg(z)$ is the complex argument
- $\lfloor x\rfloor$ is the floor function
- More information

Integral representations:

$$\frac{1}{12}\log\left(2+\sqrt{3}\right)\pi = \frac{\pi}{12}\int_1^{2+\sqrt{3}} \frac{1}{t}\, dt$$

Open code

$$\frac{1}{12}\log\left(2+\sqrt{3}\right)\pi = -\frac{i}{24}\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\left(1+\sqrt{3}\right)^{-s}\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\, ds \quad \text{for } -1<\gamma<0$$

Note that, with regard the following Mock Theta Functions:

$$\phi(q) = 1 + \frac{q}{1+q^2} + \frac{q^4}{(1+q^2)(1+q^4)} + \dots$$

$$\psi(q) = \frac{q}{1-q} + \frac{q^4}{(1-q)(1-q^3)} + \frac{q^9}{(1-q)(1-q^3)(1-q^5)} + \dots$$

$$\chi(q) = 1 + \frac{q}{1-q+q^2} + \frac{q^4}{(1-q+q^2)(1-q^2+q^4)} + \dots$$

φ(q) = 1.075226 + 0.00572374 = **1.08094974**

ψ(q) = -1.08185 + 1.08232 – 1.08232 = **– 1.08185**

χ(q) = 1.081345 + 0.00618954 = **1.08753454**

the sum of φ(q) + ψ(q) + χ(q) = **1.08663428**

Thence, we obtain, from the previous expression:

(((((1/6 ((((((((1.08663428 / (((((Pi/12))*ln(2+sqrt(3)))))))^2))))

Input interpretation:

$$\frac{1}{6}\left(\frac{1.08663428}{\frac{\pi}{12}\log\left(2+\sqrt{3}\right)}\right)^2$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

1.65552033...

1.65552033...

Series representations:

- More

We note that, the result 1,65552033... is practically equal to the 14th root of the following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3 = 1164{,}2696$ i.e. 1,65578...

Indeed:

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots \Rightarrow$$

$$\Rightarrow \frac{1}{6}\left(\frac{1.08663428}{\frac{\pi}{12}\log(2+\sqrt{3})}\right)^2$$

$$= 1.65552033\ldots$$

$$\frac{1}{6}\left(\frac{1.08663}{\frac{1}{12}\pi\log(2+\sqrt{3})}\right)^2 = \frac{28.3386}{\pi^2\log^2\left(2+\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}$$

Open code

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$$\frac{1}{6}\left(\frac{1.08663}{\frac{1}{12}\pi\log(2+\sqrt{3})}\right)^2 = \frac{28.3386}{\pi^2\left(\log(1+\sqrt{3})-\sum_{k=1}^{\infty}\frac{(-1)^k(1+\sqrt{3})^{-k}}{k}\right)^2}$$

Open code

$$\frac{1}{6}\left(\frac{1.08663}{\frac{1}{12}\pi\log(2+\sqrt{3})}\right)^2 = \frac{28.3386}{\pi^2\log^2\left(2+\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)}$$

Open code

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)

Integral representations:

$$\frac{1}{6}\left(\frac{1.08663}{\frac{1}{12}\pi\log(2+\sqrt{3})}\right)^2 = \frac{28.3386}{\pi^2\left(\int_1^{2+\sqrt{3}}\frac{1}{t}\,dt\right)^2}$$

Open code

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$$\frac{1}{6}\left(\frac{1.08663}{\frac{1}{12}\pi\log(2+\sqrt{3})}\right)^2 = \frac{113.354\,i^2}{\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)\left(1+\sqrt{3}\right)^{-s}}{\Gamma(1-s)}\,ds\right)^2} \quad \text{for } -1<\gamma<0$$

Open code

- $\Gamma(x)$ is the gamma function
- i is the imaginary unit

From the formula (2),

$$\frac{\log 1}{\sqrt{1}}-\frac{\log 3}{\sqrt{3}}+\frac{\log 5}{\sqrt{5}}-\ldots=\left(\tfrac{1}{4}\pi-\tfrac{1}{2}\gamma-\tfrac{1}{2}\log 2\pi\right)\left(\frac{1}{\sqrt{1}}-\frac{1}{\sqrt{3}}+\frac{1}{\sqrt{5}}-\ldots\right),$$

we have that:

(((((1/4 PI - 1/2 0.5772156649 - 1/2 ln(2Pi)))))) * ((((1/sqrt(1) - 1/sqrt(3) + 1/sqrt(5))))

Input interpretation:

$$\left(\frac{1}{4}\pi+\frac{1}{2}\times(-0.5772156649)-\frac{1}{2}\log(2\pi)\right)\left(\frac{1}{\sqrt{1}}-\frac{1}{\sqrt{3}}+\frac{1}{\sqrt{5}}\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

−0.3672112394...

Series representations:

- More

$$\left(\frac{\pi}{4} - \frac{0.577216}{2} - \frac{1}{2}\log(2\pi)\right)\left(\frac{1}{\sqrt{1}} - \frac{1}{\sqrt{3}} + \frac{1}{\sqrt{5}}\right) =$$

$$\frac{1}{\sqrt{x}}\, 0.25\,(-1.15443 + \pi - 2\log(2\pi))\left(\frac{1}{\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k (1-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}} - \frac{1}{\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k (3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}} + \frac{1}{\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k (5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right) \text{ for } (x \in \mathbb{R} \text{ and } x < 0)$$

Open code

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$$\left(\frac{\pi}{4} - \frac{0.577216}{2} - \frac{1}{2}\log(2\pi)\right)\left(\frac{1}{\sqrt{1}} - \frac{1}{\sqrt{3}} + \frac{1}{\sqrt{5}}\right) =$$

$$\left(-0.288608 + \frac{\pi}{4} + \frac{1}{2}\left(-\log(-1 + 2\pi) + \sum_{k=1}^{\infty}\frac{(-1)^k (-1 + 2\pi)^{-k}}{k}\right)\right)$$

$$\left(\frac{1}{\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k (1-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}} - \frac{1}{\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k (3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}} + \frac{1}{\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k (5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right) \text{ for } (x \in \mathbb{R} \text{ and } x < 0)$$

$$\left(\frac{\pi}{4} - \frac{0.577216}{2} - \frac{1}{2}\log(2\pi)\right)\left(\frac{1}{\sqrt{1}} - \frac{1}{\sqrt{3}} + \frac{1}{\sqrt{5}}\right) = \frac{1}{\sqrt{x}}\left(-0.288608 + 0.25\pi - i\left(\pi\left\lfloor\frac{\arg(2\pi - x)}{2\pi}\right\rfloor\right) - 0.5\log(x) + 0.5\sum_{k=1}^{\infty}\frac{(-1)^k (2\pi - x)^k x^{-k}}{k}\right)\left(\frac{1}{\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k (1-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}} - \frac{1}{\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k (3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}} + \frac{1}{\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k (5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right) \text{ for } (x \in \mathbb{R} \text{ and } x < 0)$$

