On the Ramanujan's equations applied to various sectors of Particle Physics and Cosmology: new possible mathematical connections. VI

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Abstract

In this research thesis, we have analyzed further Ramanujan formulas and described new possible mathematical connections with some sectors of Particle Physics and Cosmology

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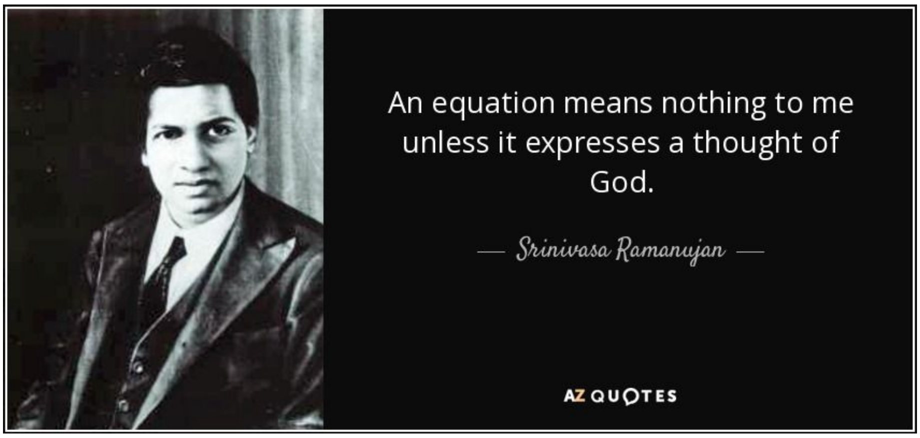
$1^3 + 12^3 = 9^3 + 10^3$

$9^3 + 10^3 = 12^3 + 1$

https://app.emaze.com/@AWOTQTCC#1



An equation means nothing to me unless it expresses a thought of God...

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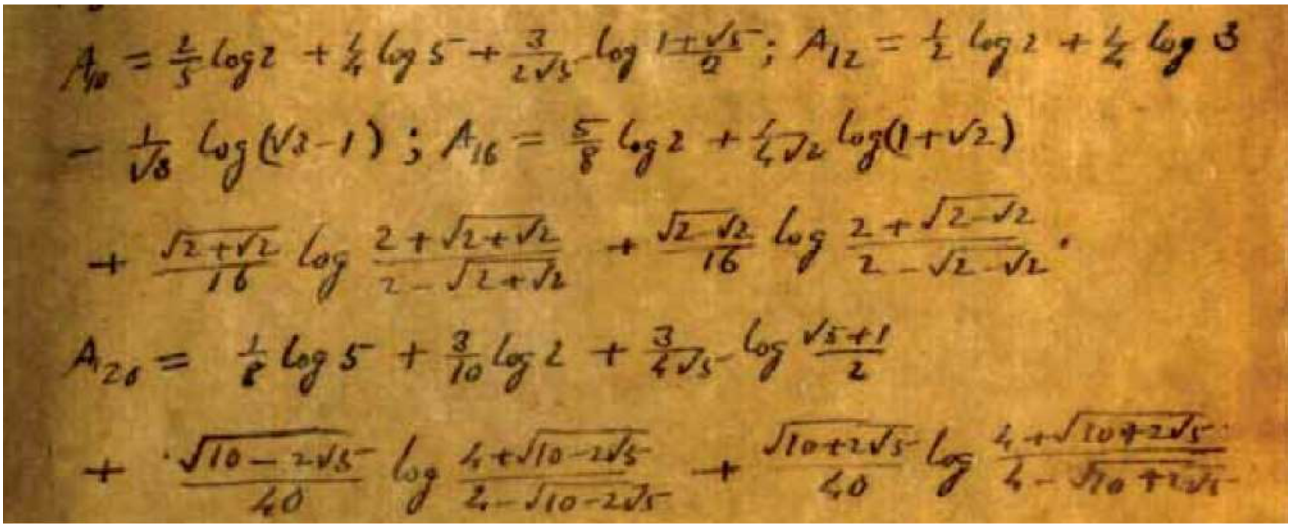
$$A_{10} = \frac{2}{5}\log 2 + \frac{1}{4}\log 5 + \frac{3}{2\sqrt{5}}\log\frac{1+\sqrt{5}}{2}; \quad A_{12} = \frac{1}{2}\log 2 + \frac{1}{4}\log 3 - \frac{1}{\sqrt{8}}\log(\sqrt{2}-1); \quad A_{16} = \frac{5}{8}\log 2 + \frac{1}{4\sqrt{2}}\log(1+\sqrt{2}) + \frac{\sqrt{2+\sqrt{2}}}{16}\log\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}} + \frac{\sqrt{2-\sqrt{2}}}{16}\log\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}.$$
$$A_{20} = \frac{1}{8}\log 5 + \frac{3}{10}\log 2 + \frac{3}{4\sqrt{5}}\log\frac{\sqrt{5}+1}{2} + \frac{\sqrt{10-2\sqrt{5}}}{40}\log\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}} + \frac{\sqrt{10+2\sqrt{5}}}{40}\log\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}$$

5/8 ln 2 + 1/(4sqrt2) ln(1+sqrt2) + 1/16(((2+sqrt2)^1/2))) ln ((((2+(2+sqrt2)^1/2))/((2-(2+sqrt2)^1/2)))) + 1/16(((2-sqrt2)^1/2)) * ln ((((2+(2-sqrt2)^1/2))/((2-(2-sqrt2)^1/2))))

5/8 ln 2 + 1/(4sqrt2) ln(1+sqrt2) + 1/16(((2+sqrt2)^1/2))) ln ((((2+(2+sqrt2)^1/2))/((2-(2+sqrt2)^1/2))))

Input:

$$\frac{5}{8}\log(2) + \frac{1}{4\sqrt{2}}\log\left(1+\sqrt{2}\right) + \frac{1}{16}\sqrt{2+\sqrt{2}}\,\log\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{5\log(2)}{8} + \frac{\log(1+\sqrt{2})}{4\sqrt{2}} + \frac{1}{16}\sqrt{2+\sqrt{2}}\,\log\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)$$

Decimal approximation:

0.962014464057704157221458732927823178593013107964709101166...

0.9620144640577… result very near to the spectral index n_s , to the mesonic Regge slope, to the inflaton value at the end of the inflation 0.9402 and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\dots}}}}\approx 0.9568666373$$

From:

Astronomy & Astrophysics manuscript no. ms c ESO 2019 - September 24, 2019
Planck 2018 results. VI. Cosmological parameters

The primordial fluctuations are consistent with Gaussian purely adiabatic scalar perturbations characterized by a power spectrum with a spectral index $n_s = 0.965 \pm 0.004$, consistent with the predictions of slow-roll, single-field, inflation.

We know that α' is the Regge slope (string tension). With regard the Omega mesons, the values are:

ω	6	$m_{u/d} = 0 - 60$	$0.910 - 0.918$
ω/ω_3	$5+3$	$m_{u/d} = 255 - 390$	$0.988 - 1.18$
ω/ω_3	$5+3$	$m_{u/d} = 240 - 345$	$0.937 - 1.000$

Alternate forms:

$$\frac{1}{16}\left(\log(1024)+2\sqrt{2}\sinh^{-1}(1)+2\sqrt{2+\sqrt{2}}\coth^{-1}\left(\sqrt{4-2\sqrt{2}}\right)\right)$$

$$\frac{1}{16}\left(10\log(2)+2\sqrt{2}\log\left(1+\sqrt{2}\right)+\sqrt{2+\sqrt{2}}\log\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)\right)$$

$$\frac{1}{16\sqrt{2}}\left(\sqrt{2\left(2+\sqrt{2}\right)}\log\left(-\frac{1}{\boxed{\text{root of } x^4-4x^2+2 \text{ near } x=1.84776}-2}\right)+\right.$$
$$\sqrt{2}\left(\sqrt{2+\sqrt{2}}\log\left(\boxed{\text{root of } x^4-4x^2+2 \text{ near } x=1.84776}+2\right)+10\log(2)\right)+$$
$$\left.4\log\left(1+\sqrt{2}\right)\right)$$

Alternative representations:

$$\frac{1}{8}\log(2)5+\frac{\log(1+\sqrt{2})}{4\sqrt{2}}+\frac{1}{16}\sqrt{2+\sqrt{2}}\log\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)=$$
$$\frac{5}{8}\log(a)\log_a(2)+\frac{\log(a)\log_a(1+\sqrt{2})}{4\sqrt{2}}+\frac{1}{16}\log(a)\log_a\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)\sqrt{2+\sqrt{2}}$$

$$\frac{1}{8}\log(2)5+\frac{\log(1+\sqrt{2})}{4\sqrt{2}}+\frac{1}{16}\sqrt{2+\sqrt{2}}\log\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)=$$
$$\frac{5\log_e(2)}{8}+\frac{\log_e(1+\sqrt{2})}{4\sqrt{2}}+\frac{1}{16}\log_e\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)\sqrt{2+\sqrt{2}}$$

$$\frac{1}{8}\log(2)5+\frac{\log(1+\sqrt{2})}{4\sqrt{2}}+\frac{1}{16}\sqrt{2+\sqrt{2}}\log\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)=$$
$$-\frac{5\,\mathrm{Li}_1(-1)}{8}-\frac{\mathrm{Li}_1(-\sqrt{2})}{4\sqrt{2}}-\frac{1}{16}\mathrm{Li}_1\left(1-\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)\sqrt{2+\sqrt{2}}$$

Series representations:

$$\frac{1}{8}\log(2)5+\frac{\log(1+\sqrt{2})}{4\sqrt{2}}+\frac{1}{16}\sqrt{2+\sqrt{2}}\log\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)=$$
$$\frac{5\log(2)}{8}+\frac{\log(2)}{8\sqrt{2}}+\frac{1}{16}\sqrt{2+\sqrt{2}}\log\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k 2^{-k/2}}{k}}{4\sqrt{2}}$$

$$\frac{1}{8}\log(2)5+\frac{\log(1+\sqrt{2})}{4\sqrt{2}}+\frac{1}{16}\sqrt{2+\sqrt{2}}\log\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)=$$
$$\frac{\log(2)}{8\sqrt{2}}+\frac{\log(1024)}{16}+\frac{1}{16}\sqrt{2+\sqrt{2}}\log\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k 2^{-k/2}}{k}}{4\sqrt{2}}$$

$$\frac{1}{8}\log(2)5+\frac{\log(1+\sqrt{2})}{4\sqrt{2}}+\frac{1}{16}\sqrt{2+\sqrt{2}}\log\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)=$$
$$\frac{\log(1024)}{16}+\frac{1}{16}\sqrt{2+\sqrt{2}}\log\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)+$$
$$\frac{\text{Res}_{s=0}\frac{2^{-s/2}\Gamma(-s)\Gamma(1+s)}{s}}{4\sqrt{2}}+\frac{\sum_{j=1}^{\infty}\text{Res}_{s=j}\frac{2^{-s/2}\Gamma(-s)\Gamma(1+s)}{s}}{4\sqrt{2}}$$

Integral representations:

$$\frac{1}{8}\log(2)5+\frac{\log(1+\sqrt{2})}{4\sqrt{2}}+\frac{1}{16}\sqrt{2+\sqrt{2}}\log\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)=$$
$$-\frac{i}{8\sqrt{2}\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{2^{-s/2}\Gamma(-s)^2\Gamma(1+s)}{\Gamma(1-s)}ds+\frac{5\log(2)}{8}+$$
$$\frac{1}{16}\sqrt{2+\sqrt{2}}\log\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)\quad\text{for } -1<\gamma<0$$

$$\frac{1}{8}\log(2)5+\frac{\log(1+\sqrt{2})}{4\sqrt{2}}+\frac{1}{16}\sqrt{2+\sqrt{2}}\log\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)=$$
$$\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(-\frac{5\,i\,\Gamma(-s)^2\Gamma(1+s)}{16\pi\Gamma(1-s)}-\frac{i\,2^{-7/2-s/2}\Gamma(-s)^2\Gamma(1+s)}{\pi\Gamma(1-s)}-\right.$$
$$\left.\frac{i\sqrt{2+\sqrt{2}}\left(-1+\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)^{-s}\Gamma(-s)^2\Gamma(1+s)}{32\pi\Gamma(1-s)}\right)ds\quad\text{for } -1<\gamma<0$$

$$\frac{1}{8}\log(2)\,5 + \frac{\log(1+\sqrt{2})}{4\sqrt{2}} + \frac{1}{16}\sqrt{2+\sqrt{2}}\,\log\left(\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right) =$$

$$\int_1^{\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}} \left(\frac{\dfrac{1}{4\left(1-\sqrt{2} - \dfrac{2-\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}-t}{1-\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}} + \dfrac{(1+\sqrt{2})\left(2-\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}-t\right)}{1-\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}}\right)} + \dfrac{5\left(1-\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}\right)}{8\left(2-\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}-t\right)}}{-1+\frac{2+\sqrt{2+\sqrt{2}}}{2-\sqrt{2+\sqrt{2}}}} + \frac{\sqrt{2+\sqrt{2}}}{16\,t} \right) dt$$

0.9620144640577 + 1/16(((2-sqrt2)^1/2)) * ln ((((2+(2-sqrt2)^1/2))/((2-(2-sqrt2)^1/2))))

Input interpretation:

$$0.9620144640577 + \frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)$$

log(x) is the natural logarithm

Result:

1.000588927172...

1.000588927172…

Alternative representations:

$$0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)=$$
$$0.96201446405770000+\frac{1}{16}\log_e\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\sqrt{2-\sqrt{2}}$$

$$0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)=$$
$$0.96201446405770000+\frac{1}{16}\log(a)\log_a\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\sqrt{2-\sqrt{2}}$$

$$0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)=$$
$$0.96201446405770000-\frac{1}{16}\operatorname{Li}_1\left(1-\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\sqrt{2-\sqrt{2}}$$

Series representations:

$$0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\;\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)=$$

$$0.06250000000000000\left(15.39223142492320+1.0000000000000000\log\left(\frac{2+\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}{2-\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}\right)\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right)$$

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

$$0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\;\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)=$$

$$0.06250000000000000\left(15.392231424923200+1.0000000000000000\log\left(\frac{2+\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}{2-\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}\right)\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right)$$

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

$$0.96201446405770000 + \frac{1}{16}\sqrt{2-\sqrt{2}}\ \log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right) = 0.06250000000000000$$

$$\left(15.392231424923200 + 1.0000000000000000\log\left(-1+\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\right.$$

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

$$1.0000000000000000$$

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

$$\left.\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{\sqrt{2-\sqrt{2}}}{-2+\sqrt{2-\sqrt{2}}}\right)^{-k}}{k}\right) \text{ for } (x \in \mathbb{R} \text{ and } x < 0)$$

Integral representations:

$$0.96201446405770000 + \frac{1}{16}\sqrt{2-\sqrt{2}}\ \log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right) =$$

$$0.9620144640577000 + 0.06250000000000000\sqrt{2-\sqrt{2}}\int_1^{\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}}\frac{1}{t}\,dt$$

$$0.96201446405770000 + \frac{1}{16}\sqrt{2-\sqrt{2}}\ \log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right) =$$

$$0.96201446405770000 + \frac{\sqrt{2-\sqrt{2}}}{32 i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)\left(-1+\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)^{-s}}{\Gamma(1-s)}\,ds$$

for $-1 < \gamma < 0$

1.000588927172 - 1/16(((2-sqrt2)^1/2)) * ln ((((2+(2-sqrt2)^1/2))/((2-(2-sqrt2)^1/2))))

Input interpretation:

$$1.000588927172 - \frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)$$

log(x) is the natural logarithm

Result:

0.9620144640577...

0.9620144640577... result very near to the spectral index n_s , to the mesonic Regge slope, to the inflaton value at the end of the inflation 0.9402 and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\frac{e^{-\pi}}{1+\frac{e^{-2\pi}}{1+\frac{e^{-3\pi}}{1+\frac{e^{-4\pi}}{1+\ldots}}}}\approx 0.9568666373$$

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Astronomy & Astrophysics manuscript no. ms c ESO 2019 - September 24, 2019

Planck 2018 results. VI. Cosmological parameters

The primordial fluctuations are consistent with Gaussian purely adiabatic scalar perturbations characterized by a power spectrum with a spectral index n_s = 0.965 ± 0.004, consistent with the predictions of slow-roll, single-field, inflation.

We know that α' is the Regge slope (string tension). With regard the Omega mesons, the values are:

ω	6	$m_{u/d} = 0 - 60$	$0.910 - 0.918$
ω/ω_3	$5+3$	$m_{u/d} = 255 - 390$	$0.988 - 1.18$

$$\omega/\omega_3 \mid 5+3 \mid m_{u/d} = 240 - 345 \mid 0.937 - 1.000$$

Alternative representations:

$$1.0005889271720000 - \frac{1}{16}\sqrt{2-\sqrt{2}}\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right) = 1.0005889271720000 - \frac{1}{16}\log_e\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\sqrt{2-\sqrt{2}}$$

$$1.0005889271720000 - \frac{1}{16}\sqrt{2-\sqrt{2}}\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right) = 1.0005889271720000 - \frac{1}{16}\log(a)\log_a\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\sqrt{2-\sqrt{2}}$$

$$1.0005889271720000 - \frac{1}{16}\sqrt{2-\sqrt{2}}\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right) = 1.0005889271720000 + \frac{1}{16}\text{Li}_1\left(1-\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\sqrt{2-\sqrt{2}}$$

Series representations:

$$1.0005889271720000 - \frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right) =$$

$$-0.06250000000000000\left(-16.00942283475200 + 1.000000000000000\,\log\left(\frac{2+\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}{2-\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}\right)\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right)$$

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

$$1.0005889271720000 - \frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right) =$$

$$-0.06250000000000000\left(-16.009422834752000 + 1.0000000000000000\,\log\left(\frac{2+\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}{2-\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}\right)\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right)$$

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

$$1.0005889271720000-\frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)=-0.0625000000000000$$

$$\left(-16.009422834752000+1.0000000000000000\log\left(-1+\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\right.$$

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

$$1.0000000000000000\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\left.\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{\sqrt{2-\sqrt{2}}}{-2+\sqrt{2-\sqrt{2}}}\right)^{-k}}{k}\right)\text{ for }(x\in\mathbb{R}\text{ and }x<0)$$

Integral representations:

$$1.0005889271720000-\frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)=$$

$$1.0005889271720000-0.0625000000000000\sqrt{2-\sqrt{2}}\int_1^{\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}}\frac{1}{t}\,dt$$

$$1.0005889271720000-\frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)=1.0005889271720000-$$

$$\frac{\sqrt{2-\sqrt{2}}}{32\,i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)\left(-1+\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)^{-s}}{\Gamma(1-s)}\,ds\quad\text{for }-1<\gamma<0$$

1/(((0.9620144640577 + 1/16(((2-sqrt2)^1/2)) * ln ((((2+(2-sqrt2)^1/2))/((2-(2-sqrt2)^1/2)))))))^16

Input interpretation:

$$\frac{1}{\left(0.9620144640577+\frac{1}{16}\sqrt{2-\sqrt{2}}\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\right)^{16}}$$

log(x) is the natural logarithm

Result:

0.990624168625...

0.990624168625…. result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1}=1-\cfrac{e^{-\pi\sqrt{5}}}{1+\cfrac{e^{-2\pi\sqrt{5}}}{1+\cfrac{e^{-3\pi\sqrt{5}}}{1+\cfrac{e^{-4\pi\sqrt{5}}}{1+\ldots}}}}\approx 0.9991104684$$

and to the dilaton value $\mathbf{0.989117352243}=\boldsymbol{\phi}$ (see Appendix)

Alternative representations:

$$\frac{1}{\left(0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\right)^{16}}=\frac{1}{\left(0.96201446405770000+\frac{1}{16}\log_e\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\sqrt{2-\sqrt{2}}\right)^{16}}$$

$$\frac{1}{\left(0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\right)^{16}}=\frac{1}{\left(0.96201446405770000+\frac{1}{16}\log(a)\log_a\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\sqrt{2-\sqrt{2}}\right)^{16}}$$

$$\frac{1}{\left(0.96201446405770000 + \frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\right)^{16}} = \frac{1}{\left(0.96201446405770000 - \frac{1}{16}\,\text{Li}_1\left(1-\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\sqrt{2-\sqrt{2}}\right)^{16}}$$

Series representations:

$$\frac{1}{\left(0.96201446405770000 + \frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\right)^{16}} =$$

$$1.8446744073710\times 10^{19} \Bigg/ \left(15.39223142492320 + 1.000000000000000 \log\left(\frac{2+\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}{2-\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}\right) \sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right)^{16}$$

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

$$\frac{1}{\left(0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\right)^{16}} =$$

$$1.8446744073710\times 10^{19} \Big/ \left(15.39223142492320 + 1.000000000000000 \log\left(\frac{2+\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}{2-\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}\right) \sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right)^{16}$$

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

$$\frac{1}{\left(0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\right)^{16}} =$$

$$1.8446744073710\times 10^{19} \Big/ \left(15.3922314249232 + 1.00000000000000 \log\left(-1+\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right) \sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}} - 1.00000000000000 \sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}} \sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{\sqrt{2-\sqrt{2}}}{-2+\sqrt{2-\sqrt{2}}}\right)^{-k}}{k}\right)^{16}$$

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

8 * 1/(((log base 0.990624168625 ((1/(((0.9620144640577 + 1/16(((2-sqrt2)^1/2)) * ln ((((2+(2-sqrt2)^1/2))/((2-(2-sqrt2)^1/2)))))))))))-Pi+1/golden ratio

Input interpretation:

$$8\times\frac{1}{\log_{0.990624168625}\left(\frac{1}{0.9620144640577+\frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)}\right)}-\pi+\frac{1}{\phi}$$

log(x) is the natural logarithm

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

ϕ is the golden ratio

Result:

125.4764413...

125.4764413…. result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 (see Appendix)

Alternative representations:

$$\frac{8}{\log_{0.9906241686250000}\left(\frac{1}{0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)}\right)}-\pi+\frac{1}{\phi}=$$

$$-\pi+\frac{1}{\phi}+\frac{8}{\log_{0.9906241686250000}\left(\frac{1}{0.96201446405770000+\frac{1}{16}\log_e\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\sqrt{2-\sqrt{2}}}\right)}$$

$$\frac{8}{\log_{0.9906241686250000}\left(\frac{1}{0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)}\right)}-\pi+\frac{1}{\phi}=$$

$$-\pi+\frac{1}{\phi}+\frac{8}{\frac{\log\left(\frac{1}{0.96201446405770000+\frac{1}{16}\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\sqrt{2-\sqrt{2}}}\right)}{\log(0.9906241686250000)}}$$

$$\frac{8}{\log_{0.9906241686250000}\left(\frac{1}{0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)}\right)}-\pi+\frac{1}{\phi}=$$

$$-\pi+\frac{1}{\phi}+\frac{8}{\log_{0.9906241686250000}\left(\frac{1}{0.96201446405770000+\frac{1}{16}\log(a)\log_a\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\sqrt{2-\sqrt{2}}}\right)}$$

Series representations:

$$\frac{8}{\log_{0.9906241686250000}\left(\frac{1}{0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)}\right)}-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi-\frac{8\log(0.9906241686250000)}{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{16.000000000000000}{15.392231424923200+\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\sqrt{2-\sqrt{2}}}\right)^k}{k}}$$

$$\frac{8}{\log_{0.9906241686250000}\left(\frac{1}{0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)}\right)}-\pi+\frac{1}{\phi}=$$

$$-\Bigg(\Bigg(-8\,\phi-\log_{0.9906241686250000}\Bigg(1\Big/\Bigg(0.96201446405770000+\frac{1}{16}\sqrt{2-\exp\left(i\,\pi\left\lfloor\frac{\arg(2-x)}{2\,\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k\,(2-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\left(\log\left(-1+\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{\sqrt{2-\sqrt{2}}}{-2+\sqrt{2-\sqrt{2}}}\right)^{-k}}{k}\right)\Bigg)\Bigg)+$$

$$\phi\,\pi\,\log_{0.9906241686250000}\Bigg(1\Big/\Bigg(0.96201446405770000+\frac{1}{16}\sqrt{2-\exp\left(i\,\pi\left\lfloor\frac{\arg(2-x)}{2\,\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k\,(2-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\left(\log\left(-1+\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{\sqrt{2-\sqrt{2}}}{-2+\sqrt{2-\sqrt{2}}}\right)^{-k}}{k}\right)\Bigg)\Bigg)\Bigg)\Big/$$

$$\Bigg(\phi\,\log_{0.9906241686250000}\Bigg(1\Big/\Bigg(0.96201446405770000+\frac{1}{16}\sqrt{2-\exp\left(i\,\pi\left\lfloor\frac{\arg(2-x)}{2\,\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k\,(2-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\left(\log\left(-1+\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{\sqrt{2-\sqrt{2}}}{-2+\sqrt{2-\sqrt{2}}}\right)^{-k}}{k}\right)\Bigg)\Bigg)\Bigg)\Bigg)\quad\text{for } (x\in\mathbb{R}\text{ and } x<0)$$

$$\frac{8}{\log_{0.9906241686250000}\left(\frac{1}{0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)}\right)}-\pi+\frac{1}{\phi}=$$

$$-\left(\left(-8\,\phi-\log_{0.9906241686250000}\left(1\Big/\left(0.96201446405770000+\frac{1}{16}\left(\log\left(-1+\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{\sqrt{2-\sqrt{2}}}{-2+\sqrt{2-\sqrt{2}}}\right)^{-k}}{k}\right)\sqrt{\left(2-\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}z_0^{1/2(1+\lfloor\arg(2-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)}\right)\right)+\right.\right.$$

$$\left.\phi\,\pi\log_{0.9906241686250000}\left(1\Big/\left(0.96201446405770000+\frac{1}{16}\left(\log\left(-1+\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{\sqrt{2-\sqrt{2}}}{-2+\sqrt{2-\sqrt{2}}}\right)^{-k}}{k}\right)\sqrt{\left(2-\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}z_0^{1/2(1+\lfloor\arg(2-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)}\right)\right)\right)\Big/$$

$$\left.\left(\phi\log_{0.9906241686250000}\left(1\Big/\left(0.96201446405770000+\frac{1}{16}\left(\log\left(-1+\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{\sqrt{2-\sqrt{2}}}{-2+\sqrt{2-\sqrt{2}}}\right)^{-k}}{k}\right)\sqrt{\left(2-\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}z_0^{1/2(1+\lfloor\arg(2-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)}\right)\right)\right)\right)$$

Integral representations:

$$\frac{8}{\log_{0.9906241686250000}\left(\frac{1}{0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)}\right)}-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi+\frac{8}{\log_{0.9906241686250000}\left(\frac{16.000000000000000}{15.392231424923200+\sqrt{2-\sqrt{2}}\int_1^{\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}}\frac{1}{t}\,dt}\right)}$$

$$\frac{8}{\log_{0.9906241686250000}\left(\frac{1}{0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)}\right)}-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi+8\Bigg/\log_{0.9906241686250000}\left(\frac{1}{0.96201446405770000+\frac{\sqrt{2-\sqrt{2}}}{32\,i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)\left(-1+\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)^{-s}}{\Gamma(1-s)}\,ds}\right)$$

for $-1<\gamma<0$

1/8 ln 5 + 3/10 ln 2 + 3/(4sqrt5) ln ((sqrt5+1)/2)

Input:

$$\frac{1}{8}\log(5)+\frac{3}{10}\log(2)+\frac{3}{4\sqrt{5}}\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)$$

log(x) is the natural logarithm

Exact result:

$$\frac{3\log(2)}{10}+\frac{\log(5)}{8}+\frac{3\log\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)}{4\sqrt{5}}$$

Decimal approximation:

0.570527246083747654233802015447203459897564215544249912009...

0.57052724608…

Alternate forms:

$$\frac{1}{40}\left(\log(12\,800\,000)+6\sqrt{5}\ \operatorname{csch}^{-1}(2)\right)$$

$$\frac{3\log(2)}{10}+\frac{\log(5)}{8}+\frac{3\operatorname{csch}^{-1}(2)}{4\sqrt{5}}$$

$$\frac{1}{40}\left(5\log(5)+\log(4096)+6\sqrt{5}\ \log\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)\right)$$

Alternative representations:

$$\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}=$$
$$\frac{1}{8}\log(a)\log_a(5)+\frac{3}{10}\log(a)\log_a(2)+\frac{3\log(a)\log_a\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)}{4\sqrt{5}}$$

$$\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}=\frac{\log_e(5)}{8}+\frac{3\log_e(2)}{10}+\frac{3\log_e\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)}{4\sqrt{5}}$$

$$\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}=$$
$$-\frac{\operatorname{Li}_1(-4)}{8}-\frac{3\operatorname{Li}_1(-1)}{10}-\frac{3\operatorname{Li}_1\left(1+\frac{1}{2}\left(-1-\sqrt{5}\right)\right)}{4\sqrt{5}}$$

Series representations:

$$\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}=$$
$$\frac{17}{20}i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\frac{3i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor}{2\sqrt{5}}+\frac{17\log(z_0)}{40}+\frac{3\log(z_0)}{4\sqrt{5}}+$$
$$\sum_{k=1}^{\infty}-\frac{(-1)^k\left(12(2-z_0)^k+5(5-z_0)^k+6\sqrt{5}\left(\frac{1}{2}\left(1+\sqrt{5}\right)-z_0\right)^k\right)z_0^{-k}}{40k}$$

$$\frac{\log(5)}{8} + \frac{1}{10}\log(2)\,3 + \frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}} = \frac{3}{5}\,i\,\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor + \frac{1}{4}\,i\,\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor + \frac{3\,i\,\pi\left\lfloor\frac{\arg\left(\frac{1}{2}\left(1+\sqrt{5}\right)-x\right)}{2\pi}\right\rfloor}{2\sqrt{5}} + \frac{17\log(x)}{40} + \frac{3\log(x)}{4\sqrt{5}} + \sum_{k=1}^{\infty} -\frac{(-1)^k\left(12\,(2-x)^k + 5\,(5-x)^k + 6\sqrt{5}\left(\frac{1}{2}\left(1+\sqrt{5}\right)-x\right)^k\right)x^{-k}}{40\,k} \quad \text{for } x < 0$$

$$\frac{\log(5)}{8} + \frac{1}{10}\log(2)\,3 + \frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}} = \frac{3}{10}\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right) + \frac{1}{8}\left\lfloor\frac{\arg(5-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right) + \frac{3\left\lfloor\frac{\arg\left(\frac{1}{2}\left(1+\sqrt{5}\right)-z_0\right)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)}{4\sqrt{5}} + \frac{17\log(z_0)}{40} + \frac{3\log(z_0)}{4\sqrt{5}} + \frac{3}{10}\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\log(z_0) + \frac{1}{8}\left\lfloor\frac{\arg(5-z_0)}{2\pi}\right\rfloor\log(z_0) + \frac{3\left\lfloor\frac{\arg\left(\frac{1}{2}\left(1+\sqrt{5}\right)-z_0\right)}{2\pi}\right\rfloor\log(z_0)}{4\sqrt{5}} + \sum_{k=1}^{\infty} -\frac{(-1)^k\left(12\,(2-z_0)^k + 5\,(5-z_0)^k + 6\sqrt{5}\left(\frac{1}{2}\left(1+\sqrt{5}\right)-z_0\right)^k\right)z_0^{-k}}{40\,k}$$

Integral representations:

$$\frac{\log(5)}{8} + \frac{1}{10}\log(2)\,3 + \frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}} = \int_1^{\frac{1}{2}\left(1+\sqrt{5}\right)} \frac{-90 + 48\sqrt{5} - \left(9 + 47\sqrt{5}\right)t + 4\left(17 + 6\sqrt{5}\right)t^2}{10\,t\left(-3 + \sqrt{5} + 2\,t\right)\left(-9 + \sqrt{5} + 8\,t\right)}\,dt$$

$$\frac{\log(5)}{8} + \frac{1}{10}\log(2)\,3 + \frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}} = \int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\left(-\frac{3\,i\,\Gamma(-s)^2\,\Gamma(1+s)}{20\,\pi\,\Gamma(1-s)} - \frac{i\,4^{-2-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\pi\,\Gamma(1-s)} - \frac{3\,i\left(-1 + \frac{1}{2}\left(1+\sqrt{5}\right)\right)^{-s}\Gamma(-s)^2\,\Gamma(1+s)}{8\sqrt{5}\,\pi\,\Gamma(1-s)}\right)ds \quad \text{for } -1 < \gamma < 0$$

1/40*sqrt(10-2sqrt5) ln ((((((4+sqrt(10-2sqrt5))/(4-sqrt(10-2sqrt5))))))) + 1/40*sqrt(10+2sqrt5) ln ((((4+sqrt(10+2sqrt5))/(4-sqrt(10+2sqrt5))))

Input:

$$\frac{1}{40}\sqrt{10-2\sqrt{5}}\ \log\left(\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)+\frac{1}{40}\sqrt{10+2\sqrt{5}}\ \log\left(\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}\right)$$

log(x) is the natural logarithm

Decimal approximation:

0.429773917801358845066792189915639095406723478805627468837...