Integral representations:

$$\left(\frac{\pi}{4} - \frac{0.577216}{2} - \frac{1}{2}\log(2\pi)\right)\left(\frac{1}{\sqrt{1}} - \frac{1}{\sqrt{3}} + \frac{1}{\sqrt{5}}\right) = 0.25\left(-1.15443 + \pi - 2\int_1^{2\pi}\frac{1}{t}\,dt\right)\left(\frac{1}{\sqrt{1}} - \frac{1}{\sqrt{3}} + \frac{1}{\sqrt{5}}\right)$$

Open code

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$$\left(\frac{\pi}{4} - \frac{0.577216}{2} - \frac{1}{2}\log(2\pi)\right)\left(\frac{1}{\sqrt{1}} - \frac{1}{\sqrt{3}} + \frac{1}{\sqrt{5}}\right) = \frac{1}{4}\left(-1.15443 + \pi - \frac{1}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{(-1+2\pi)^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)\left(\frac{1}{\sqrt{1}} - \frac{1}{\sqrt{3}} + \frac{1}{\sqrt{5}}\right) \text{ for } -1 < \gamma < 0$$

Open code

- $\Gamma(x)$ is the gamma function

From:

1/ [-1.08651989^6 * (((((((((((1/4 PI - 1/2 0.5772156649 - 1/2 ln(2Pi))))))*((((1/sqrt(1) - 1/sqrt(3) + 1/sqrt(5)))))))))]

where 1,08663428 + 1,0864055 = 2,17303978 ÷ 2 = **1,08651989** that are all Mock Theta Functions, we obtain:

Input interpretation:

$$-\frac{1}{1.08651989^6\left(\left(\frac{1}{4}\pi+\frac{1}{2}\times(-0.5772156649)-\frac{1}{2}\log(2\pi)\right)\left(\frac{1}{\sqrt{1}}-\frac{1}{\sqrt{3}}+\frac{1}{\sqrt{5}}\right)\right)}$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

1.6552285...

1.6552285...

We note that, the result 1,6552285... is practically equal to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164{,}2696$ i.e. 1,65578...

Indeed:

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots \Rightarrow$$

$$\Rightarrow -\frac{1}{1.08651989^6\left(\left(\frac{1}{4}\pi+\frac{1}{2}\times(-0.5772156649)-\frac{1}{2}\log(2\pi)\right)\left(\frac{1}{\sqrt{1}}-\frac{1}{\sqrt{3}}+\frac{1}{\sqrt{5}}\right)\right)}$$

= 1.6552285...

Series representations:

- More

$$-\frac{1}{1.08652^6\left(\frac{\pi}{4}-\frac{0.577216}{2}-\frac{1}{2}\log(2\pi)\right)\left(\frac{1}{\sqrt{1}}-\frac{1}{\sqrt{3}}+\frac{1}{\sqrt{5}}\right)} =$$

$$-\Bigg(\Bigg(2.43127\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)$$

$$\sqrt{x}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_1!\,k_2!\,k_3!}(-1)^{k_1+k_2+k_3}(1-x)^{k_1}(3-x)^{k_2}$$

$$(5-x)^{k_3}x^{-k_1-k_2-k_3}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-\frac{1}{2}\right)_{k_3}\Bigg)\Bigg/$$

$$\Bigg((-1.15443+\pi-2\log(2\pi))\Bigg(\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}(3-x)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!} -$$

$$\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\Bigg(\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}(5-x)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}\Bigg)+$$

$$\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(3-x)^{k_1}(5-x)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}\Bigg)\Bigg)\Bigg)$$

for ($x \in \mathbb{R}$ and $x < 0$)

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$$-\frac{1}{1.08652^6\left(\frac{\pi}{4}-\frac{0.577216}{2}-\frac{1}{2}\log(2\pi)\right)\left(\frac{1}{\sqrt{1}}-\frac{1}{\sqrt{3}}+\frac{1}{\sqrt{5}}\right)} =$$

$$-\Bigg(\Bigg(2.43127\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)$$

$$\sqrt{x}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_1!\,k_2!\,k_3!}(-1)^{k_1+k_2+k_3}(1-x)^{k_1}(3-x)^{k_2}$$

$$(5-x)^{k_3}x^{-k_1-k_2-k_3}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-\frac{1}{2}\right)_{k_3}\Bigg)\Bigg/$$

$$\Bigg(\Bigg(-1.15443+\pi-2\log(-1+2\pi)+2\sum_{k=1}^{\infty}\frac{(-1)^k(-1+2\pi)^{-k}}{k}\Bigg)$$

$$\Bigg(\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}(3-x)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}-$$

$$\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\Bigg(\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}(5-x)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}\Bigg)+$$

$$\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(3-x)^{k_1}(5-x)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}\Bigg)\Bigg)\Bigg)$$

for ($x \in \mathbb{R}$ and $x < 0$)

$$-\frac{1}{1.08652^6\left(\frac{\pi}{4}-\frac{0.577216}{2}-\frac{1}{2}\log(2\pi)\right)\left(\frac{1}{\sqrt{1}}-\frac{1}{\sqrt{3}}+\frac{1}{\sqrt{5}}\right)}=$$

$$\Bigg(0.607818\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)$$

$$\sqrt{x}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_1!k_2!k_3!}(-1)^{k_1+k_2+k_3}(1-x)^{k_1}(3-x)^{k_2}$$

$$(5-x)^{k_3}x^{-k_1-k_2-k_3}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-\frac{1}{2}\right)_{k_3}\Bigg)\Big/$$

$$\Bigg(\Bigg(0.288608-0.25\pi+i\pi\left\lfloor\frac{\arg(2\pi-x)}{2\pi}\right\rfloor+0.5\log(x)-0.5\sum_{k=1}^{\infty}\frac{(-1)^k(2\pi-x)^k x^{-k}}{k}\Bigg)$$

$$\Bigg(\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}(3-x)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!k_2!}-$$

$$\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\Bigg(\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}(5-x)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!k_2!}\Bigg)+$$

$$\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(3-x)^{k_1}(5-x)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!k_2!}\Bigg)\Bigg)$$

for $(x\in\mathbb{R}$ and $x<0)$

- $\arg(z)$ is the complex argument
- $\lfloor x\rfloor$ is the floor function
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- i is the imaginary unit
- $\mathbb{R}$ is the set of real numbers
- More information

Integral representation:

$$-\frac{1}{1.08652^6\left(\frac{\pi}{4}-\frac{0.577216}{2}-\frac{1}{2}\log(2\pi)\right)\left(\frac{1}{\sqrt{1}}-\frac{1}{\sqrt{3}}+\frac{1}{\sqrt{5}}\right)}=$$

$$-\frac{2.43127\,i\,\pi\sqrt{1}\sqrt{3}\sqrt{5}}{\left(i(-1.15443+\pi)\pi-\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{(-1+2\pi)^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)\left(\sqrt{1}\left(\sqrt{3}-\sqrt{5}\right)+\sqrt{3}\sqrt{5}\right)}$$

for $-1<\gamma<0$

Open code

- $\Gamma(x)$ is the gamma function
-

From the formula (9),

$$\frac{1}{1^7 \cosh \frac{1}{2}\pi\sqrt{3}} - \frac{1}{3^7 \cosh \frac{3}{2}\pi\sqrt{3}} + \cdots = \frac{\pi^7}{23040}.$$

we obtain:

Pi^7 / 23040

Input:

$$\frac{\pi^7}{23\,040}$$

Open code

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Decimal approximation:

- More digits

0.13108911578892326681919299015069626006586078451802961209 8...

Open code

Property:

$\frac{\pi^7}{23\,040}$ is a transcendental number

Open code

Series representations:

- More

$$\frac{\pi^7}{23\,040} = \frac{32}{45}\left(\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}\right)^7$$

Open code

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$$\frac{\pi^7}{23\,040} = \frac{32}{45}\left(\sum_{k=0}^{\infty} \frac{(-1)^{1+k}\, 1195^{-1-2k}\left(5^{1+2k} - 4 \times 239^{1+2k}\right)}{1+2k}\right)^7$$

Open code

$$\frac{\pi^7}{23040} = \frac{\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^7}{23040}$$

Open code

- More information

Integral representations:

- More

$$\frac{\pi^7}{23040} = \frac{32}{45}\left(\int_0^1 \sqrt{1-t^2}\,dt\right)^7$$

Open code

$$\frac{\pi^7}{23040} = \frac{1}{180}\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^7$$

Open code

$$\frac{\pi^7}{23040} = \frac{1}{180}\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt\right)^7$$

Open code

1+(0.0864055+0.08753454+0.0838295)/3 * 1 /(Pi^7 / 23040)

Input interpretation:

$$1+\left(\frac{1}{3}(0.0864055+0.08753454+0.0838295)\right)\times\frac{1}{\frac{\pi^7}{23040}}$$

Open code

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Result:

- More digits

1.655456...

1.655456...

We note that, the result 1,655456... is practically equal to the 14th root of the following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3 = 1164{,}2696$ i.e. 1,65578...

Indeed:

$$\sqrt[14]{\left(\sqrt{\frac{113}{8}\ \sqrt{505}} + \sqrt{\frac{105}{8}\ \sqrt{505}}\right)^3} = 1{,}65578\ldots \Rightarrow$$

$$\Rightarrow 1+\left(\frac{1}{3}(0.0864055+0.08753454+0.0838295)\right)\times\frac{1}{\frac{\pi^7}{23040}}$$

$$= 1.655456\ldots$$

Series representations:

- More

$$1+\frac{0.0864055+0.0875345+0.0838295}{\frac{\pi^7\,3}{23040}} = 1+\frac{0.120829}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^7}$$

Open code

$$1+\frac{0.0864055+0.0875345+0.0838295}{\frac{\pi^7\,3}{23040}} = 1+\frac{15.4662}{\left(-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)^7}$$

Open code

$$1+\frac{0.0864055+0.0875345+0.0838295}{\frac{\pi^7\,3}{23040}} = 1+\frac{1979.67}{\left(\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^7}$$

Open code

- $\binom{n}{m}$ is the binomial coefficient
- More information

Integral representations:

- More

$$1+\frac{0.0864055+0.0875345+0.0838295}{\frac{\pi^7\,3}{23040}} = 1+\frac{15.4662}{\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^7}$$

Open code

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$$1+\frac{0.0864055+0.0875345+0.0838295}{\frac{\pi^7 3}{23040}}=1+\frac{0.120829}{\left(\int_0^1 \sqrt{1-t^2}\,dt\right)^7}$$

Open code

$$1+\frac{0.0864055+0.0875345+0.0838295}{\frac{\pi^7 3}{23040}}=1+\frac{15.4662}{\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^7}$$

From the formula (8), we have that:

$$(8)\quad \frac{1}{\left(25+\frac{1^4}{100}\right)\cdot(e^{\pi}+1)}+\frac{3}{\left(25+\frac{3^4}{100}\right)(e^{3\pi}+1)}+\frac{5}{\left(25+\frac{5^4}{100}\right)(e^{5\pi}+1)}+\ldots=\frac{\pi}{8}\coth^2\frac{5\pi}{2}-\frac{4689}{11890}.$$

(Pi/8)coth^2(5Pi/2)-(4689/11890)

Input:

$$\frac{\pi}{8}\coth^2\left(5\times\frac{\pi}{2}\right)-\frac{4689}{11\,890}$$

Open code

- $\coth(x)$ is the hyperbolic cotangent function

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\frac{1}{8}\pi\coth^2\left(\frac{5\pi}{2}\right)-\frac{4689}{11\,890}$$

Decimal approximation:

- More digits

−0.001665694195127834328346934326933649713197872426167604420...

Open code

Series representations:

- More

$$\frac{1}{8}\coth^2\left(\frac{5\pi}{2}\right)\pi-\frac{4689}{11\,890}=-\frac{4689}{11\,890}+\frac{1}{8}\pi\left(1+2\sum_{k=0}^{\infty}e^{-5(1+k)\pi}\right)^2$$

Open code

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$$\frac{1}{8}\coth^2\left(\frac{5\pi}{2}\right)\pi - \frac{4689}{11890} = -\frac{4689}{11890} + \frac{1}{8}\pi\left(1+2\sum_{k=1}^{\infty} q^{2k}\right)^2 \text{ for } q = e^{(5\pi)/2}$$

Open code

$$\frac{1}{8}\coth^2\left(\frac{5\pi}{2}\right)\pi - \frac{4689}{11890} = -\frac{4689}{11890} + \frac{\left(2+100\sum_{k=1}^{\infty}\frac{1}{25+4k^2}\right)^2}{200\pi}$$

Open code

- More information

Integral representation:

$$\frac{1}{8}\coth^2\left(\frac{5\pi}{2}\right)\pi - \frac{4689}{11890} = -\frac{4689}{11890} + \frac{1}{8}\pi\left(\int_{\frac{i\pi}{2}}^{\frac{5\pi}{2}} \operatorname{csch}^2(t)\,dt\right)^2$$

Open code

- $\operatorname{csch}(x)$ is the hyperbolic cosecant function
-

-10^3 ((((((Pi/8)coth^2(5Pi/2)-(4689/11890))))))

Input:

$$-10^3\left(\frac{\pi}{8}\coth^2\left(5\times\frac{\pi}{2}\right) - \frac{4689}{11890}\right)$$

Open code

- $\coth(x)$ is the hyperbolic cotangent function

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Exact result:

$$-1000\left(\frac{1}{8}\pi\coth^2\left(\frac{5\pi}{2}\right) - \frac{4689}{11890}\right)$$

Decimal approximation:

- More digits

1.665694195127834328346934326933649713197872426167604421221...