0.429773917801…

Alternate forms:

$$\frac{1}{20}\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}\ \log\left(11-4\sqrt{5}+2\sqrt{2\left(25-11\sqrt{5}\right)}\right)+\frac{1}{20}\sqrt{\frac{1}{2}\left(5+\sqrt{5}\right)}\ \log\left(11+4\sqrt{5}+2\sqrt{2\left(25+11\sqrt{5}\right)}\right)$$

$$\frac{1}{40}\left(\sqrt{10-2\sqrt{5}}\ \log\left(\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)+\sqrt{2\left(5+\sqrt{5}\right)}\ \log\left(\frac{4+\sqrt{2\left(5+\sqrt{5}\right)}}{4-\sqrt{2\left(5+\sqrt{5}\right)}}\right)\right)$$

$$\frac{\sqrt{5-\sqrt{5}}\ \log\left(\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)+\sqrt{5+\sqrt{5}}\ \log\left(\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}\right)}{20\sqrt{2}}$$

Alternative representations:

$$\frac{1}{40}\sqrt{10-2\sqrt{5}}\ \log\left(\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)+\frac{1}{40}\sqrt{10+2\sqrt{5}}\ \log\left(\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}\right)=\frac{1}{40}\log(a)\log_a\left(\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)\sqrt{10-2\sqrt{5}}+\frac{1}{40}\log(a)\log_a\left(\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}\right)\sqrt{10+2\sqrt{5}}$$

$$\frac{1}{40}\sqrt{10-2\sqrt{5}}\ \log\left(\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)+\frac{1}{40}\sqrt{10+2\sqrt{5}}\ \log\left(\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}\right)=\frac{1}{40}\log_e\left(\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)\sqrt{10-2\sqrt{5}}+\frac{1}{40}\log_e\left(\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}\right)\sqrt{10+2\sqrt{5}}$$

$$\frac{1}{40}\sqrt{10-2\sqrt{5}}\,\log\left(\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)+\frac{1}{40}\sqrt{10+2\sqrt{5}}\,\log\left(\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}\right)=$$
$$-\frac{1}{40}\,\mathrm{Li}_1\left(1-\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)\sqrt{10-2\sqrt{5}}-$$
$$\frac{1}{40}\,\mathrm{Li}_1\left(1-\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}\right)\sqrt{10+2\sqrt{5}}$$

Series representations:

$$\frac{1}{40}\sqrt{10-2\sqrt{5}}\,\log\left(\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)+\frac{1}{40}\sqrt{10+2\sqrt{5}}\,\log\left(\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}\right)=$$
$$\frac{1}{40}\sqrt{10-2\sqrt{5}}\,\log\left(-1+\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)+$$
$$\frac{1}{40}\sqrt{10+2\sqrt{5}}\,\log\left(-1+\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}\right)+$$
$$\sum_{k=1}^{\infty}\left(\frac{(-1)^{-1+k}\sqrt{10-2\sqrt{5}}\left(-1+\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)^{-k}}{40\,k}+\frac{(-1)^{-1+k}\sqrt{10+2\sqrt{5}}\left(-1+\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}\right)^{-k}}{40\,k}\right)$$

$$\frac{1}{40}\sqrt{10-2\sqrt{5}}\,\log\left(\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)+\frac{1}{40}\sqrt{10+2\sqrt{5}}\,\log\left(\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}\right)=$$
$$\frac{1}{20}\,i\sqrt{10-2\sqrt{5}}\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+$$
$$\frac{1}{20}\,i\sqrt{10+2\sqrt{5}}\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\frac{1}{40}\sqrt{10-2\sqrt{5}}\,\log(z_0)+$$
$$\frac{1}{40}\sqrt{10+2\sqrt{5}}\,\log(z_0)+\sum_{k=1}^{\infty}\left(\frac{(-1)^{-1+k}\sqrt{10-2\sqrt{5}}\left(\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}-z_0\right)^k z_0^{-k}}{40\,k}+\right.$$
$$\left.\frac{(-1)^{-1+k}\sqrt{10+2\sqrt{5}}\left(\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}-z_0\right)^k z_0^{-k}}{40\,k}\right)$$

$$\frac{1}{40}\sqrt{10-2\sqrt{5}}\,\log\left(\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)+\frac{1}{40}\sqrt{10+2\sqrt{5}}\,\log\left(\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}\right)=$$
$$\frac{1}{20}\,i\sqrt{10-2\sqrt{5}}\,\pi\left\lfloor\frac{\arg\left(\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}-x\right)}{2\pi}\right\rfloor+$$
$$\frac{1}{20}\,i\sqrt{10+2\sqrt{5}}\,\pi\left\lfloor\frac{\arg\left(\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}-x\right)}{2\pi}\right\rfloor+\frac{1}{40}\sqrt{10-2\sqrt{5}}\,\log(x)+$$
$$\frac{1}{40}\sqrt{10+2\sqrt{5}}\,\log(x)+\sum_{k=1}^{\infty}\left(\frac{(-1)^{-1+k}\sqrt{10-2\sqrt{5}}\left(\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}-x\right)^k x^{-k}}{40\,k}+\right.$$
$$\left.\frac{(-1)^{-1+k}\sqrt{10+2\sqrt{5}}\left(\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}-x\right)^k x^{-k}}{40\,k}\right)\quad \text{for } x<0$$

Integral representations:

$$\frac{1}{40}\sqrt{10-2\sqrt{5}}\log\left(\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)+\frac{1}{40}\sqrt{10+2\sqrt{5}}\log\left(\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}\right)=$$

$$\int_1^{\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}}\left(\frac{\sqrt{10-2\sqrt{5}}}{40t}+\frac{\sqrt{10+2\sqrt{5}}\left(1-\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)\left(-1+\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}\right)}{40\left(-1+\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)\left(-\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}+\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}+t-\frac{\left(4+\sqrt{10+2\sqrt{5}}\right)t}{4-\sqrt{10+2\sqrt{5}}}\right)}\right)dt$$

$$\frac{1}{40}\sqrt{10-2\sqrt{5}}\log\left(\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)+\frac{1}{40}\sqrt{10+2\sqrt{5}}\log\left(\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}\right)=$$

$$\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(-\frac{i\sqrt{10-2\sqrt{5}}\left(-1+\frac{4+\sqrt{10-2\sqrt{5}}}{4-\sqrt{10-2\sqrt{5}}}\right)^{-s}\Gamma(-s)^2\,\Gamma(1+s)}{80\pi\,\Gamma(1-s)}-\frac{i\sqrt{10+2\sqrt{5}}\left(-1+\frac{4+\sqrt{10+2\sqrt{5}}}{4-\sqrt{10+2\sqrt{5}}}\right)^{-s}\Gamma(-s)^2\,\Gamma(1+s)}{80\pi\,\Gamma(1-s)}\right)ds \quad \text{for } -1<\gamma<0$$

1/8 ln 5 + 3/10 ln 2 + 3/(4sqrt5) ln ((sqrt5+1)/2) + 0.429773917801358845066

Input interpretation:

$$\frac{1}{8}\log(5)+\frac{3}{10}\log(2)+\frac{3}{4\sqrt{5}}\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)+0.429773917801358845066$$

log(x) is the natural logarithm

Result:

1.00030116388851064993...

1.00030116388…

Alternative representations:

$$\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.429773917801358845060000 = 0.429773917801358845060000+\frac{1}{8}\log(a)\log_a(5)+\frac{3}{10}\log(a)\log_a(2)+\frac{3\log(a)\log_a\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)}{4\sqrt{5}}$$

$$\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.429773917801358845060000 = 0.429773917801358845060000+\frac{\log_e(5)}{8}+\frac{3\log_e(2)}{10}+\frac{3\log_e\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)}{4\sqrt{5}}$$

$$\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.429773917801358845060000 = 0.429773917801358845060000-\frac{\mathrm{Li}_1(-4)}{8}-\frac{3\,\mathrm{Li}_1(-1)}{10}-\frac{3\,\mathrm{Li}_1\left(1+\frac{1}{2}\left(-1-\sqrt{5}\right)\right)}{4\sqrt{5}}$$

Series representations:

$$\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.429773917801358845060000 = \frac{1}{\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}}\,0.3000000000000000000000\left(2.500000000000000000000\log\left(\frac{1}{2}\left(1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)\right)+1.432579726004529483533\,3\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+1.000000000000000000000\log(2)\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+0.4166666666666666666667\log(5)\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{\log(5)}{8} + \frac{1}{10}\log(2)\,3 + \frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}} + 0.429773917801358845060000 =$$

$$\left(0.300000000000000000000\left(2.500000000000000000000 \log\left(\frac{1}{2}\left(1+\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k (5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right) + 1.432579726004529483533 3\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k (5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!} + 1.000000000000000000000 \exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\log(2)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k (5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!} + 0.4166666666666666666667\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\log(5)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k (5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right) \Big/ \left(\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k (5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

$$\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.429773917801358845060000=$$

$$\left(0.3000000000000000000000\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}z_0^{-1/2-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}\left(2.500000000000000000000\log\left(\frac{1}{2}\left(1+\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}z_0^{1/2(1+\lfloor\arg(5-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right)+1.432579726004529483533\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}z_0^{1/2+1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+1.000000000000000000000\log(2)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}z_0^{1/2+1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+0.4166666666666666666667\log(5)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}z_0^{1/2+1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right)\Bigg/\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)$$

Integral representations:

$$\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.429773917801358845060000=0.429773917801358845060000+\int_1^2\left(\frac{3}{10t}+\frac{1}{2(-3+4t)}+\frac{3\left(-1+\frac{1}{2}\left(1+\sqrt{5}\right)\right)}{4\sqrt{5}\left(2-t+\frac{1}{2}\left(-1-\sqrt{5}\right)+\frac{1}{2}t\left(1+\sqrt{5}\right)\right)}\right)dt$$

$$\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.429773917801358845060000=0.429773917801358845060 6+\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{1}{i\pi\,\Gamma(1-s)\sqrt{5}}\,4^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)\left(-1+\sqrt{5}\right)^{-s}\left(0.37500000000000000\times 8^s+\left(0.06250000000000000+0.15000000000000000\times 4^s\right)\left(-1+\sqrt{5}\right)^s\sqrt{5}\right)ds\quad\text{for }-1<\gamma<0$$

1/[1/8 ln 5 + 3/10 ln 2 + 3/(4sqrt5) ln ((sqrt5+1)/2) + 0.42977391780135884506]^32

Input interpretation:

$$\frac{1}{\left(\frac{1}{8}\log(5)+\frac{3}{10}\log(2)+\frac{3}{4\sqrt{5}}\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)+0.42977391780135884506\right)^{32}}$$

log(x) is the natural logarithm

Result:

0.9904104820846705839...

0.990410482…. result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1}=1-\frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\ldots}}}}\approx 0.9991104684$$

and to the dilaton value **0.989117352243** = $\boldsymbol{\phi}$ (see Appendix)

Alternative representations:

$$\frac{1}{\left(\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.4297739178013588450600000\right)^{32}}=\frac{1}{\left(0.4297739178013588450600000+\frac{\log_e(5)}{8}+\frac{3\log_e(2)}{10}+\frac{3\log_e\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)}{4\sqrt{5}}\right)^{32}}$$

$$\frac{1}{\left(\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.4297739178013588450600000\right)^{32}}=$$

$$1\Big/\left(0.4297739178013588450600000+\frac{1}{8}\log(a)\log_a(5)+\frac{3}{10}\log(a)\log_a(2)+\frac{3\log(a)\log_a\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)}{4\sqrt{5}}\right)^{32}$$

$$\frac{1}{\left(\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.42977391780135884506000\right)^{32}}=$$

$$\frac{1}{\left(0.42977391780135884506000-\frac{\text{Li}_1(-4)}{8}-\frac{3\,\text{Li}_1(-1)}{10}-\frac{3\,\text{Li}_1\left(1+\frac{1}{2}\left(-1-\sqrt{5}\right)\right)}{4\sqrt{5}}\right)^{32}}$$

Series representations:

$$\frac{1}{\left(\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.42977391780135884506000\right)^{32}}=$$

$$\left(5.39659527735429015323\times10^{16}\sqrt{4}^{32}\left(\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^{32}\right)\Big/$$
$$\left(2.50000000000000000000\log\left(\frac{1}{2}\left(1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)\right)+\right.$$
$$1.43257972600452948353333\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+$$
$$1.00000000000000000000\log(2)\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+$$
$$\left.0.416666666666666666667\log(5)\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^{32}$$

$$\frac{1}{\left(\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.4297739178013588450600000\right)^{32}}=$$

$$\left(5.3965952773542901532\times10^{16}\exp^{32}\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}^{32}\left(\sum_{k=0}^{\infty}\frac{(-1)^k(5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^{32}\right)\Bigg/\left(2.5000000000000000000000\log\left(\frac{1}{2}\left(1+\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)+1.4325797260045294835333\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+1.0000000000000000000000\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\log(2)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+0.41666666666666666666667\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\log(5)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^{32} \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\frac{1}{\left(\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.4297739178013588450600000\right)^{32}}=$$

$$1\Bigg/\left(0.4297739178013588450600000+\frac{3}{10}\left(\log(z_0)+\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)+\frac{1}{8}\left(\log(z_0)+\left\lfloor\frac{\arg(5-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(5-z_0)^k z_0^{-k}}{k}\right)+\left(3\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}z_0^{1/2(-1-\lfloor\arg(5-z_0)/(2\pi)\rfloor)}\left(\log(z_0)+\left\lfloor\frac{\arg\left(\frac{1}{2}\left(1+\sqrt{5}\right)-z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(1+\sqrt{5}-2z_0\right)^k z_0^{-k}}{k}\right)\right)\Bigg/\left(4\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right)^{32}$$

4/log base 0.990410482 ((1/[1/8 ln 5 + 3/10 ln 2 + 3/(4sqrt5) ln ((sqrt5+1)/2) + 0.42977391780135884506]))-Pi+1/golden ratio

Input interpretation:

$$\frac{4}{\log_{0.990410482}\left(\frac{1}{\frac{1}{8}\log(5)+\frac{3}{10}\log(2)+\frac{3}{4\sqrt{5}}\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)+0.42977391780135884506}\right)}-\pi+\frac{1}{\phi}$$

log(x) is the natural logarithm

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

ϕ is the golden ratio

Result:

125.4764...