1.665694195... is a golden number very near to the proton mass

Open code

Series representations:

- More

$$-10^3\left(\frac{1}{8}\coth^2\left(\frac{5\pi}{2}\right)\pi - \frac{4689}{11890}\right) = \frac{468900}{1189} - 12500\pi\left(\sum_{k=-\infty}^{\infty}\frac{1}{25\pi+4k^2\pi}\right)^2$$

Open code

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$$-10^3\left(\frac{1}{8}\coth^2\left(\frac{5\pi}{2}\right)\pi - \frac{4689}{11890}\right) = \frac{20\left(-1189 + 23445\pi - 118900\sum_{k=1}^{\infty}\frac{1}{25+4k^2} - 2972500\left(\sum_{k=1}^{\infty}\frac{1}{25+4k^2}\right)^2\right)}{1189\pi}$$

Open code

$$-10^3\left(\frac{1}{8}\coth^2\left(\frac{5\pi}{2}\right)\pi - \frac{4689}{11890}\right) = -\frac{25\left(-18756 + 5945\pi + 23780\pi\sum_{k=1}^{\infty}q^{2k} + 23780\pi\left(\sum_{k=1}^{\infty}q^{2k}\right)^2\right)}{1189} \text{ for } q = e^{(5\pi)/2}$$

Open code

More information

Integral representation:

$$-10^3\left(\frac{1}{8}\coth^2\left(\frac{5\pi}{2}\right)\pi - \frac{4689}{11890}\right) = \frac{468900}{1189} - 125\pi\left(\int_{\frac{i\pi}{2}}^{\frac{5\pi}{2}}\operatorname{csch}^2(t)\,dt\right)^2$$

Open code

- $\operatorname{csch}(x)$ is the hyperbolic cosecant function
-

((((((1/ ((((((Pi/8)coth^2(5Pi/2)-(4689/11890)))))))))))^1/13

Input:

$$\sqrt[13]{\frac{1}{\frac{\pi}{8}\coth^2\left(5\times\frac{\pi}{2}\right) - \frac{4689}{11890}}}$$

Open code

- $\coth(x)$ is the hyperbolic cotangent function

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Exact result:

$$\sqrt[13]{-\frac{1}{\frac{4689}{11890} - \frac{1}{8}\pi\coth^2\left(\frac{5\pi}{2}\right)}}$$

Decimal approximation:

- More digits

1.588241891097195770354355188746247521320510976445882809 3... +
0.391466467295503561838181622822469073208042436404200959 98... i

Open code

Polar coordinates:

- Exact form

$r \approx 1.63577$ (radius), $\theta \approx 13.8462°$ (angle)

Open code

1.63577 is a golden number

2*sqrt((((((((6*((((((1/ ((((((Pi/8)coth^2(5Pi/2)-(4689/11890)))))))))))^1/13))))))))

Input:

$$2\sqrt{6\sqrt[13]{\frac{1}{\frac{\pi}{8}\coth^2\left(5\times\frac{\pi}{2}\right)-\frac{4689}{11890}}}}$$

Open code

- $\coth(x)$ is the hyperbolic cotangent function

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Exact result:

$$2\sqrt{6}\sqrt[26]{-\frac{1}{\frac{4689}{11890}-\frac{1}{8}\pi\coth^2\left(\frac{5\pi}{2}\right)}}$$

Decimal approximation:

- More digits

6.2199836819899363220637724886866171507140994304997000674... +
0.75524275427731632783741695322575081746604152078198191383... i

Open code

Polar coordinates:

- Exact form

$r \approx 6.26567$ (radius), $\theta \approx 6.92308°$ (angle)

Open code

6.26567 ≈ 2π

Series representations:

- More

$$2\sqrt{6\sqrt[13]{\frac{1}{\frac{1}{8}\coth^2\left(\frac{5\pi}{2}\right)\pi-\frac{4689}{11890}}}}=2\sqrt{6}\sqrt[26]{-\frac{1}{\frac{4689}{11890}-\frac{1}{8}\pi\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)^2}}$$

for $q = e^{(5\pi)/2}$

Open code

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$$2\sqrt{6\sqrt[13]{\frac{1}{\frac{1}{8}\coth^2\left(\frac{5\pi}{2}\right)\pi-\frac{4689}{11890}}}}=2\sqrt{6}\sqrt[26]{-\frac{1}{\frac{4689}{11890}-\frac{1}{8}\pi\left(1+2\sum_{k=0}^{\infty}e^{-5(1+k)\pi}\right)^2}}$$

Open code

$$2\sqrt{6\sqrt[13]{\frac{1}{\frac{1}{8}\coth^2\left(\frac{5\pi}{2}\right)\pi-\frac{4689}{11\,890}}}}=2\sqrt{6}\sqrt[26]{-\frac{1}{\frac{4689}{11\,890}-\frac{\left(2+100\sum_{k=1}^{\infty}\frac{1}{25+4k^2}\right)^2}{200\pi}}}$$

Open code

- More information

Integral representation:

$$2\sqrt{6\sqrt[13]{\frac{1}{\frac{1}{8}\coth^2\left(\frac{5\pi}{2}\right)\pi-\frac{4689}{11\,890}}}}=2\sqrt{6}\sqrt[26]{-\frac{1}{\frac{4689}{11\,890}-\frac{1}{8}\pi\left(\int_{\frac{i\pi}{2}}^{\frac{5\pi}{2}}\operatorname{csch}^2(t)\,dt\right)^2}}$$

Open code

- $\operatorname{csch}(x)$ is the hyperbolic cosecant function
-

From the formula (7), we have that:

$$(7)\quad \frac{1}{(1^2+2^2)(\sinh 3\pi-\sinh\pi)}+\frac{1}{(2^2+3^2)(\sinh 5\pi-\sinh\pi)}+\frac{1}{(3^2+4^2)(\sinh 7\pi-\sinh\pi)}+\ldots=\frac{1}{2\sinh\pi}\left(\frac{1}{\pi}+\coth\pi-\frac{\pi}{2}\tanh^2\frac{\pi}{2}\right).$$

1/(2sinhPi) (1/Pi+cothPi-Pi/2tanh^2Pi/2)

Input:

$$\frac{1}{2\sinh(\pi)}\left(\frac{1}{\pi}+\coth(\pi)-\frac{\pi}{2}\times\frac{\tanh^2(\pi)}{2}\right)$$

Open code

- $\sinh(x)$ is the hyperbolic sine function
- $\coth(x)$ is the hyperbolic cotangent function
- $\tanh(x)$ is the hyperbolic tangent function

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Exact result:

$$\frac{1}{2}\operatorname{csch}(\pi)\left(\frac{1}{\pi}-\frac{1}{4}\pi\tanh^2(\pi)+\coth(\pi)\right)$$

- $\operatorname{csch}(x)$ is the hyperbolic cosecant function

Decimal approximation:

- More digits

0.0234873466781021718117225612185847437753451329869960331 58...