125.4764... result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 (see Appendix)

Alternative representations:

$$\frac{4}{\log_{0.99041}\left(\frac{1}{\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.42977391780135884506\,0000}\right)}-\pi+\frac{1}{\phi}=-\pi+\frac{1}{\phi}+\frac{4}{\frac{\log\left(\frac{1}{0.42977391780135884506\,0000+\frac{\log(5)}{8}+\frac{3\log(2)}{10}+\frac{3\log\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)}{4\sqrt{5}}}\right)}{\log(0.99041)}}$$

$$\frac{4}{\log_{0.99041}\left(\frac{1}{\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.42977391780135884506\,0000}\right)}-\pi+\frac{1}{\phi}=-\pi+\frac{1}{\phi}+\frac{4}{\log_{0.99041}\left(\frac{1}{0.42977391780135884506\,0000+\frac{\log_e(5)}{8}+\frac{3\log_e(2)}{10}+\frac{3\log_e\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)}{4\sqrt{5}}}\right)}$$

$$\frac{4}{\log_{0.99041}\left(\frac{1}{\frac{\log(5)}{8}+\frac{1}{10}\log(2)3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.42977391780135884506000 0}\right)}-\pi+\frac{1}{\phi}=-\pi+\frac{1}{\phi}+$$

$$\frac{4}{\log_{0.99041}\left(\frac{1}{0.42977391780135884506000 0+\frac{1}{8}\log(a)\log_a(5)+\frac{3}{10}\log(a)\log_a(2)+\frac{3\log(a)\log_a\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)}{4\sqrt{5}}}\right)}$$

Series representation:

$$\frac{4}{\log_{0.99041}\left(\frac{1}{\frac{\log(5)}{8}+\frac{1}{10}\log(2)3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.42977391780135884506000 0}\right)}-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi-(4\log(0.99041))\Bigg/\left(\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1+\left(3.333333333333333333333333\sqrt{5}\right)\Big/\left(2.500000000000000000000000\log\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)+(1.432579726004529483533333+\log(2)+0.4166666666666666666666667\log(5))\sqrt{5}\right)\right)^k\right)$$

Integral representations:

$$\frac{4}{\log_{0.99041}\left(\frac{1}{\frac{\log(5)}{8}+\frac{1}{10}\log(2)3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.4297739178013588450600000}\right)}-\pi+\frac{1}{\phi}=$$

$$-\left(\left(-4\phi-\log_{0.99041}\left(\left(3.3333333333333333333333\sqrt{5}\right)\Big/\left(2.5000000000000000000000\int_1^{\frac{1}{2}\left(1+\sqrt{5}\right)}\frac{1}{t}\,dt+\left(1.4325797260045294835333+\int_1^2\left(-\frac{1.6666666666666666666667}{3-4t}+\frac{1}{t}\right)dt\right)\sqrt{5}\right)\right)+\phi\pi\log_{0.99041}\left(\left(3.3333333333333333333333\sqrt{5}\right)\Big/\left(2.5000000000000000000000\int_1^{\frac{1}{2}\left(1+\sqrt{5}\right)}\frac{1}{t}\,dt+\left(1.4325797260045294835333+\int_1^2\left(-\frac{1.6666666666666666666667}{3-4t}+\frac{1}{t}\right)dt\right)\sqrt{5}\right)\right)\right)\Big/\left(\phi\log_{0.99041}\left(\left(3.3333333333333333333333\sqrt{5}\right)\Big/\left(2.5000000000000000000000\int_1^{\frac{1}{2}\left(1+\sqrt{5}\right)}\frac{1}{t}\,dt+\left(1.4325797260045294835333+\int_1^2\left(-\frac{1.6666666666666666666667}{3-4t}+\frac{1}{t}\right)dt\right)\sqrt{5}\right)\right)\right)\right)$$

$$\frac{4}{\log_{0.99041}\left(\frac{1}{\frac{\log(5)}{8}+\frac{1}{10}\log(2)3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.4297739178013588450600000}\right)}-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi+4\Big/\log_{0.99041}\left(1\Big/\left(0.4297739178013588450600000+\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(\frac{3\,\Gamma(-s)^2\,\Gamma(1+s)}{20\,i\,\pi\,\Gamma(1-s)}+\frac{4^{-2-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{i\,\pi\,\Gamma(1-s)}+\frac{3\,\Gamma(-s)^2\,\Gamma(1+s)\left(-1+\frac{1}{2}\left(1+\sqrt{5}\right)\right)^{-s}}{8\,i\,\pi\,\Gamma(1-s)\sqrt{5}}\right)ds\right)\right)\quad \text{for } -1<\gamma<0$$

From the sum of the two results, we obtain:

1/8 ln 5 + 3/10 ln 2 + 3/(4sqrt5) ln ((sqrt5+1)/2) + 0.42977391780135884506 + 0.9620144640577 + 1/16(((2-sqrt2)^1/2)) * ln ((((2+(2-sqrt2)^1/2))/((2-(2-sqrt2)^1/2))))

Input interpretation:

$$\frac{1}{8}\log(5)+\frac{3}{10}\log(2)+\frac{3}{4\sqrt{5}}\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)+0.42977391780135884506+0.9620144640577+\frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)$$

log(x) is the natural logarithm

Result:

2.000890091057...

2.00089009… result practically equal to the graviton spin 2 (boson)

Series representations:

$$\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.4297739178013588450600000+$$

$$0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)=$$

$$\left(0.750000000000000\left(1.0000000000000000\left(\log\left(\frac{1}{2}\left(1+\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)+\right.\right.\right.$$

$$1.855717842478745\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}$$

$$\sum_{k=0}^{\infty}\frac{(-1)^k(5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+0.4000000000000000$$

$$\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\log(2)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+$$

$$0.1666666666666667\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\log(5)$$

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

$$0.08333333333333333\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)$$

$$\log\left(\frac{2+\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}{2-\sqrt{2-\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}\right)$$

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

$$\left.\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k(5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\right)\Bigg/$$

$$\left(\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

$$\frac{\log(5)}{8} + \frac{1}{10}\log(2)\,3 + \frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}} + 0.42977391780135884506 0000 +$$

$$0.96201446405770000 + \frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right) =$$

$$\Bigg(0.3000000000000000\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor} z_0^{-1/2-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}$$

$$\Bigg(2.500000000000000\log\left(\frac{1}{2}\left(1+\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor} z_0^{1/2(1+\lfloor\arg(5-z_0)/(2\pi)\rfloor)}\right.\right.$$

$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right) + 4.639294606196863$$

$$\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!} +$$

$$1.0000000000000000\log(2)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}$$

$$\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!} + 0.4166666666666667\log(5)$$

$$\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!} +$$

$$0.2083333333333333\log\left(\left(2+\sqrt{\left(2-\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}\right.}\right.\right.$$

$$\left.\left.\left.z_0^{1/2(1+\lfloor\arg(2-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)\right)\right/$$

$$\left(2-\sqrt{\left(2-\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor} z_0^{1/2(1+\lfloor\arg(2-z_0)/(2\pi)\rfloor)}\right.}\right.$$

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

$$\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}\sqrt{\left(2-\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}\right.}$$

$$\left.z_0^{1/2+1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)$$

$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right)\Bigg/\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)$$

$$\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.429773917801358845060000+$$

$$0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)=$$

$$1.39178838185905885+\frac{3}{10}\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\frac{1}{8}\left\lfloor\frac{\arg(5-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+$$

$$\frac{17\log(z_0)}{40}+\frac{3}{10}\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\log(z_0)+\frac{1}{8}\left\lfloor\frac{\arg(5-z_0)}{2\pi}\right\rfloor\log(z_0)-$$

$$\frac{3}{10}\sum_{k=1}^{\infty}\frac{(-1)^k\,(2-z_0)^k\,z_0^{-k}}{k}+\frac{1}{16}\left\lfloor\frac{\arg\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}-z_0\right)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)$$

$$\sqrt{2-\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}z_0^{1/2+1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k\,z_0^{-k}}{k!}}+$$

$$\frac{1}{16}\log(z_0)$$

$$\sqrt{2-\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}z_0^{1/2+1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k\,z_0^{-k}}{k!}}+$$

$$\frac{1}{16}\left\lfloor\frac{\arg\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}-z_0\right)}{2\pi}\right\rfloor\log(z_0)$$

$$\sqrt{2-\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}z_0^{1/2+1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k\,z_0^{-k}}{k!}}-$$

$$\frac{1}{8}\sum_{k=1}^{\infty}\frac{(-1)^k\,(5-z_0)^k\,z_0^{-k}}{k}+$$

$$\frac{3\left\lfloor\frac{\arg\left(\frac{1}{2}\left(1+\sqrt{5}\right)-z_0\right)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}z_0^{-1/2-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}}{4\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k\,z_0^{-k}}{k!}}+$$

$$\frac{3\log(z_0)\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}z_0^{-1/2-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}}{4\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k\,z_0^{-k}}{k!}}+$$

$$\frac{3\left\lfloor\frac{\arg\left(\frac{1}{2}\left(1+\sqrt{5}\right)-z_0\right)}{2\pi}\right\rfloor\log(z_0)\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}z_0^{-1/2-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}}{4\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k\,z_0^{-k}}{k!}}-$$

$$\frac{3\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}z_0^{-1/2-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(1+\sqrt{5}-2z_0\right)^k z_0^{-k}}{k}}{4\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k\,z_0^{-k}}{k!}}-$$

$$\frac{1}{16}\sqrt{2-\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}z_0^{1/2+1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k\,z_0^{-k}}{k!}}$$

Integral representations:

$$\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.429773917801358845060000+0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)=1.39178838185905885+\int_1^2\left(\frac{3}{10\,t}+\frac{1}{2(-3+4\,t)}+\frac{\left(-1+\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)\sqrt{2-\sqrt{2}}}{16\left(2-t-\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}+\frac{t\left(2+\sqrt{2-\sqrt{2}}\right)}{2-\sqrt{2-\sqrt{2}}}\right)}+\frac{3\left(-1+\frac{1}{2}\left(1+\sqrt{5}\right)\right)}{4\sqrt{5}\left(2-t+\frac{1}{2}\left(-1-\sqrt{5}\right)+\frac{1}{2}\,t\left(1+\sqrt{5}\right)\right)}\right)dt$$

$$\frac{\log(5)}{8}+\frac{1}{10}\log(2)\,3+\frac{\log\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)3}{4\sqrt{5}}+0.429773917801358845060000+0.96201446405770000+\frac{1}{16}\sqrt{2-\sqrt{2}}\,\log\left(\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)=1.39178838185905885+\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\left(\frac{3\,\Gamma(-s)^2\,\Gamma(1+s)}{20\,i\,\pi\,\Gamma(1-s)}+\frac{4^{-2-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{i\,\pi\,\Gamma(1-s)}+\frac{\Gamma(-s)^2\,\Gamma(1+s)\left(-1+\frac{2+\sqrt{2-\sqrt{2}}}{2-\sqrt{2-\sqrt{2}}}\right)^{-s}\sqrt{2-\sqrt{2}}}{32\,i\,\pi\,\Gamma(1-s)}+\frac{3\,\Gamma(-s)^2\,\Gamma(1+s)\left(-1+\frac{1}{2}\left(1+\sqrt{5}\right)\right)^{-s}}{8\,i\,\pi\,\Gamma(1-s)\sqrt{5}}\right)ds \quad \text{for } -1<\gamma<0$$

This is the difference compared to 2: 0.0008900910571, from which, performing the inversion, we obtain:

(1/0.0008900910571)-76-29+1/golden ratio

Where 76 and 29 are Lucas numbers

Input interpretation:

$$\frac{1}{0.0008900910571} - 76 - 29 + \frac{1}{\phi}$$

ϕ is the golden ratio

Result:

1019.098595...

1019.098595…. result practically equal to the rest mass of Phi meson 1019.445

Alternative representations:

$$\frac{1}{0.000890091} - 76 - 29 + \frac{1}{\phi} = -105 + \frac{1}{0.000890091} + \frac{1}{2\sin(54^\circ)}$$

$$\frac{1}{0.000890091} - 76 - 29 + \frac{1}{\phi} = -105 + \frac{1}{0.000890091} + -\frac{1}{2\cos(216^\circ)}$$

$$\frac{1}{0.000890091} - 76 - 29 + \frac{1}{\phi} = -105 + \frac{1}{0.000890091} + -\frac{1}{2\sin(666^\circ)}$$

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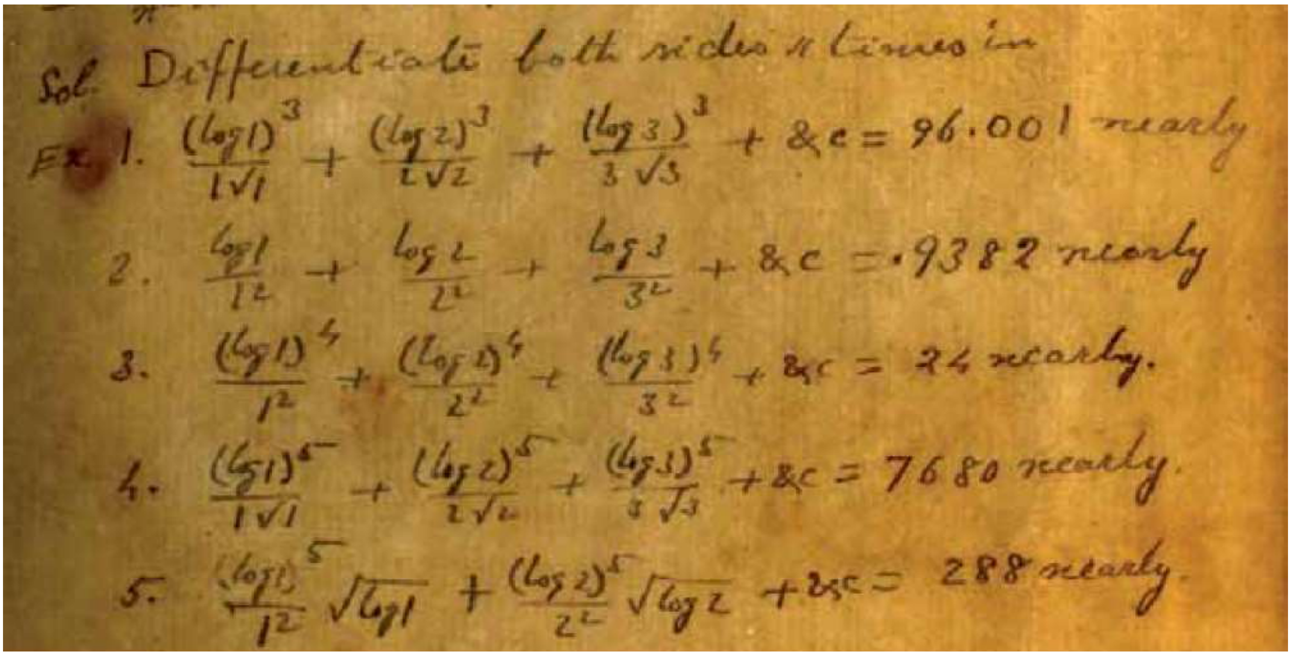


Sol. Differentiate both sides n times in

Ex. 1. $\frac{(\log 1)^3}{1\sqrt{1}} + \frac{(\log 2)^3}{2\sqrt{2}} + \frac{(\log 3)^3}{3\sqrt{3}} + \&c = 96.001$ nearly

2. $\frac{\log 1}{1^2} + \frac{\log 2}{2^2} + \frac{\log 3}{3^2} + \&c = .9382$ nearly

3. $\frac{(\log 1)^4}{1^2} + \frac{(\log 2)^4}{2^2} + \frac{(\log 3)^4}{3^2} + \&c = 24$ nearly.

4. $\frac{(\log 1)^5}{1\sqrt{1}} + \frac{(\log 2)^5}{2\sqrt{2}} + \frac{(\log 3)^5}{3\sqrt{3}} + \&c = 7680$ nearly.

5. $\frac{(\log 1)^5}{1^2}\sqrt{\log 1} + \frac{(\log 2)^5}{2^2}\sqrt{\log 2} + \&c = 288$ nearly.

(513*0.5)* (((((((log 1))^3)/(1sqrt1) + (((log 2))^3)/(2sqrt2) + (((log3))^3)/(3sqrt3)))))

Input:

$$(513\times 0.5)\left(\frac{\log^3(1)}{1\sqrt{1}}+\frac{\log^3(2)}{2\sqrt{2}}+\frac{\log^3(3)}{3\sqrt{3}}\right)$$

log(x) is the natural logarithm

Result:

95.6552...

95.6552…

Alternative representations:

$$\left(\frac{\log^3(1)}{1\sqrt{1}}+\frac{\log^3(2)}{2\sqrt{2}}+\frac{\log^3(3)}{3\sqrt{3}}\right)513\times 0.5 = 256.5\left(\frac{\log_e^3(1)}{\sqrt{1}}+\frac{\log_e^3(2)}{2\sqrt{2}}+\frac{\log_e^3(3)}{3\sqrt{3}}\right)$$

$$\left(\frac{\log^3(1)}{1\sqrt{1}}+\frac{\log^3(2)}{2\sqrt{2}}+\frac{\log^3(3)}{3\sqrt{3}}\right)513\times 0.5 = 256.5\left(\frac{(\log(a)\log_a(1))^3}{\sqrt{1}}+\frac{(\log(a)\log_a(2))^3}{2\sqrt{2}}+\frac{(\log(a)\log_a(3))^3}{3\sqrt{3}}\right)$$

$$\left(\frac{\log^3(1)}{1\sqrt{1}}+\frac{\log^3(2)}{2\sqrt{2}}+\frac{\log^3(3)}{3\sqrt{3}}\right)513\times 0.5 = 256.5\left(\frac{(-\text{Li}_1(0))^3}{\sqrt{1}}+\frac{(-\text{Li}_1(-1))^3}{2\sqrt{2}}+\frac{(-\text{Li}_1(-2))^3}{3\sqrt{3}}\right)$$

Series representations:

$$\left(\frac{\log^3(1)}{1\sqrt{1}}+\frac{\log^3(2)}{2\sqrt{2}}+\frac{\log^3(3)}{3\sqrt{3}}\right)513\times 0.5 = 256.5\left(\frac{\left(2 i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(1-x)^k x^{-k}}{k}\right)^3}{\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(1-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}+\frac{\left(2 i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}}{k}\right)^3}{2\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}+\frac{\left(2 i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}}{k}\right)^3}{3\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right) \text{ for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\left(\frac{\log^3(1)}{1\sqrt{1}}+\frac{\log^3(2)}{2\sqrt{2}}+\frac{\log^3(3)}{3\sqrt{3}}\right)513\times 0.5 =$$

$$\left(85.5\left(\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\log^3(3)\right.\right.$$
$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}(2-x)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}+$$
$$1.5\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\log^3(2)$$
$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}(3-x)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}+$$
$$3\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\log^3(1)$$
$$\left.\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(2-x)^{k_1}(3-x)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}\right)\right)\Big/$$
$$\left(\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\right.$$
$$\left(\sum_{k=0}^{\infty}\frac{(-1)^k(1-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\left(\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\quad\text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\left(\frac{\log^3(1)}{1\sqrt{1}}+\frac{\log^3(2)}{2\sqrt{2}}+\frac{\log^3(3)}{3\sqrt{3}}\right)513\times 0.5 =$$

$$256.5\left(\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor}z_0^{1/2(-1-\lfloor\arg(1-z_0)/(2\pi)\rfloor)}\right.\right.$$
$$\left.\left(\log(z_0)+\left\lfloor\frac{\arg(1-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(1-z_0)^k z_0^{-k}}{k}\right)^3\right)\Big/$$
$$\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(1-z_0)^k z_0^{-k}}{k!}\right)+\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}z_0^{1/2(-1-\lfloor\arg(2-z_0)/(2\pi)\rfloor)}\right.$$
$$\left.\left(\log(z_0)+\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^3\right)\Big/$$
$$\left(2\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)+\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(3-z_0)/(2\pi)\rfloor}z_0^{1/2(-1-\lfloor\arg(3-z_0)/(2\pi)\rfloor)}\right.$$
$$\left.\left(\log(z_0)+\left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}\right)^3\right)\Big/$$
$$\left.\left(3\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right)\right)$$

Integral representation:

$$\left(\frac{\log^3(1)}{1\sqrt{1}} + \frac{\log^3(2)}{2\sqrt{2}} + \frac{\log^3(3)}{3\sqrt{3}}\right) 513 \times 0.5 = \frac{256.5\left(0.333333\left(\int_1^3 \frac{1}{t}\,dt\right)^3 \sqrt{1}\sqrt{2} + 0.5\left(\int_1^2 \frac{1}{t}\,dt\right)^3 \sqrt{1}\sqrt{3} + \left(\int_1^1 \frac{1}{t}\,dt\right)^3 \sqrt{2}\sqrt{3}\right)}{\sqrt{1}\sqrt{2}\sqrt{3}}$$

Or:

(derivative(derivative (((((((log 1))^3)/(1sqrt1) + (((log 2))^3)/(2sqrt2) + (((log3))^3)/(3sqrt3))))))) = (derivative(derivative 96.001))

Input interpretation:

$$\frac{\partial}{\partial x}\frac{\partial}{\partial x}\left(\frac{\log^3(1)}{1\sqrt{1}} + \frac{\log^3(2)}{2\sqrt{2}} + \frac{\log^3(3)}{3\sqrt{3}}\right) = \frac{\partial}{\partial x}\frac{\partial 96.001}{\partial x}$$

log(x) is the natural logarithm

Result:

True

96.001

(27/8.5) (((((log 1))/(1) + ((log 2))/(4) + ((log3))/(9))))

Input:

$$\frac{27}{8.5}\left(\frac{\log(1)}{1} + \frac{\log(2)}{4} + \frac{\log(3)}{9}\right)$$

log(x) is the natural logarithm

Result:

0.938186...

0.938186… result very near to the spectral index n_s , to the mesonic Regge slope, to the inflaton value at the end of the inflation 0.9402 (see Appendix) and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\frac{e^{-\pi}}{1+\frac{e^{-2\pi}}{1+\frac{e^{-3\pi}}{1+\frac{e^{-4\pi}}{1+\ldots}}}}\approx 0.9568666373$$

Alternative representations:

$$\frac{\left(\log(1)\frac{1}{1}+\frac{\log(2)}{4}+\frac{\log(3)}{9}\right)27}{8.5}=\frac{27\left(\log(a)\log_a(1)+\frac{1}{4}\log(a)\log_a(2)+\frac{1}{9}\log(a)\log_a(3)\right)}{8.5}$$

$$\frac{\left(\log(1)\frac{1}{1}+\frac{\log(2)}{4}+\frac{\log(3)}{9}\right)27}{8.5}=\frac{27\left(\log_e(1)+\frac{\log_e(2)}{4}+\frac{\log_e(3)}{9}\right)}{8.5}$$

$$\frac{\left(\log(1)\frac{1}{1}+\frac{\log(2)}{4}+\frac{\log(3)}{9}\right)27}{8.5}=\frac{27\left(-\text{Li}_1(0)-\frac{\text{Li}_1(-1)}{4}-\frac{\text{Li}_1(-2)}{9}\right)}{8.5}$$

Series representations:

$$\frac{\left(\log(1)\frac{1}{1}+\frac{\log(2)}{4}+\frac{\log(3)}{9}\right)27}{8.5}=6.35294\,i\,\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor+1.58824\,i\,\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor+0.705882\,i\,\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor+4.32353\log(x)+\sum_{k=1}^{\infty}\frac{(-1)^k\left(-3.17647(1-x)^k-0.794118(2-x)^k-0.352941(3-x)^k\right)x^{-k}}{k}\quad\text{for } x<0$$

$$\frac{\left(\log(1)\frac{1}{1}+\frac{\log(2)}{4}+\frac{\log(3)}{9}\right)27}{8.5}=3.17647\left\lfloor\frac{\arg(1-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+0.794118\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+0.352941\left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+4.32353\log(z_0)+3.17647\left\lfloor\frac{\arg(1-z_0)}{2\pi}\right\rfloor\log(z_0)+0.794118\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\log(z_0)+0.352941\left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor\log(z_0)+\sum_{k=1}^{\infty}\frac{(-1)^k\left(-3.17647(1-z_0)^k-0.794118(2-z_0)^k-0.352941(3-z_0)^k\right)z_0^{-k}}{k}$$

$$\frac{\left(\log(1)\,\frac{1}{1} + \frac{\log(2)}{4} + \frac{\log(3)}{9}\right) 27}{8.5} =$$

$$6.35294\, i\, \pi \left\lfloor -\frac{-\pi + \arg\left(\frac{1}{z_0}\right) + \arg(z_0)}{2\,\pi} \right\rfloor + 1.58824\, i\, \pi \left\lfloor -\frac{-\pi + \arg\left(\frac{2}{z_0}\right) + \arg(z_0)}{2\,\pi} \right\rfloor +$$
$$0.705882\, i\, \pi \left\lfloor -\frac{-\pi + \arg\left(\frac{3}{z_0}\right) + \arg(z_0)}{2\,\pi} \right\rfloor + 4.32353 \log(z_0) +$$
$$\sum_{k=1}^{\infty} \frac{(-1)^k \left(-3.17647\,(1 - z_0)^k - 0.794118\,(2 - z_0)^k - 0.352941\,(3 - z_0)^k\right) z_0^{-k}}{k}$$

Or:

(derivative(derivative (((((log 1))/(1) + ((log 2))/(4) + ((log3))/(9)))))) = (derivative(derivative 0.9382))

Input interpretation:

$$\frac{\partial}{\partial x}\frac{\partial}{\partial x}\left(\frac{\log(1)}{1} + \frac{\log(2)}{4} + \frac{\log(3)}{9}\right) = \frac{\partial}{\partial x}\frac{\partial 0.9382}{\partial x}$$

$\log(x)$ is the natural logarithm

Result:

True

0.9382 result very near to the spectral index n_s , to the mesonic Regge slope, to the inflaton value at the end of the inflation 0.9402 (see Appendix) and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}} - \varphi + 1} = 1 - \cfrac{e^{-\pi}}{1 + \cfrac{e^{-2\pi}}{1 + \cfrac{e^{-3\pi}}{1 + \cfrac{e^{-4\pi}}{1 + \ldots}}}} \approx 0.9568666373$$

108 (((((((log 1))^4)/(1) + (((log 2))^4)/(4) + (((log3))^4)/(9)))))

Input:

$$108\left(\frac{\log^4(1)}{1}+\frac{\log^4(2)}{4}+\frac{\log^4(3)}{9}\right)$$

$\log(x)$ is the natural logarithm

Exact result:

$$108\left(\frac{\log^4(2)}{4}+\frac{\log^4(3)}{9}\right)$$

Decimal approximation:

23.713257189822111762644926172321921460580493072330642817 54...

23.713257189…

Alternate forms:

$$27\log^4(2)+12\log^4(3)$$

$$3\left(9\log^4(2)+4\log^4(3)\right)$$

Alternative representations:

$$108\left(\log^4(1)\frac{1}{1}+\frac{\log^4(2)}{4}+\frac{\log^4(3)}{9}\right)=108\left(\log_e^4(1)+\frac{1}{4}\log_e^4(2)+\frac{1}{9}\log_e^4(3)\right)$$

$$108\left(\log^4(1)\frac{1}{1}+\frac{\log^4(2)}{4}+\frac{\log^4(3)}{9}\right)=$$
$$108\left((\log(a)\log_a(1))^4+\frac{1}{4}(\log(a)\log_a(2))^4+\frac{1}{9}(\log(a)\log_a(3))^4\right)$$

$$108\left(\log^4(1)\frac{1}{1}+\frac{\log^4(2)}{4}+\frac{\log^4(3)}{9}\right)=108\left(\frac{1}{9}(-\mathrm{Li}_1(-2))^4+\frac{1}{4}(-\mathrm{Li}_1(-1))^4+(-\mathrm{Li}_1(0))^4\right)$$

Series representations:

$$108\left(\log^4(1)\frac{1}{1}+\frac{\log^4(2)}{4}+\frac{\log^4(3)}{9}\right)=$$
$$108\left(\frac{1}{4}\left(2i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}}{k}\right)^4+\right.$$
$$\left.\frac{1}{9}\left(2i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}}{k}\right)^4\right)\quad\text{for } x<0$$

$$108\left(\log^4(1)\frac{1}{1}+\frac{\log^4(2)}{4}+\frac{\log^4(3)}{9}\right)=$$
$$108\left(\frac{1}{4}\left(\log(z_0)+\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^4+\frac{1}{9}\left(\log(z_0)+\left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}\right)^4\right)$$

$$108\left(\log^4(1)\frac{1}{1}+\frac{\log^4(2)}{4}+\frac{\log^4(3)}{9}\right)=$$
$$108\left(\frac{1}{4}\left(2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^4+\frac{1}{9}\left(2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}\right)^4\right)$$

Integral representations:

$$108\left(\log^4(1)\frac{1}{1}+\frac{\log^4(2)}{4}+\frac{\log^4(3)}{9}\right)=3\left(9\left(\int_1^2\frac{1}{t}\,dt\right)^4+4\left(\int_1^3\frac{1}{t}\,dt\right)^4\right)$$

$$108\left(\log^4(1)\frac{1}{1}+\frac{\log^4(2)}{4}+\frac{\log^4(3)}{9}\right)=$$
$$\frac{3\left(9\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^4+4\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{2^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^4\right)}{16\pi^4}\quad\text{for } -1<\gamma<0$$

Or:

(derivative(derivative (((((((log 1))^4)/(1) + (((log 2))^4)/(4) + (((log3))^4)/(9)))))) = (derivative(derivative 24))

Input interpretation:

$$\frac{\partial}{\partial x}\frac{\partial}{\partial x}\left(\frac{\log^4(1)}{1}+\frac{\log^4(2)}{4}+\frac{\log^4(3)}{9}\right)=\frac{\partial}{\partial x}\frac{\partial 24}{\partial x}$$

log(x) is the natural logarithm

Result:

True

24

This value is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

21060 * (((((((log 1))^5)/(1sqrt1) + (((log 2))^5)/(2sqrt2) + (((log3))^5)/(3sqrt3)))))

Input:

$$21\,060\left(\frac{\log^5(1)}{1\sqrt{1}}+\frac{\log^5(2)}{2\sqrt{2}}+\frac{\log^5(3)}{3\sqrt{3}}\right)$$

$\log(x)$ is the natural logarithm

Exact result:

$$21\,060\left(\frac{\log^5(2)}{2\sqrt{2}}+\frac{\log^5(3)}{3\sqrt{3}}\right)$$

Decimal approximation:

7677.679222678524882044754597609374166484502041159930665050...

7677.679222678…

Alternate forms:

$$5265\sqrt{2}\,\log^5(2)+2340\sqrt{3}\,\log^5(3)$$

$$585\left(9\sqrt{2}\,\log^5(2)+4\sqrt{3}\,\log^5(3)\right)$$

$$585\sqrt{6}\left(3\sqrt{3}\,\log^5(2)+2\sqrt{2}\,\log^5(3)\right)$$

Alternative representations:

$$21\,060\left(\frac{\log^5(1)}{1\sqrt{1}}+\frac{\log^5(2)}{2\sqrt{2}}+\frac{\log^5(3)}{3\sqrt{3}}\right)=21\,060\left(\frac{\log_e^5(1)}{\sqrt{1}}+\frac{\log_e^5(2)}{2\sqrt{2}}+\frac{\log_e^5(3)}{3\sqrt{3}}\right)$$

$$21\,060\left(\frac{\log^5(1)}{1\sqrt{1}}+\frac{\log^5(2)}{2\sqrt{2}}+\frac{\log^5(3)}{3\sqrt{3}}\right)=$$
$$21\,060\left(\frac{(\log(a)\log_a(1))^5}{\sqrt{1}}+\frac{(\log(a)\log_a(2))^5}{2\sqrt{2}}+\frac{(\log(a)\log_a(3))^5}{3\sqrt{3}}\right)$$

$$21060\left(\frac{\log^5(1)}{1\sqrt{1}}+\frac{\log^5(2)}{2\sqrt{2}}+\frac{\log^5(3)}{3\sqrt{3}}\right)=21060\left(\frac{(-\text{Li}_1(0))^5}{\sqrt{1}}+\frac{(-\text{Li}_1(-1))^5}{2\sqrt{2}}+\frac{(-\text{Li}_1(-2))^5}{3\sqrt{3}}\right)$$

Series representations:

$$21060\left(\frac{\log^5(1)}{1\sqrt{1}}+\frac{\log^5(2)}{2\sqrt{2}}+\frac{\log^5(3)}{3\sqrt{3}}\right)= 21060\left(\frac{\left(2i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}}{k}\right)^5}{2\sqrt{2}}+\frac{\left(2i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}}{k}\right)^5}{3\sqrt{3}}\right) \text{ for } x<0$$

$$21060\left(\frac{\log^5(1)}{1\sqrt{1}}+\frac{\log^5(2)}{2\sqrt{2}}+\frac{\log^5(3)}{3\sqrt{3}}\right)= 21060\left(\frac{\left(\log(z_0)+\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^5}{2\sqrt{2}}+\frac{\left(\log(z_0)+\left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}\right)^5}{3\sqrt{3}}\right)$$

$$21060\left(\frac{\log^5(1)}{1\sqrt{1}}+\frac{\log^5(2)}{2\sqrt{2}}+\frac{\log^5(3)}{3\sqrt{3}}\right)= 21060\left(\frac{\left(2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^5}{2\sqrt{2}}+\frac{\left(2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}\right)^5}{3\sqrt{3}}\right)$$

Integral representations:

$$21060\left(\frac{\log^5(1)}{1\sqrt{1}}+\frac{\log^5(2)}{2\sqrt{2}}+\frac{\log^5(3)}{3\sqrt{3}}\right)=585\left(9\sqrt{2}\left(\int_1^2\frac{1}{t}\,dt\right)^5+4\sqrt{3}\left(\int_1^3\frac{1}{t}\,dt\right)^5\right)$$

$$21060\left(\frac{\log^5(1)}{1\sqrt{1}}+\frac{\log^5(2)}{2\sqrt{2}}+\frac{\log^5(3)}{3\sqrt{3}}\right)=$$
$$-\frac{585\,i\left(9\sqrt{2}\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^5+4\sqrt{3}\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{2^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^5\right)}{32\,\pi^5}\quad\text{for}$$
$-1<\gamma<0$

Or:

derivative (derivative (((((((log 1))^5)/(1sqrt1) + (((log 2))^5)/(2sqrt2) + (((log3))^5)/(3sqrt3)))))) = (derivative (derivative 7680))

Input interpretation:

$$\frac{\partial}{\partial x}\frac{\partial}{\partial x}\left(\frac{\log^5(1)}{1\sqrt{1}}+\frac{\log^5(2)}{2\sqrt{2}}+\frac{\log^5(3)}{3\sqrt{3}}\right)=\frac{\partial}{\partial x}\frac{\partial 7680}{\partial x}$$

log(x) is the natural logarithm

Result:

True

7680

8640 (((((((log 1))^5) (sqrt(ln1)) /(1)^2 + (((log 2))^5) (sqrt(ln2))/(2)^2))))

Input:

$$8640\left(\log^5(1)\times\frac{\sqrt{\log(1)}}{1^2}+\log^5(2)\times\frac{\sqrt{\log(2)}}{2^2}\right)$$

log(x) is the natural logarithm

Exact result:

$2160\log^{11/2}(2)$

Decimal approximation:

287.73572504121957202126926728405198851141754757677568900 38...