Open code

Series representations:

- More

$$\frac{\frac{1}{\pi}+\coth(\pi)-\frac{\pi\tanh^2(\pi)}{2\times 2}}{2\sinh(\pi)}=\frac{\left(-1+\pi+16\left(\sum_{k=1}^{\infty}\frac{1}{5-4k+4k^2}\right)^2+2\pi\sum_{k=1}^{\infty}q^{2k}\right)\sum_{k=1}^{\infty}q^{-1+2k}}{\pi}$$

for $q=e^{\pi}$

Open code

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$$\frac{\frac{1}{\pi}+\coth(\pi)-\frac{\pi\tanh^2(\pi)}{2\times 2}}{2\sinh(\pi)}=-\frac{\left(1-16\left(\sum_{k=1}^{\infty}\frac{1}{5-4k+4k^2}\right)^2+\pi\sum_{k=-\infty}^{\infty}\frac{1}{\pi+k^2\pi}\right)\sum_{k=1}^{\infty}q^{-1+2k}}{\pi}$$

for $q=e^{\pi}$

Open code

$$\frac{\frac{1}{\pi}+\coth(\pi)-\frac{\pi\tanh^2(\pi)}{2\times 2}}{2\sinh(\pi)}=$$
$$\frac{\left(-8+\pi^2-8\sum_{k=1}^{\infty}\frac{1}{1+k^2}+4\pi^2\sum_{k=1}^{\infty}(-1)^k q^{2k}+4\pi^2\left(\sum_{k=1}^{\infty}(-1)^k q^{2k}\right)^2\right)\sum_{k=1}^{\infty}q^{-1+2k}}{4\pi}$$

for $q=e^{\pi}$

Open code

- More information

Integral representations:

$$\frac{\frac{1}{\pi}+\coth(\pi)-\frac{\pi\tanh^2(\pi)}{2\times 2}}{2\sinh(\pi)}=-\frac{-4+4\pi\int_{\frac{i\pi}{2}}^{\pi}\operatorname{csch}^2(t)\,dt+\pi^2\left(\int_0^{\pi}\operatorname{sech}^2(t)\,dt\right)^2}{8\pi^2\int_0^1\cosh(\pi t)\,dt}$$

Open code

$$\frac{\frac{1}{\pi}+\coth(\pi)-\frac{\pi\tanh^2(\pi)}{2\times 2}}{2\sinh(\pi)}=-\frac{i\left(-4+4\pi\int_{\frac{i\pi}{2}}^{\pi}\operatorname{csch}^2(t)\,dt+\pi^2\left(\int_0^{\pi}\operatorname{sech}^2(t)\,dt\right)^2\right)}{2\pi\sqrt{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(4s)+s}}{s^{3/2}}\,ds}\quad\text{for }\gamma>0$$

Open code

7 * 10 * 1/(2sinhPi) (1/Pi+cothPi-Pi/2tanh^2Pi/2)

Input:

$$7\times 10\times \frac{1}{2\sinh(\pi)}\left(\frac{1}{\pi}+\coth(\pi)-\frac{\pi}{2}\times\frac{\tanh^2(\pi)}{2}\right)$$

Open code

- $\sinh(x)$ is the hyperbolic sine function
- $\coth(x)$ is the hyperbolic cotangent function
- $\tanh(x)$ is the hyperbolic tangent function

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Exact result:

$$35\operatorname{csch}(\pi)\left(\frac{1}{\pi}-\frac{1}{4}\pi\tanh^2(\pi)+\coth(\pi)\right)$$

- $\operatorname{csch}(x)$ is the hyperbolic cosecant function

Decimal approximation:

- More digits

1.644114267467152026820579285300932064274159309089722321108...

Open code

1.64411426… ≈ ζ (2)

Series representations:

- More

$$\frac{7\times 10\left(\frac{1}{\pi}+\coth(\pi)-\frac{\tanh^2(\pi)\pi}{2\times 2}\right)}{2\sinh(\pi)}=\frac{70\left(-1+\pi+16\left(\sum_{k=1}^{\infty}\frac{1}{5-4k+4k^2}\right)^2+2\pi\sum_{k=1}^{\infty}q^{2k}\right)\sum_{k=1}^{\infty}q^{-1+2k}}{\pi}\quad\text{for } q=e^{\pi}$$

Open code

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$$\frac{7\times 10\left(\frac{1}{\pi}+\coth(\pi)-\frac{\tanh^2(\pi)\pi}{2\times 2}\right)}{2\sinh(\pi)}=-\frac{70\left(1-16\left(\sum_{k=1}^{\infty}\frac{1}{5-4k+4k^2}\right)^2+\pi\sum_{k=-\infty}^{\infty}\frac{1}{\pi+k^2\pi}\right)\sum_{k=1}^{\infty}q^{-1+2k}}{\pi}\quad\text{for } q=e^{\pi}$$

Open code

$$\frac{7\times 10\left(\frac{1}{\pi}+\coth(\pi)-\frac{\tanh^2(\pi)\pi}{2\times 2}\right)}{2\sinh(\pi)}=\frac{35\left(-8+\pi^2-8\sum_{k=1}^{\infty}\frac{1}{1+k^2}+4\pi^2\sum_{k=1}^{\infty}(-1)^k q^{2k}+4\pi^2\left(\sum_{k=1}^{\infty}(-1)^k q^{2k}\right)^2\right)\sum_{k=1}^{\infty}q^{-1+2k}}{2\pi}$$

$\text{for } q=e^{\pi}$

Open code

More information

Integral representations:

$$\frac{7\times 10\left(\frac{1}{\pi}+\coth(\pi)-\frac{\tanh^2(\pi)\pi}{2\times 2}\right)}{2\sinh(\pi)} = -\frac{35\left(-4+4\pi\int_{\frac{i\pi}{2}}^{\pi}\operatorname{csch}^2(t)\,dt+\pi^2\left(\int_0^{\pi}\operatorname{sech}^2(t)\,dt\right)^2\right)}{4\pi^2\int_0^1\cosh(\pi t)\,dt}$$

Open code

$$\frac{7\times 10\left(\frac{1}{\pi}+\coth(\pi)-\frac{\tanh^2(\pi)\pi}{2\times 2}\right)}{2\sinh(\pi)} = -\frac{35\,i\left(-4+4\pi\int_{\frac{i\pi}{2}}^{\pi}\operatorname{csch}^2(t)\,dt+\pi^2\left(\int_0^{\pi}\operatorname{sech}^2(t)\,dt\right)^2\right)}{\pi\sqrt{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(4s)+s}}{s^{3/2}}\,ds} \quad \text{for } \gamma>0$$

2*sqrt(((((((((6*((((((7 * 10 * 1/(2sinhPi) (1/Pi+cothPi-Pi/2tanh^2Pi/2)))))))))))))

Input:

$$2\sqrt{6\left(7\times 10\times\frac{1}{2\sinh(\pi)}\left(\frac{1}{\pi}+\coth(\pi)-\frac{\pi}{2}\times\frac{\tanh^2(\pi)}{2}\right)\right)}$$

Open code

- $\sinh(x)$ is the hyperbolic sine function
- $\coth(x)$ is the hyperbolic cotangent function
- $\tanh(x)$ is the hyperbolic tangent function

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Exact result:

$$2\sqrt{210\operatorname{csch}(\pi)\left(\frac{1}{\pi}-\frac{1}{4}\pi\tanh^2(\pi)+\coth(\pi)\right)}$$

- $\operatorname{csch}(x)$ is the hyperbolic cosecant function

Decimal approximation:

- More digits

6.281619410566963714168449994811026419474589553613741654166...

Open code

6.28161941... ≈ 2π

Series representations:

- More

$$2\sqrt{\frac{6\times 7\left(10\left(\frac{1}{\pi}+\coth(\pi)-\frac{\pi\tanh^2(\pi)}{2\times 2}\right)\right)}{2\sinh(\pi)}} = 4\sqrt{\frac{105}{\pi}}\sqrt{\left(\left(-1+\pi+16\left(\sum_{k=1}^{\infty}\frac{1}{5-4k+4k^2}\right)^2+2\pi\sum_{k=1}^{\infty}q^{2k}\right)\sum_{k=1}^{\infty}q^{-1+2k}\right)} \quad \text{for } q=e^{\pi}$$

Open code

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$$2\sqrt{\frac{6\times 7\left(10\left(\frac{1}{\pi}+\coth(\pi)-\frac{\pi\tanh^2(\pi)}{2\times 2}\right)\right)}{2\sinh(\pi)}} = 4\sqrt{\frac{105}{\pi}}\sqrt{\left(\left(-1+16\left(\sum_{k=1}^{\infty}\frac{1}{5-4k+4k^2}\right)^2-\pi\sum_{k=-\infty}^{\infty}\frac{1}{\pi+k^2\pi}\right)\sum_{k=1}^{\infty}q^{-1+2k}\right)} \quad \text{for } q=e^{\pi}$$

Open code

$$2\sqrt{\frac{6\times 7\left(10\left(\frac{1}{\pi}+\coth(\pi)-\frac{\pi\tanh^2(\pi)}{2\times 2}\right)\right)}{2\sinh(\pi)}} = 2\sqrt{\frac{105}{\pi}}\sqrt{\left(\left(-4+4\pi+\pi^2+8\pi\sum_{k=1}^{\infty}q^{2k}+4\pi^2\sum_{k=1}^{\infty}(-1)^k q^{2k}+4\pi^2\left(\sum_{k=1}^{\infty}(-1)^k q^{2k}\right)^2\right)\sum_{k=1}^{\infty}q^{-1+2k}\right)} \quad \text{for } q=e^{\pi}$$

Open code

Integral representations:

$$2\sqrt{\frac{6\times 7\left(10\left(\frac{1}{\pi}+\coth(\pi)-\frac{\pi\tanh^2(\pi)}{2\times 2}\right)\right)}{2\sinh(\pi)}} = 2\sqrt{-\frac{105\left(-4+4\pi\int_{\frac{i\pi}{2}}^{\pi}\operatorname{csch}^2(t)\,dt+\pi^2\left(\int_0^{\pi}\operatorname{sech}^2(t)\,dt\right)^2\right)}{2\pi^2\int_0^1\cosh(\pi t)\,dt}}$$

Open code

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$$2\sqrt{\frac{6\times 7\left(10\left(\frac{1}{\pi}+\coth(\pi)-\frac{\pi\tanh^2(\pi)}{2\times 2}\right)\right)}{2\sinh(\pi)}} =$$

$$2\sqrt{\frac{840\, i\left(\frac{1}{\pi}-\frac{\int_{i\pi}^{\pi}\operatorname{csch}^2(t)\,dt}{2}-\frac{1}{4}\pi\left(\int_0^{\pi}\operatorname{sech}^2(t)\,dt\right)^2\right)}{\sqrt{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(4s)+s}}{s^{3/2}}\,ds}} \quad \text{for } \gamma > 0$$

And:

(50Pi^2/7) * 1/(2sinhPi) (1/Pi+cothPi-Pi/2tanh^2Pi/2)

Input:

$$\left(50\times\frac{\pi^2}{7}\right)\times\frac{1}{2\sinh(\pi)}\left(\frac{1}{\pi}+\coth(\pi)-\frac{\pi}{2}\times\frac{\tanh^2(\pi)}{2}\right)$$

Open code

- $\sinh(x)$ is the hyperbolic sine function
- $\coth(x)$ is the hyperbolic cotangent function
- $\tanh(x)$ is the hyperbolic tangent function

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Exact result:

$$\frac{25}{7}\pi^2\operatorname{csch}(\pi)\left(\frac{1}{\pi}-\frac{1}{4}\pi\tanh^2(\pi)+\coth(\pi)\right)$$

- $\operatorname{csch}(x)$ is the hyperbolic cosecant function

Decimal approximation:

- More digits

1.655791572457919443570551528169123376166260519096828862910...

1.655791572…

We note that, the result 1,65579... is practically equal to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164{,}2696$ i.e. 1,65578...

Indeed:

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots \Rightarrow$$

$$\Rightarrow\left(50\times\frac{\pi^2}{7}\right)\times\frac{1}{2\sinh(\pi)}\left(\frac{1}{\pi}+\coth(\pi)-\frac{\pi}{2}\times\frac{\tanh^2(\pi)}{2}\right)$$

$= 1.65579\ldots$

Open code
Series representations:

- More

$$\frac{\left(\frac{1}{\pi}+\coth(\pi)-\frac{\pi\tanh^2(\pi)}{2\times 2}\right)50\pi^2}{(2\sinh(\pi))7} = \frac{50}{7}\pi\left(-1+\pi+16\left(\sum_{k=1}^{\infty}\frac{1}{5-4k+4k^2}\right)^2+2\pi\sum_{k=1}^{\infty}q^{2k}\right)\sum_{k=1}^{\infty}q^{-1+2k} \quad \text{for } q=e^{\pi}$$

Open code

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$$\frac{\left(\frac{1}{\pi}+\coth(\pi)-\frac{\pi\tanh^2(\pi)}{2\times 2}\right)50\pi^2}{(2\sinh(\pi))7} = -\frac{50}{7}\pi\left(1-16\left(\sum_{k=1}^{\infty}\frac{1}{5-4k+4k^2}\right)^2+\pi\sum_{k=-\infty}^{\infty}\frac{1}{\pi+k^2\pi}\right)\sum_{k=1}^{\infty}q^{-1+2k} \quad \text{for } q=e^{\pi}$$

Open code

$$\frac{\left(\frac{1}{\pi}+\coth(\pi)-\frac{\pi\tanh^2(\pi)}{2\times 2}\right)50\pi^2}{(2\sinh(\pi))7} = \frac{25}{14}\pi\left(-8+\pi^2-8\sum_{k=1}^{\infty}\frac{1}{1+k^2}+4\pi^2\sum_{k=1}^{\infty}(-1)^k q^{2k}+4\pi^2\left(\sum_{k=1}^{\infty}(-1)^k q^{2k}\right)^2\right)\sum_{k=1}^{\infty}q^{-1+2k} \quad \text{for } q=e^{\pi}$$