287.735725…

Property:

$2160\log^{11/2}(2)$ is a transcendental number

Alternative representations:

$$8640\left(\frac{\log^5(1)\sqrt{\log(1)}}{1^2}+\frac{\log^5(2)\sqrt{\log(2)}}{2^2}\right)=$$
$$8640\left((\log(a)\log_a(1))^5\sqrt{\log(a)\log_a(1)}+\frac{1}{4}(\log(a)\log_a(2))^5\sqrt{\log(a)\log_a(2)}\right)$$

$$8640\left(\frac{\log^5(1)\sqrt{\log(1)}}{1^2}+\frac{\log^5(2)\sqrt{\log(2)}}{2^2}\right)=$$
$$8640\left(\log_e^5(1)\sqrt{\log_e(1)}+\frac{1}{4}\log_e^5(2)\sqrt{\log_e(2)}\right)$$

$$8640\left(\frac{\log^5(1)\sqrt{\log(1)}}{1^2}+\frac{\log^5(2)\sqrt{\log(2)}}{2^2}\right)=$$
$$8640\left(\frac{1}{4}(-\text{Li}_1(-1))^5\sqrt{-\text{Li}_1(-1)}+(-\text{Li}_1(0))^5\sqrt{-\text{Li}_1(0)}\right)$$

Series representations:

$$8640\left(\frac{\log^5(1)\sqrt{\log(1)}}{1^2}+\frac{\log^5(2)\sqrt{\log(2)}}{2^2}\right)=$$
$$2160\left(2i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}}{k}\right)^{11/2} \quad \text{for } x<0$$

$$8640\left(\frac{\log^5(1)\sqrt{\log(1)}}{1^2}+\frac{\log^5(2)\sqrt{\log(2)}}{2^2}\right)=$$
$$2160\left(\log(z_0)+\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^{11/2}$$

$$8640\left(\frac{\log^5(1)\sqrt{\log(1)}}{1^2}+\frac{\log^5(2)\sqrt{\log(2)}}{2^2}\right)=$$
$$2160\left(2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^{11/2}$$

Integral representations:

$$8640\left(\frac{\log^5(1)\sqrt{\log(1)}}{1^2}+\frac{\log^5(2)\sqrt{\log(2)}}{2^2}\right)=2160\left(\int_1^2\frac{1}{t}\,dt\right)^{11/2}$$

$$8640\left(\frac{\log^5(1)\sqrt{\log(1)}}{1^2}+\frac{\log^5(2)\sqrt{\log(2)}}{2^2}\right)=\frac{135\left(-i\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^{11/2}}{2\sqrt{2}\,\pi^{11/2}}$$

for $-1 < \gamma < 0$

Or:

(derivative(derivative (((((((log 1))^5) (sqrt(ln1)) /(1)^2 + (((log 2))^5) (sqrt(ln2))/(2)^2)))))) = (derivative(derivative 288))

Input interpretation:

$$\frac{\partial}{\partial x}\frac{\partial}{\partial x}\left(\log^5(1)\times\frac{\sqrt{\log(1)}}{1^2}+\log^5(2)\times\frac{\sqrt{\log(2)}}{2^2}\right)=\frac{\partial}{\partial x}\frac{\partial 288}{\partial x}$$

log(x) is the natural logarithm

Result:

True

288

From these results

96.001; 0.9382; 24; 7680; 288

We obtain:

derivative(derivative(96.001 + 0.9382 + 24 + 7680 + 288)) = (derivative(derivative 8088.9392)

Input interpretation:

$$\frac{\partial}{\partial x}\frac{\partial(96.001+0.9382+24+7680+288)}{\partial x}=\frac{\partial}{\partial x}\frac{\partial 8088.9392}{\partial x}$$

Result:

True

integrate integrate [(96.001 + 0.9382 + 24 + 7680 + 288))] = integrate integrate [(8088.9392)]

Input interpretation:

$$\int\left(\int(96.001+0.9382+24+7680+288)\,dx\right)dx=\int\left(\int 8088.9392\,dx\right)dx$$

Result:

True

integral(integral8088.94 dx) dx

Input interpretation:

$\int\left(\int 8088.94\, dx\right) dx$

Result:

$4044.47\, x^2$

Indefinite integral assuming all variables are real:

$1348.16\, x^3 + \text{constant}$

1348.16

We note that, adding 34 that is a Fibonacci number:

1348.16 + 34 = 1382.16 result practically equal to the rest mass of Sigma baryon 1382.8

Definite integral over a disk of radius R:

$\iint_{2 x^2 < R^2} 8088.94\, dx\, dx = 25\,412.2\, R^2$

Definite integral over a square of edge length 2 L:

$\int_{-L}^{L}\int_{-L}^{L} 8088.94\, dx\, dx = 32\,355.8\, L^2$

Or:

1/6 [(96.001 + 0.9382 + 24 + 7680 + 288))]]

Input interpretation:

$\frac{1}{6}(96.001 + 0.9382 + 24 + 7680 + 288)$

Result:

1348.156533333333333333333333333333333333333333333333333...

Repeating decimal:

$1348.1565\overline{3}$ (period 1)

1348.15653...

From which 1348.15653 + 34 = 1382.15653 result practically equal to the rest mass of Sigma baryon 1382.8

And also, performing the average, we obtain:

1/5 [(96.001 + 0.9382 + 24 + 7680 + 288))]]

Input interpretation:

$$\frac{1}{5}(96.001 + 0.9382 + 24 + 7680 + 288)$$

Result:

1617.78784

1617.78784

We have also:

1/5 [(96.001 + 0.9382 + 24 + 7680 + 288))]]+55

Where 55 is a Fibonacci number

Input interpretation:

$$\frac{1}{5}(96.001 + 0.9382 + 24 + 7680 + 288) + 55$$

Result:

1672.78784

1672.78784 result practically equal to the rest mass of Omega baryon 1672.45

From which:

1/10^3 * 1/5 [(96.001 + 0.9382 + 24 + 7680 + 288))]

Input interpretation:

$$\frac{1}{10^3} \times \frac{1}{5}(96.001 + 0.9382 + 24 + 7680 + 288)$$

Result:

1.61778784

1.61778784 result that is a very good approximation to the value of the golden ratio 1,618033988749...

1/(((1/10^3 * 1/5 [(96.001 + 0.9382 + 24 + 7680 + 288))]))

Input interpretation:

$$\frac{1}{\frac{1}{10^3} \times \frac{1}{5} (96.001 + 0.9382 + 24 + 7680 + 288)}$$

Result:

0.618128023511414203731436131946695804067856017510924052933...

0.6181280235... result practically equal to the golden ratio conjugate

While from the previous results obtained by our calculations, we obtain:

1/10^3 * 1/5 [(95.6552 + 0.938186 + 23.713257189 + 7677.6792 + 287.735725)]

Input interpretation:

$$\frac{1}{10^3} \times \frac{1}{5} (95.6552 + 0.938186 + 23.713257189 + 7677.6792 + 287.735725)$$

Result:

1.6171443136378

1.6171443136378 result that is a very good approximation to the value of the golden ratio 1,618033988749...

1/(((1/10^3 * 1/5 [(95.6552 + 0.938186 + 23.713257189 + 7677.6792 + 287.735725)])))

Input interpretation:

$$\frac{1}{\frac{1}{10^3} \times \frac{1}{5} (95.6552 + 0.938186 + 23.713257189 + 7677.6792 + 287.735725)}$$

Result:

0.618374001359519397408843701837659980669851611646961678485...

0.6183740013... result practically equal to the golden ratio conjugate

Multiplying and integrating the several results, we obtain:

integrate integrate [(96.001 * 0.9382 * 24 * 7680 * 288))] = integrate integrate [(4.781191459110912 × 10^9)]

Input interpretation:

$$\int\left(\int 96.001\times 0.9382\times 24\times 7680\times 288\,dx\right)dx = \int\left(\int 4.781191459110912\times 10^9\,dx\right)dx$$

Result:

True

integrate integrate [(4.781191459110912 × 10^9)]

Input interpretation:

$$\int\left(\int 4.781191459110912\times 10^9\,dx\right)dx$$

Result:

$2.390595729555456\times 10^9\,x^2$

Indefinite integral assuming all variables are real:

$7.968652431851520\times 10^8\,x^3$ + constant

ln(796865243.1851520)

Input interpretation:

$\log(7.968652431851520\times 10^8)$

log(x) is the natural logarithm

Result:

20.496196142390025...

20.49619… result very near to the black hole entropy 20.5520

Alternative representations:

$\log(7.9686524318515200000\times 10^8) = \log_e(7.9686524318515200000\times 10^8)$

$$\log(7.96865243185152000000\times10^8) = \log(a)\log_a(7.96865243185152000000\times10^8)$$

$$\log(7.96865243185152000000\times10^8) = -\text{Li}_1(-7.96865242185152000000\times10^8)$$

Series representations:

$$\log(7.96865243185152000000\times10^8) = \log(7.96865242185152000000\times10^8) - \sum_{k=1}^{\infty}\frac{(-1)^k\, e^{-20.4961961411351074847\,k}}{k}$$

$$\log(7.96865243185152000000\times10^8) = 2\,i\,\pi\left\lfloor\frac{\arg(7.96865243185152000000\times10^8 - x)}{2\,\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k\,(7.96865243185152000000\times10^8 - x)^k\,x^{-k}}{k} \quad \text{for } x<0$$

$$\log(7.96865243185152000000\times10^8) = \left\lfloor\frac{\arg(7.96865243185152000000\times10^8 - z_0)}{2\,\pi}\right\rfloor\log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor\frac{\arg(7.96865243185152000000\times10^8 - z_0)}{2\,\pi}\right\rfloor\log(z_0) - \sum_{k=1}^{\infty}\frac{(-1)^k\,(7.96865243185152000000\times10^8 - z_0)^k\,z_0^{-k}}{k}$$

Integral representations:

$$\log(7.96865243185152000000\times10^8) = \int_1^{7.96865243185152000000\times10^8}\frac{1}{t}\,dt$$

$$\log(7.96865243185152000000\times10^8) = \frac{1}{2\,i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-20.4961961411351074847\,s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

golden ratio^2*sqrt(796865243.1851520) - (322+76+18) + golden ratio^3

Input interpretation:

$$\phi^2\sqrt{7.968652431851520\times10^8} - (322+76+18) + \phi^3$$

ϕ is the golden ratio

Result:

73492.19827672097...

73492.198276….

Thence, we have the following mathematical connections:

$$\left(\phi^2 \sqrt{7.968652431851520\times10^8} - (322+76+18) + \phi^3\right) = 73492.198... \Rightarrow$$

$$\Rightarrow -3927 + 2\left(\sqrt[13]{\frac{N \exp\left[\int d\hat{\sigma}\left(-\frac{1}{4u^2}\mathbf{P}_i D\mathbf{P}_i\right)\right] |Bp\rangle_{\mathrm{NS}}}{\int [d\mathbf{X}^\mu] \exp\left\{\int d\hat{\sigma}\left(-\frac{1}{4v^2} D\mathbf{X}^\mu D^2 \mathbf{X}^\mu\right)\right\} |\mathbf{X}^\mu, \mathbf{X}^i = 0\rangle_{\mathrm{NS}}} +}\right) =$$

$$-3927 + 2\sqrt[13]{2.2983717437\times10^{59} + 2.0823329825883\times10^{59}}$$

$$= 73490.8437525.... \Rightarrow$$

$$\Rightarrow \left(A(r) \times \frac{1}{B(r)}\left(-\frac{1}{\phi(r)}\right) \times \frac{1}{e^{\Lambda(r)}}\right) \Rightarrow$$

$$\Rightarrow \left(-0.000029211892\times\frac{1}{0.0003644621}\left(-\frac{1}{0.0005946833}\right)\times\frac{1}{0.00183393}\right) =$$

$$= 73491.78832548118710549159572042220548025195726563413398700...$$

$$= 73491.7883254... \Rightarrow$$

$$\left(\begin{array}{c} I_{21} \ll \int_{-\infty}^{+\infty} \exp\left(-\left(\frac{t}{H}\right)^2\right) \left| \sum_{\lambda \leqslant p^{1-\varepsilon_2}} \frac{a(\lambda)}{\sqrt{\lambda}} B(\lambda) \lambda^{-i(T+t)} \right|^2 dt \ll \\ \ll H\left\{\left(\frac{4}{\varepsilon_2 \log T}\right)^{2r} (\log T)(\log X)^{-2\beta} + (\varepsilon_2^{-2r}(\log T)^{-2r} + \varepsilon_2^{-r} h_1^r (\log T)^{-r}) T^{-\varepsilon_1}\right\} \end{array}\right) /$$

$$/(26\times4)^2 - 24 = \left(\frac{7.9313976505275\times10^8}{(26\times4)^2 - 24}\right) = 73493.30662...$$

Mathematical connections with the boundary state corresponding to the NSNS-sector of N Dp-branes in the limit of u → ∞, with the ratio concerning the general asymptotically flat solution of the equations of motion of the p-brane and with the Karatsuba's equation concerning the zeros of a special type of function connected with Dirichlet series.

Series representations:

$$\phi^2 \sqrt{7.96865243185152000000\times 10^8} - (322+76+18) + \phi^3 = -416 + \phi^3 + \phi^2 \sqrt{7.96865242185152000000\times 10^8} \sum_{k=0}^{\infty} e^{-20.4961961411351074847 k} \binom{\frac{1}{2}}{k}$$

$$\phi^2 \sqrt{7.96865243185152000000\times 10^8} - (322+76+18) + \phi^3 = -416 + \phi^3 + \phi^2 \sqrt{7.96865242185152000000\times 10^8} \sum_{k=0}^{\infty} \frac{(-1.25491732737371615 34\times 10^{-9})^k \left(-\frac{1}{2}\right)_k}{k!}$$

$$\phi^2 \sqrt{7.96865243185152000000\times 10^8} - (322+76+18) + \phi^3 = -416 + \phi^3 + \phi^2 \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (7.96865243185152000000\times 10^8 - z_0)^k z_0^{-k}}{k!}$$

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

Dividing and integrating the various results, we obtain:

Input interpretation:

$$\int\left(\int 7680\times\frac{1}{288}\times\frac{1}{96.001}\times\frac{1}{24}\times\frac{1}{0.9382}\,dx\right)dx$$

Result:

$0.00616817 x^2$

Indefinite integral assuming all variables are real:

$0.00205606 x^3$ + constant

0.00205606

(1/0.00205606)+11

Input interpretation:

$$\frac{1}{0.00205606}+11$$

Result:

497.367129363929068217853564584691108236140968648774841 2011...

497.36712936…. result practically equal to the rest mass of Kaon meson 497.614

Performing the inversion, we obtain:

1/(((integrate integrate [(7680*1/ 288*1/96.001*1/ 24*1/0.9382))]))

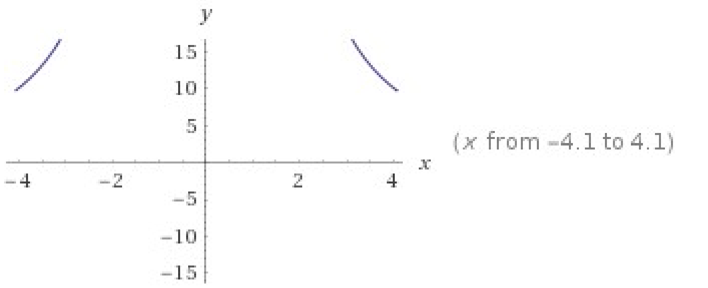
Input interpretation:

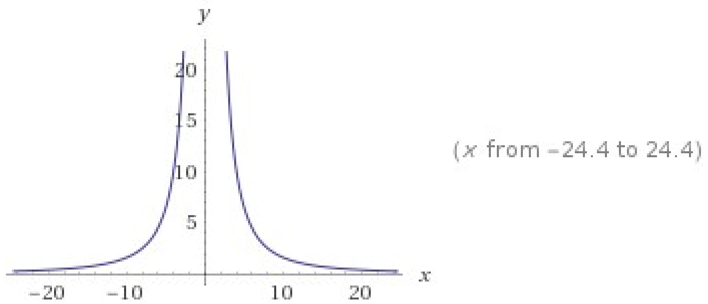
$$\frac{1}{\int\left(\int 7680\times\frac{1}{288}\times\frac{1}{96.001}\times\frac{1}{24}\times\frac{1}{0.9382}\,dx\right)dx}$$

Result:

$$\frac{162.123}{x^2}$$

Plots:





Alternate form assuming x is real:

$$\frac{162.123}{x^2}+0$$

Indefinite integral assuming all variables are real:

$$-\frac{162.123}{x}+\text{constant}$$

From which, for x = 1:

162.123/1^2-34-Pi+1/golden ratio

Input interpretation:

$$\frac{162.123}{1^2} - 34 - \pi + \frac{1}{\phi}$$

ϕ is the golden ratio

Result:

125.599...