Open code

Integral representations:

$$\frac{\left(\frac{1}{\pi}+\coth(\pi)-\frac{\pi\tanh^2(\pi)}{2\times 2}\right)50\pi^2}{(2\sinh(\pi))7} = -\frac{25\left(-4+4\pi\int_{\frac{i\pi}{2}}^{\pi}\operatorname{csch}^2(t)\,dt+\pi^2\left(\int_0^{\pi}\operatorname{sech}^2(t)\,dt\right)^2\right)}{28\int_0^1\cosh(\pi t)\,dt}$$

Open code

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$$\frac{\left(\frac{1}{\pi}+\coth(\pi)-\frac{\pi\tanh^2(\pi)}{2\times 2}\right)50\pi^2}{(2\sinh(\pi))7} = -\frac{25i\pi\left(-4+4\pi\int_{\frac{i\pi}{2}}^{\pi}\operatorname{csch}^2(t)\,dt+\pi^2\left(\int_0^{\pi}\operatorname{sech}^2(t)\,dt\right)^2\right)}{7\sqrt{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(4s)+s}}{s^{3/2}}\,ds} \quad \text{for } \gamma>0$$

From the following formula (5), we obtain:

$$(5)\qquad \frac{1^5}{e^{2\pi}-1}\frac{1}{2500+1^4}+\frac{2^5}{e^{4\pi}-1}\frac{1}{2500+2^4}+\ldots=\frac{123826979}{6306456}-\frac{25\pi}{4}\coth^2 5\pi.$$

......

123826979/6306456 – 25Pi/4 * coth^2(5Pi)

Input:

$$\frac{123826979}{6306456} - 25\times\frac{\pi}{4}\coth^2(5\pi)$$

Open code

- $\coth(x)$ is the hyperbolic cotangent function

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Exact result:

$$\frac{123826979}{6306456} - \frac{25}{4}\pi\coth^2(5\pi)$$

Decimal approximation:

- More digits

$$7.9304736196295415678811036158483322376557529198598066\ldots\times 10^{-7}$$

Open code

Series representations:

- More

$$\frac{123826979}{6306456} - \frac{1}{4}\pi\, 25\coth^2(5\pi) = \frac{123826979}{6306456} - \frac{625}{4}\pi\left(\sum_{k=-\infty}^{\infty}\frac{1}{25\pi+k^2\pi}\right)^2$$

Open code

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$$\frac{123826979}{6306456} - \frac{1}{4}\pi\, 25\coth^2(5\pi) = \frac{-1576614+123826979\pi-157661400\sum_{k=1}^{\infty}\frac{1}{25+k^2}-3941535000\left(\sum_{k=1}^{\infty}\frac{1}{25+k^2}\right)^2}{6306456\pi}$$

Open code

$$\frac{123826979}{6306456} - \frac{1}{4}\pi\, 25\coth^2(5\pi) = \frac{123826979-39415350\pi-157661400\pi\sum_{k=1}^{\infty}q^{2k}-157661400\pi\left(\sum_{k=1}^{\infty}q^{2k}\right)^2}{6306456}$$

for $q = e^{5\pi}$

Open code

- More information

Integral representation:

$$\frac{123826979}{6306456} - \frac{1}{4}\pi\, 25\coth^2(5\pi) = \frac{123826979}{6306456} - \frac{25}{4}\pi\left(\int_{\frac{i\pi}{2}}^{5\pi}\operatorname{csch}^2(t)\,dt\right)^2$$

Open code

- $\operatorname{csch}(x)$ is the hyperbolic cosecant function

10^4 * (144+63+2)*(((((123826979/6306456 – 25Pi/4 * coth^2(5Pi)))))

Input:

$$10^4\,(144+63+2)\left(\frac{123826979}{6306456} - 25\times\frac{\pi}{4}\coth^2(5\pi)\right)$$

Open code

- $\coth(x)$ is the hyperbolic cotangent function

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Exact result:

$$2090000\left(\frac{123826979}{6306456} - \frac{25}{4}\pi\coth^2(5\pi)\right)$$

Decimal approximation:

- More digits

1.6574689865025741876871506557123014376700523602506995812 12...

Open code

1.6574689865... is a golden number very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164{,}2696$ i.e. 1,65578...

Series representations:

- More

$$10^4\,(144+63+2)\left(\frac{123826979}{6306456} - \frac{1}{4}\pi\, 25\coth^2(5\pi)\right) = \frac{32349798263750}{788307} - 326562500\pi\left(\sum_{k=-\infty}^{\infty}\frac{1}{25\pi + k^2\pi}\right)^2$$

Open code

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$$10^4\,(144+63+2)\left(\frac{123826979}{6306456} - \frac{1}{4}\pi\, 25\coth^2(5\pi)\right) = \frac{1}{788307\pi}261250\left(-1576614 + 123826979\pi - 157661400\sum_{k=1}^{\infty}\frac{1}{25+k^2} - 3941535000\left(\sum_{k=1}^{\infty}\frac{1}{25+k^2}\right)^2\right)$$

Open code

$$10^4(144+63+2)\left(\frac{123\,826\,979}{6\,306\,456}-\frac{1}{4}\pi\,25\coth^2(5\pi)\right) = -\frac{1}{788\,307}261\,250\left(-123\,826\,979+39\,415\,350\pi+157\,661\,400\pi\sum_{k=1}^{\infty}q^{2k}+157\,661\,400\pi\left(\sum_{k=1}^{\infty}q^{2k}\right)^2\right) \text{ for } q=e^{5\pi}$$

Open code

Integral representation:

$$10^4(144+63+2)\left(\frac{123\,826\,979}{6\,306\,456}-\frac{1}{4}\pi\,25\coth^2(5\pi)\right) = \frac{32\,349\,798\,263\,750}{788\,307}-13\,062\,500\pi\left(\int_{\frac{i\pi}{2}}^{5\pi}\operatorname{csch}^2(t)\,dt\right)^2$$

From the formula (4), we obtain:

......

$$(4)\quad \frac{1}{1^3}\left(\coth\pi x+x^2\coth\frac{\pi}{x}\right)+\frac{1}{2^3}\left(\coth 2\pi x+x^2\coth\frac{2\pi}{x}\right)+\frac{1}{3^3}\left(\coth 3\pi x+x^2\coth\frac{3\pi}{x}\right)+\ldots=\frac{\pi^3}{90x^3}(x^4+5x^2+1).$$

Pi^3/(90x^3) * (x^4+5x^2+1)

Input:

$$\frac{\pi^3}{90x^3}(x^4+5x^2+1)$$

Open code

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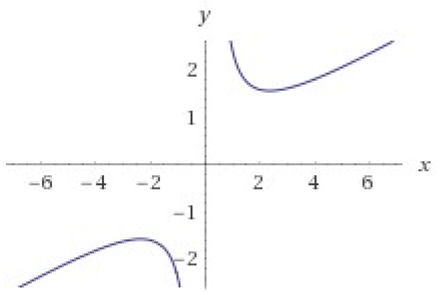
Result:

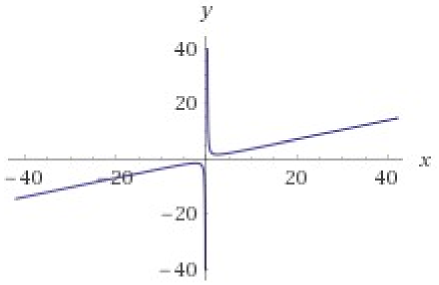
$$\frac{\pi^3(x^4+5x^2+1)}{90x^3}$$

Plots:



(x from -7 to 7)

Open code



(x from -42 to 42)

Complex roots:

- Approximate forms
- Step-by-step solution

$$x = -i\sqrt{\frac{1}{2}\left(5-\sqrt{21}\right)}$$

$$x = i\sqrt{\frac{1}{2}\left(5-\sqrt{21}\right)}$$

$$x = -i\sqrt{\frac{1}{2}\left(5+\sqrt{21}\right)}$$

$$x = i\sqrt{\frac{1}{2}\left(5+\sqrt{21}\right)}$$

Complex roots:

$x \approx -0.45685\, i$
$x \approx 0.45685\, i$
$x \approx -2.1889\, i$
$x \approx 2.1889\, i$

Derivative:

- Exact form
- Step-by-step solution

$$\frac{d}{dx}\left(\frac{\pi^3\left(x^4+5x^2+1\right)}{90x^3}\right) \approx \frac{0.344514\left(x^4-5x^2-3\right)}{x^4}$$

Open code

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Indefinite integral:

- Exact form
- Step-by-step solution

$$\int \frac{\pi^3\left(1+5x^2+x^4\right)}{90x^3}\,dx \approx \text{constant} + \frac{0.172257\left(x^4+10x^2\log(x)-1\right)}{x^2}$$

(assuming a complex-valued logarithm)

Open code

- $\log(x)$ is the natural logarithm

Local maximum:

- More digits
- Exact form
- Step-by-step solution

$$\max\left\{\frac{\pi^3\left(x^4+5x^2+1\right)}{90x^3}\right\} \approx -1.5692 \text{ at } x \approx -2.3540$$

Open code

Local minimum:

- More digits
- Exact form
- Step-by-step solution

$$\min\left\{\frac{\pi^3 (x^4 + 5 x^2 + 1)}{90 x^3}\right\} \approx 1.5692 \text{ at } x \approx 2.3540$$

Open code

Series representations:

$$\frac{\pi^3 (1 + 5 x^2 + x^4)}{90 x^3} = \sum_{n=-\infty}^{\infty} \left(\begin{cases} \frac{\pi^3}{90} & (n = -3 \text{ or } n = 1) \\ \frac{\pi^3}{18} & n = -1 \end{cases} \right) x^n$$

Open code

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$$\frac{\pi^3 (1 + 5 x^2 + x^4)}{90 x^3} = \sum_{n=-\infty}^{\infty} \left(\begin{cases} \frac{1}{180} (-1)^n (12 + 3 n + n^2) \pi^3 & n > 1 \\ \frac{1}{90} \left(1 + 5 (-1)^n + \frac{1}{2} (-1)^n (1 + n)(2 + n)\right) \pi^3 & (n = 0 \text{ or } n = 1) \end{cases} \right) (-1 + x)^n$$

Open code

- More information

Integral representations:

- More

$$\frac{(x^4 + 5 x^2 + 1) \pi^3}{90 x^3} = \frac{32 (1 + 5 x^2 + x^4) \left(\int_0^1 \sqrt{1 - t^2}\, dt\right)^3}{45 x^3}$$

Open code

$$\frac{(x^4 + 5 x^2 + 1) \pi^3}{90 x^3} = \frac{4 (1 + 5 x^2 + x^4) \left(\int_0^\infty \frac{1}{1+t^2}\, dt\right)^3}{45 x^3}$$

Open code

$$\frac{(x^4 + 5 x^2 + 1) \pi^3}{90 x^3} = \frac{4 (1 + 5 x^2 + x^4) \left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\, dt\right)^3}{45 x^3}$$

Open code

For x = 3, we have:

Pi^3/(90*3^3) * (3^4+5*3^2+1)

Input:

$$\frac{\pi^3}{90\times 3^3}\left(3^4+5\times 3^2+1\right)$$

Open code

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Result:

- Approximate form
- Step-by-step solution

$$\frac{127\,\pi^3}{2430}$$

Decimal approximation:

- More digits

1.620492649546533811640120170173612012626589155500991225167...

1.620492649… is a golden number, near to the golden ratio 1.61803398...

Open code

Property:

$$\frac{127\,\pi^3}{2430}\text{ is a transcendental number}$$

Open code

Series representations:

- More

$$\frac{\left(3^4+5\times 3^2+1\right)\pi^3}{90\times 3^3}=-\frac{2032\sum_{k=1}^{\infty}\frac{(-1)^k}{(-1+2k)^3}}{1215}$$

Open code

$$\frac{\left(3^4+5\times 3^2+1\right)\pi^3}{90\times 3^3}=\frac{4064\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^3}{1215}$$

Open code

$$\frac{\left(3^4+5\times 3^2+1\right)\pi^3}{90\times 3^3}=\frac{4064\left(\sum_{k=0}^{\infty}\frac{(-1)^{1+k}\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^3}{1215}$$

Open code

- More information

Integral representations:

- More

$$\frac{\left(3^4+5\times 3^2+1\right)\pi^3}{90\times 3^3}=\frac{4064\left(\int_0^1\sqrt{1-t^2}\,dt\right)^3}{1215}$$

Open code

$$\frac{(3^4+5\times 3^2+1)\pi^3}{90\times 3^3}=\frac{508\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^3}{1215}$$

Open code

$$\frac{(3^4+5\times 3^2+1)\pi^3}{90\times 3^3}=\frac{508\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt\right)^3}{1215}$$

Conclusion

From this work it is possible to highlight that using the mathematics of S. Ramanujan (various formulas and mainly the mock theta functions), and developing, according to our opinion and personal but correct interpretation, different equations of the aforementioned works by Witten et al, we obtain: like-particle solutions, ζ(2) = 1.6449 and values very close to it, solutions near or equal to the 14th root of Ramanujan's class invariant $Q=\left(G_{505}/G_{101/5}\right)^3$ = 1164,2696 i.e. 1,65578... and golden numbers, belonging to the range of the golden ratio and sometimes, the golden ratio itself. Furthermore, we obtain solutions very near to π and 2π, i.e. the circle length with radius equal to 1. This leads us to conclude that Ramanujan's mathematics is applicable in a fruitful way to the mathematical development of gauge theories, and therefore of string and that π and ϕ are fundamental mathematical constants that are always present in the forms of the microcosm and the macrocosm, therefore in quantum and relativistic physics, and, consequently, in gauge and string theories.

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