125.599…. result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 (see Appendix)

Alternative representations:

$$\frac{162.123}{1^2} - 34 - \pi + \frac{1}{\phi} = -34 - \pi + 162.123 \times \frac{1}{1} + -\frac{1}{2\cos(216\,°)}$$

$$\frac{162.123}{1^2} - 34 - \pi + \frac{1}{\phi} = -34 - 180\,° + 162.123 \times \frac{1}{1} + -\frac{1}{2\cos(216\,°)}$$

$$\frac{162.123}{1^2} - 34 - \pi + \frac{1}{\phi} = -34 - \pi + 162.123 \times \frac{1}{1} + \frac{1}{2\cos\left(\frac{\pi}{5}\right)}$$

Series representations:

$$\frac{162.123}{1^2} - 34 - \pi + \frac{1}{\phi} = 128.123 + \frac{1}{\phi} - 4\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}$$

$$\frac{162.123}{1^2} - 34 - \pi + \frac{1}{\phi} = 130.123 + \frac{1}{\phi} - 2\sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}$$

$$\frac{162.123}{1^2} - 34 - \pi + \frac{1}{\phi} = 128.123 + \frac{1}{\phi} - \sum_{k=0}^{\infty} \frac{2^{-k} (-6 + 50 k)}{\binom{3k}{k}}$$

Integral representations:

$$\frac{162.123}{1^2} - 34 - \pi + \frac{1}{\phi} = 128.123 + \frac{1}{\phi} - 2 \int_0^{\infty} \frac{1}{1+t^2} \, dt$$

$$\frac{162.123}{1^2} - 34 - \pi + \frac{1}{\phi} = 128.123 + \frac{1}{\phi} - 4 \int_0^{1} \sqrt{1-t^2} \, dt$$

$$\frac{162.123}{1^2} - 34 - \pi + \frac{1}{\phi} = 128.123 + \frac{1}{\phi} - 2 \int_0^{\infty} \frac{\sin(t)}{t} \, dt$$

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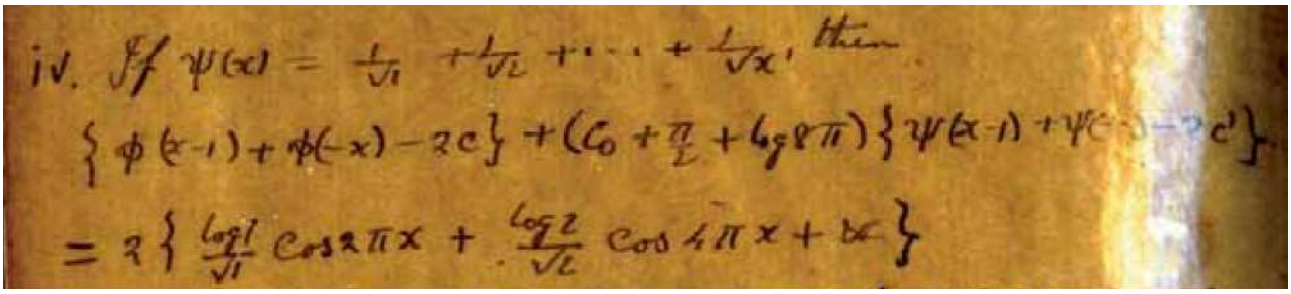


2((log(1)/sqrt1 cos (2Pi*3) + log(2)/sqrt2 cos(4Pi*3)))

Input:

$$2 \left(\frac{\log(1)}{\sqrt{1}} \cos(2 \pi \times 3) + \frac{\log(2)}{\sqrt{2}} \cos(4 \pi \times 3) \right)$$

$\log(x)$ is the natural logarithm

Exact result:

$$\sqrt{2} \log(2)$$

Decimal approximation:

0.9802581434685471917139017236352333812914606990990547210 42...

0.9802581434685…

Property:

$\sqrt{2} \log(2)$ is a transcendental number

Alternative representations:

$$2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)=2\left(\frac{\cosh(-6 i\pi)\log(1)}{\sqrt{1}}+\frac{\cosh(-12 i\pi)\log(2)}{\sqrt{2}}\right)$$

$$2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)= 2\left(\frac{\cosh(6 i\pi)\log(a)\log_a(1)}{\sqrt{1}}+\frac{\cosh(12 i\pi)\log(a)\log_a(2)}{\sqrt{2}}\right)$$

$$2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)=2\left(\frac{\cosh(6 i\pi)\log_e(1)}{\sqrt{1}}+\frac{\cosh(12 i\pi)\log_e(2)}{\sqrt{2}}\right)$$

Series representations:

$$2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)= 2 i\sqrt{2}\,\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor+\sqrt{2}\,\log(x)-\sqrt{2}\sum_{k=1}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}}{k}\quad\text{for } x<0$$

$$2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)=\sqrt{2}\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+ \sqrt{2}\,\log(z_0)+\sqrt{2}\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\log(z_0)-\sqrt{2}\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}$$

$$2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)= 2 i\sqrt{2}\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\sqrt{2}\,\log(z_0)-\sqrt{2}\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}$$

Integral representations:

$$2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)=\sqrt{2}\int_1^2\frac{1}{t}\,dt$$

$$2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)=-\frac{i}{\sqrt{2}\,\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\quad\text{for } -1<\gamma<0$$

Multiple-argument formulas:

$$2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)=$$
$$2\left(\frac{(-1+2\cos^2(3\pi))\log(1)}{\sqrt{1}}+\frac{(-1+2\cos^2(6\pi))\log(2)}{\sqrt{2}}\right)$$

$$2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)=$$
$$2\left(\frac{\log(1)(1-2\sin^2(3\pi))}{\sqrt{1}}+\frac{\log(2)(1-2\sin^2(6\pi))}{\sqrt{2}}\right)$$

$$2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)=$$
$$2\left(\frac{\cos(2\pi)(-3+4\cos^2(2\pi))\log(1)}{\sqrt{1}}+\frac{\cos(4\pi)(-3+4\cos^2(4\pi))\log(2)}{\sqrt{2}}\right)$$

sqrt[2((log(1)/sqrt1 cos (2Pi*3) + log(2)/sqrt2 cos(4Pi*3)))]

Input:

$$\sqrt{2\left(\frac{\log(1)}{\sqrt{1}}\cos(2\pi\times 3)+\frac{\log(2)}{\sqrt{2}}\cos(4\pi\times 3)\right)}$$

$\log(x)$ is the natural logarithm

Exact result:

$$\sqrt[4]{2}\sqrt{\log(2)}$$

Decimal approximation:

0.9900798672170579955176421894745470086778346278105537543 45...

0.990079867217…. result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1}=1-\frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\dots}}}}\approx 0.9991104684$$

and to the dilaton value **0.989117352243** = $\boldsymbol{\phi}$ (see Appendix)

Property:

$\sqrt[4]{2}\sqrt{\log(2)}$ is a transcendental number

All 2nd roots of sqrt(2) log(2):

$\sqrt[4]{2}\, e^{0}\sqrt{\log(2)} \approx 0.99008$ (real, principal root)

$\sqrt[4]{2}\, e^{i\pi}\sqrt{\log(2)} \approx -0.9901$ (real root)

Alternative representations:

$$\sqrt{2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)} = \sqrt{2\left(\frac{\cosh(-6 i\pi)\log(1)}{\sqrt{1}}+\frac{\cosh(-12 i\pi)\log(2)}{\sqrt{2}}\right)}$$

$$\sqrt{2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)} = \sqrt{2\left(\frac{\cosh(6 i\pi)\log(a)\log_a(1)}{\sqrt{1}}+\frac{\cosh(12 i\pi)\log(a)\log_a(2)}{\sqrt{2}}\right)}$$

$$\sqrt{2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)} = \sqrt{2\left(\frac{\cosh(6 i\pi)\log_e(1)}{\sqrt{1}}+\frac{\cosh(12 i\pi)\log_e(2)}{\sqrt{2}}\right)}$$

Series representations:

$$\sqrt{2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)} = \sqrt[4]{2}\sqrt{2 i \pi \left\lfloor \frac{\arg(2-x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (2-x)^k x^{-k}}{k}} \quad \text{for } x < 0$$

$$\sqrt{2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)} = \sqrt[4]{2}\sqrt{\log(z_0) + \left\lfloor \frac{\arg(2-z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k (2-z_0)^k z_0^{-k}}{k}}$$

$$\sqrt{2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)} = \sqrt[4]{2}\sqrt{2 i \pi \left\lfloor \frac{\pi - \arg\left(\frac{1}{z_0}\right) - \arg(z_0)}{2\pi} \right\rfloor + \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (2-z_0)^k z_0^{-k}}{k}}$$

Integral representations:

$$\sqrt{2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)} = \sqrt[4]{2}\sqrt{\int_1^2 \frac{1}{t}\, dt}$$

$$\sqrt{2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)} = \frac{\sqrt{-i \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\, ds}}{\sqrt[4]{2}\sqrt{\pi}} \quad \text{for } -1 < \gamma < 0$$

Multiple-argument formulas:

$$\sqrt{2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)} = \sqrt{2}\sqrt{\frac{\cos(6\pi)\log(1)}{\sqrt{1}}+\frac{\cos(12\pi)\log(2)}{\sqrt{2}}}$$

$$\sqrt{2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)} =$$

$$\exp\left(i\pi\left\lfloor-\frac{-\pi+\arg(2)+\arg\left(\frac{\cos(6\pi)\log(1)}{\sqrt{1}}+\frac{\cos(12\pi)\log(2)}{\sqrt{2}}\right)}{2\pi}\right\rfloor\right)$$

$$\sqrt{2}\sqrt{\frac{\cos(6\pi)\log(1)}{\sqrt{1}}+\frac{\cos(12\pi)\log(2)}{\sqrt{2}}}$$

64 log base 0.990079867217 [2((log(1)/sqrt1 cos (2Pi*3) + log(2)/sqrt2 cos(4Pi*3)))]-Pi+1/golden ratio

Input interpretation:

$$64\log_{0.990079867217}\left(2\left(\frac{\log(1)}{\sqrt{1}}\cos(2\pi\times 3)+\frac{\log(2)}{\sqrt{2}}\cos(4\pi\times 3)\right)\right)-\pi+\frac{1}{\phi}$$

$\log(x)$ is the natural logarithm

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

ϕ is the golden ratio

Result:

125.4764413...

125.4764413... result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 (see Appendix)

Alternative representations:

$$64\log_{0.9900798672170000}\left(2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)\right)-\pi+\frac{1}{\phi} = -\pi+64\log_{0.9900798672170000}\left(2\left(\frac{\cosh(-6i\pi)\log(1)}{\sqrt{1}}+\frac{\cosh(-12i\pi)\log(2)}{\sqrt{2}}\right)\right)+\frac{1}{\phi}$$

$$64\log_{0.9900798672170000}\left(2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}}+\frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)\right)-\pi+\frac{1}{\phi} = -\pi+\frac{1}{\phi}+\frac{64\log\left(2\left(\frac{\cos(6\pi)\log(1)}{\sqrt{1}}+\frac{\cos(12\pi)\log(2)}{\sqrt{2}}\right)\right)}{\log(0.9900798672170000)}$$

$$64 \log_{0.9900798672170000}\left(2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}} + \frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)\right) - \pi + \frac{1}{\phi} =$$
$$-\pi + 64 \log_{0.9900798672170000}\left(2\left(\frac{\cosh(6 i \pi)\log(a)\log_a(1)}{\sqrt{1}} + \frac{\cosh(12 i \pi)\log(a)\log_a(2)}{\sqrt{2}}\right)\right) + \frac{1}{\phi}$$

Series representation:

$$64 \log_{0.9900798672170000}\left(2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}} + \frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)\right) - \pi + \frac{1}{\phi} =$$
$$\frac{1}{\phi} - \pi - \frac{64 \sum_{k=1}^{\infty} \frac{(-1)^k \left(-1 + \frac{2\cos(6\pi)\log(1)}{\sqrt{1}} + \frac{2\cos(12\pi)\log(2)}{\sqrt{2}}\right)^k}{k}}{\log(0.9900798672170000)}$$

Integral representations:

$$64 \log_{0.9900798672170000}\left(2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}} + \frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi +$$
$$64 \log_{0.9900798672170000}\left(\int_{\frac{\pi}{2}}^{6\pi}\left(-\frac{2\log(1)\sin(t)}{\sqrt{1}} - \frac{46\log(2)\sin\left(\frac{1}{11}(-6\pi + 23t)\right)}{11\sqrt{2}}\right)dt\right)$$

$$64 \log_{0.9900798672170000}\left(2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}} + \frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)\right) - \pi + \frac{1}{\phi} =$$
$$\frac{1}{\phi} - \pi + 64 \log_{0.9900798672170000}\left(\frac{\sqrt{\pi}}{i\pi\sqrt{1}\sqrt{2}} \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{e^{-(36\pi^2)/s+s}\left(\log(2)\sqrt{1} + e^{(27\pi^2)/s}\log(1)\sqrt{2}\right)}{\sqrt{s}}\,ds\right) \text{ for } \gamma > 0$$

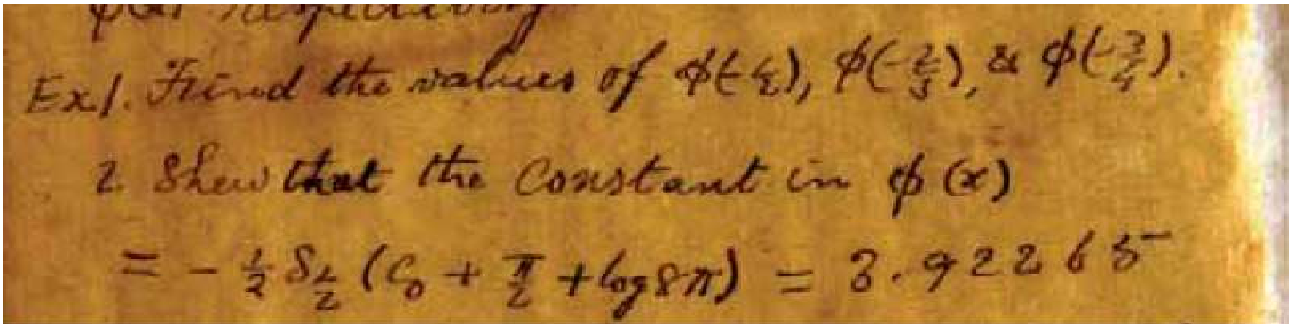
$$64 \log_{0.9900798672170000}\left(2\left(\frac{\cos(2\pi 3)\log(1)}{\sqrt{1}} + \frac{\cos(4\pi 3)\log(2)}{\sqrt{2}}\right)\right) - \pi + \frac{1}{\phi} =$$
$$-\frac{1}{\phi}\left(-1 + \phi\pi - 64\phi\log_{0.9900798672170000}\left(\int_0^1\int_0^1 \sin\left(\frac{1}{2}(\pi + 11\pi t_2)\right)dt_2\,dt_1 + \int_0^1\int_0^1 \frac{\sin\left(\frac{1}{2}(\pi + 23\pi t_2)\right)}{1+t_1}\,dt_2\,dt_1\right)\right)$$

Multiple-argument formulas:

$$64 \log_{0.9900798672170000}\left(2\left(\frac{\cos(2\pi\,3)\log(1)}{\sqrt{1}} + \frac{\cos(4\pi\,3)\log(2)}{\sqrt{2}}\right)\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi + 64\left(\log_{0.9900798672170000}(2) + \log_{0.9900798672170000}\left(\frac{\cos(6\pi)\log(1)}{\sqrt{1}} + \frac{\cos(12\pi)\log(2)}{\sqrt{2}}\right)\right)$$

$$64 \log_{0.9900798672170000}\left(2\left(\frac{\cos(2\pi\,3)\log(1)}{\sqrt{1}} + \frac{\cos(4\pi\,3)\log(2)}{\sqrt{2}}\right)\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi + 64 \log_{0.9900798672170000}\left(2\left(\frac{(-1 + 2\cos^2(3\pi))\log(1)}{\sqrt{1}} + \frac{(-1 + 2\cos^2(6\pi))\log(2)}{\sqrt{2}}\right)\right)$$

$$64 \log_{0.9900798672170000}\left(2\left(\frac{\cos(2\pi\,3)\log(1)}{\sqrt{1}} + \frac{\cos(4\pi\,3)\log(2)}{\sqrt{2}}\right)\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi + 64 \log_{0.9900798672170000}\left(2\left(\frac{\log(1)(1 - 2\sin^2(3\pi))}{\sqrt{1}} + \frac{\log(2)(1 - 2\sin^2(6\pi))}{\sqrt{2}}\right)\right)$$


Ex 1. Find the values of $\phi(-\frac{1}{2})$, $\phi(-\frac{2}{3})$, & $\phi(-\frac{3}{4})$.

2. Shew that the constant in $\phi(x)$

$= -\frac{1}{2}S_{\frac{1}{2}}(C_0 + \frac{\pi}{2} + \log 8\pi) = 3.92265$

-1/2*(2(2)^1/5)+(((55/199+Pi/2+log(8Pi))))

Input:

$$-\frac{1}{2}\left(2\sqrt[5]{2}\right) + \left(\frac{55}{199} + \frac{\pi}{2} + \log(8\pi)\right)$$

log(x) is the natural logarithm

Exact result:

$$\frac{55}{199} - \sqrt[5]{2} + \frac{\pi}{2} + \log(8\pi)$$

Decimal approximation:

3.922651308874836408295155144006497695664207418545631733824...

3.92265130887…

Alternate forms:

$$\frac{1}{398}\left(110-398\sqrt[5]{2}+199\pi+398\log(8\pi)\right)$$

$$\frac{\pi}{2}+\frac{1}{199}\left(55-199\sqrt[5]{2}+199\log(8\pi)\right)$$

$$\frac{1}{398}\left(199\pi+2\left(55-199\sqrt[5]{2}+597\log(2)\right)+398\log(\pi)\right)$$

Alternative representations:

$$\frac{1}{2}\left(2\sqrt[5]{2}\right)(-1)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)=\frac{\pi}{2}+\log_e(8\pi)-\sqrt[5]{2}+\frac{55}{199}$$

$$\frac{1}{2}\left(2\sqrt[5]{2}\right)(-1)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)=\frac{\pi}{2}+\log(a)\log_a(8\pi)-\sqrt[5]{2}+\frac{55}{199}$$

$$\frac{1}{2}\left(2\sqrt[5]{2}\right)(-1)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)=\frac{\pi}{2}-\text{Li}_1(1-8\pi)-\sqrt[5]{2}+\frac{55}{199}$$

Series representations:

$$\frac{1}{2}\left(2\sqrt[5]{2}\right)(-1)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)=\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}+\log(-1+8\pi)-\sum_{k=1}^{\infty}\frac{\left(\frac{1}{1-8\pi}\right)^k}{k}$$

$$\frac{1}{2}\left(2\sqrt[5]{2}\right)(-1)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)=$$
$$\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}+2i\pi\left\lfloor\frac{\arg(8\pi-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(8\pi-x)^k x^{-k}}{k}\quad\text{for } x<0$$

$$\frac{1}{2}\left(2\sqrt[5]{2}\right)(-1)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)=$$
$$\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}+2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(8\pi-z_0)^k z_0^{-k}}{k}$$

Integral representations:

$$\frac{1}{2}\left(2\sqrt[5]{2}\right)(-1)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)=\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}+\int_1^{8\pi}\frac{1}{t}\,dt$$

$$\frac{1}{2}\left(2\sqrt[5]{2}\right)(-1)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)=$$
$$\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}-\frac{i}{2\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{(-1+8\pi)^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

Or:

-1/2*8((713Pi)/7800)+(((55/199+Pi/2+log(8Pi))))

Input:

$$-\frac{1}{2}\times 8\times\frac{713\pi}{7800}+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)$$

log(x) is the natural logarithm

Exact result:

$$\frac{55}{199}+\frac{131\pi}{975}+\log(8\pi)$$

Decimal approximation:

3.922654503866988041235389920385304486937503547769352085309...

3.9226545038…

Alternate forms:

$$\frac{55}{199}+\frac{131\pi}{975}+\log(8)+\log(\pi)$$

$$\frac{53625+26069\pi}{194025}+\log(8\pi)$$

$$\frac{53625+26069\pi+194025\log(8\pi)}{194025}$$

Alternative representations:

$$\frac{(8(713\pi))(-1)}{7800\times 2}+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)=\frac{\pi}{2}+\log_e(8\pi)+\frac{55}{199}-\frac{2852\pi}{7800}$$

$$\frac{(8(713\pi))(-1)}{7800\times 2}+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)=\frac{\pi}{2}+\log(a)\log_a(8\pi)+\frac{55}{199}-\frac{2852\pi}{7800}$$

$$\frac{(8(713\pi))(-1)}{7800\times 2}+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)=\frac{\pi}{2}-\mathrm{Li}_1(1-8\pi)+\frac{55}{199}-\frac{2852\pi}{7800}$$

Series representations:

$$\frac{(8(713\pi))(-1)}{7800\times 2}+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)=\frac{55}{199}+\frac{131\pi}{975}+\log(-1+8\pi)-\sum_{k=1}^{\infty}\frac{\left(\frac{1}{1-8\pi}\right)^k}{k}$$

$$\frac{(8(713\pi))(-1)}{7800\times 2}+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)=$$
$$\frac{55}{199}+\frac{131\pi}{975}+2i\pi\left\lfloor\frac{\arg(8\pi-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(8\pi-x)^k x^{-k}}{k}\quad\text{for } x<0$$

$$\frac{(8(713\pi))(-1)}{7800\times 2}+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)=$$
$$\frac{55}{199}+\frac{131\pi}{975}+2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(8\pi-z_0)^k z_0^{-k}}{k}$$

Integral representations:

$$\frac{(8(713\pi))(-1)}{7800\times 2}+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)=\frac{55}{199}+\frac{131\pi}{975}+\int_1^{8\pi}\frac{1}{t}\,dt$$

$$\frac{(8(713\pi))(-1)}{7800\times 2}+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)=$$
$$\frac{55}{199}+\frac{131\pi}{975}-\frac{i}{2\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{(-1+8\pi)^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\quad\text{for } -1<\gamma<0$$

With this other data, we obtain:

-2/3+4/5+2-0.0082(((55+Pi/2+log(8Pi))))

Input:

$$-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)$$

log(x) is the natural logarithm

Result:

1.643015...

$1.643015\ldots \approx \zeta(2)=\frac{\pi^2}{6}=1.644934\ldots$

Alternative representations:

$$-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)=\frac{4}{3}-0.0082\left(55+\frac{\pi}{2}+\log_e(8\pi)\right)+\frac{4}{5}$$

$$-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)=\frac{4}{3}-0.0082\left(55+\frac{\pi}{2}+\log(a)\log_a(8\pi)\right)+\frac{4}{5}$$

$$-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)=\frac{4}{3}-0.0082\left(55+\frac{\pi}{2}-\text{Li}_1(1-8\pi)\right)+\frac{4}{5}$$

Series representations:

$$-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)=$$
$$1.68233-0.0041\pi-0.0082\log(-1+8\pi)+0.0082\sum_{k=1}^{\infty}\frac{(-1)^k(-1+8\pi)^{-k}}{k}$$

$$-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)=$$
$$1.68233-0.0041\pi-0.0164\,i\pi\left\lfloor\frac{\arg(8\pi-x)}{2\pi}\right\rfloor-$$
$$0.0082\log(x)+0.0082\sum_{k=1}^{\infty}\frac{(-1)^k(8\pi-x)^k x^{-k}}{k}\quad\text{for } x<0$$

$$-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)=$$
$$1.68233-0.0041\pi-0.0082\left\lfloor\frac{\arg(8\pi-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)-0.0082\log(z_0)-$$
$$0.0082\left\lfloor\frac{\arg(8\pi-z_0)}{2\pi}\right\rfloor\log(z_0)+0.0082\sum_{k=1}^{\infty}\frac{(-1)^k(8\pi-z_0)^k z_0^{-k}}{k}$$

Integral representations:

$$-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)=1.68233-0.0041\pi-0.0082\int_1^{8\pi}\frac{1}{t}\,dt$$

$$-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)=$$
$$1.68233-0.0041\pi-\frac{0.0041}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{(-1+8\pi)^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\quad\text{for } -1<\gamma<0$$

1/10^27 * ((((29/10^3-2/3+4/5+2-0.0082(((55+Pi/2+log(8Pi)))))))

Input:

$$\frac{1}{10^{27}}\left(\frac{29}{10^3}-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)\right)$$

log(x) is the natural logarithm

Result:

$1.672015\ldots \times 10^{-27}$

1.672015…*10^{-27} result practically equal to the proton mass

Alternative representations:

$$\frac{\frac{29}{10^3}-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)}{10^{27}}=\frac{\frac{4}{3}-0.0082\left(55+\frac{\pi}{2}+\log_e(8\pi)\right)+\frac{4}{5}+\frac{29}{10^3}}{10^{27}}$$

$$\frac{\frac{29}{10^3}-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)}{10^{27}}=\frac{\frac{4}{3}-0.0082\left(55+\frac{\pi}{2}+\log(a)\log_a(8\pi)\right)+\frac{4}{5}+\frac{29}{10^3}}{10^{27}}$$

$$\frac{\frac{29}{10^3}-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)}{10^{27}}=\frac{\frac{4}{3}-0.0082\left(55+\frac{\pi}{2}-\text{Li}_1(1-8\pi)\right)+\frac{4}{5}+\frac{29}{10^3}}{10^{27}}$$

Series representations:

$$\frac{\frac{29}{10^3}-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)}{10^{27}}=1.71133\times10^{-27}-4.1\times10^{-30}\,\pi-8.2\times10^{-30}\log(-1+8\pi)+8.2\times10^{-30}\sum_{k=1}^{\infty}\frac{(-1)^k(-1+8\pi)^{-k}}{k}$$

$$\frac{\frac{29}{10^3}-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)}{10^{27}}=1.71133\times10^{-27}-4.1\times10^{-30}\,\pi-1.64\times10^{-29}\,i\pi\left\lfloor\frac{\arg(8\pi-x)}{2\pi}\right\rfloor-8.2\times10^{-30}\log(x)+8.2\times10^{-30}\sum_{k=1}^{\infty}\frac{(-1)^k(8\pi-x)^k x^{-k}}{k}\quad\text{for } x<0$$

$$\frac{\frac{29}{10^3}-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)}{10^{27}} = 1.71133\times10^{-27} - 4.1\times10^{-30}\,\pi - 8.2\times10^{-30}\left\lfloor\frac{\arg(8\pi-z_0)}{2\pi}\right\rfloor \log\left(\frac{1}{z_0}\right) - 8.2\times10^{-30}\log(z_0) - 8.2\times10^{-30}\left\lfloor\frac{\arg(8\pi-z_0)}{2\pi}\right\rfloor \log(z_0) + 8.2\times10^{-30}\sum_{k=1}^{\infty}\frac{(-1)^k (8\pi-z_0)^k z_0^{-k}}{k}$$

Integral representations:

$$\frac{\frac{29}{10^3}-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)}{10^{27}} = 1.71133\times10^{-27} - 4.1\times10^{-30}\,\pi - 8.2\times10^{-30}\int_1^{8\pi}\frac{1}{t}\,dt$$

$$\frac{\frac{29}{10^3}-\frac{2}{3}+\frac{4}{5}+2-0.0082\left(55+\frac{\pi}{2}+\log(8\pi)\right)}{10^{27}} = 1.71133\times10^{-27} - 4.1\times10^{-30}\,\pi - \frac{4.1\times10^{-30}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{(-1+8\pi)^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

From the principal result, we obtain:

(((1/4[-1/2*(2(2)^1/5)+(((55/199+Pi/2+log(8Pi))))])))^1/2

Input:

$$\sqrt{\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)}$$

log(x) is the natural logarithm

Exact result:

$$\frac{1}{2}\sqrt{\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}+\log(8\pi)}$$

Decimal approximation:

0.990284215373904211395505494704027753725570040888517572997...

0.9902842153…. result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1} = 1-\frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\ldots}}}} \approx 0.9991104684$$

and to the dilaton value **0.989117352243** = $\boldsymbol{\phi}$ (see Appendix)

Alternate forms:

$$\frac{1}{2}\sqrt{\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}+\log(8)+\log(\pi)}$$

$$\frac{1}{2}\sqrt{\frac{1}{398}\left(110-398\sqrt[5]{2}+199\pi+398\log(8\pi)\right)}$$

$$\frac{1}{2}\sqrt{\frac{1}{398}\left(199\pi+2\left(55-199\sqrt[5]{2}+597\log(2)\right)+398\log(\pi)\right)}$$

All 2nd roots of 1/4 (55/199 - 2^(1/5) + π/2 + log(8 π)):

$$\frac{1}{2}e^0\sqrt{\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}+\log(8\pi)} \approx 0.9903 \text{ (real, principal root)}$$

$$\frac{1}{2}e^{i\pi}\sqrt{\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}+\log(8\pi)} \approx -0.9903 \text{ (real root)}$$

Alternative representations:

$$\sqrt{\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)} = \sqrt{\frac{1}{4}\left(\frac{\pi}{2}+\log_e(8\pi)-\sqrt[5]{2}+\frac{55}{199}\right)}$$

$$\sqrt{\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)} = \sqrt{\frac{1}{4}\left(\frac{\pi}{2}+\log(a)\log_a(8\pi)-\sqrt[5]{2}+\frac{55}{199}\right)}$$

$$\sqrt{\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)}=\sqrt{\frac{1}{4}\left(\frac{\pi}{2}-\text{Li}_1(1-8\pi)-\sqrt[5]{2}+\frac{55}{199}\right)}$$

Series representations:

$$\sqrt{\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)}=\frac{1}{2}\sqrt{\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}+\log(-1+8\pi)-\sum_{k=1}^{\infty}\frac{\left(\frac{1}{1-8\pi}\right)^k}{k}}$$

$$\sqrt{\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)}=\frac{1}{2}\sqrt{\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}+2i\pi\left\lfloor\frac{\arg(8\pi-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(8\pi-x)^k x^{-k}}{k}}\quad\text{for } x<0$$

$$\sqrt{\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)}=\frac{1}{2}\sqrt{\left(\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}+\log(z_0)+\left\lfloor\frac{\arg(8\pi-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(8\pi-z_0)^k z_0^{-k}}{k}\right)}$$

Integral representations:

$$\sqrt{\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)}=\frac{1}{2}\sqrt{\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}+\int_1^{8\pi}\frac{1}{t}\,dt}$$

$$\sqrt{\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)}=\frac{1}{2}\sqrt{\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}-\frac{i}{2\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{(-1+8\pi)^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}\quad\text{for } -1<\gamma<0$$

64*log base 0.9902842153739 (((1/4[-1/2*(2(2)^1/5)+(((55/199+Pi/2+log(8Pi))))])))-Pi+1/golden ratio

Input interpretation:

$$64 \log_{0.9902842153739}\left(\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)\right)-\pi+\frac{1}{\phi}$$

log(x) is the natural logarithm

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

ϕ is the golden ratio

Result:

125.47644134...

125.47644134... result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 (see Appendix)

Alternative representations:

$$64 \log_{0.99028421537390000}\left(\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)\right)-\pi+\frac{1}{\phi}= -\pi+64 \log_{0.99028421537390000}\left(\frac{1}{4}\left(\frac{\pi}{2}+\log_e(8\pi)-\sqrt[5]{2}+\frac{55}{199}\right)\right)+\frac{1}{\phi}$$

$$64 \log_{0.99028421537390000}\left(\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)\right)-\pi+\frac{1}{\phi}= -\pi+\frac{1}{\phi}+\frac{64 \log\left(\frac{1}{4}\left(\frac{\pi}{2}+\log(8\pi)-\sqrt[5]{2}+\frac{55}{199}\right)\right)}{\log(0.99028421537390000)}$$

$$64 \log_{0.99028421537390000}\left(\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)\right)-\pi+\frac{1}{\phi}= -\pi+64 \log_{0.99028421537390000}\left(\frac{1}{4}\left(\frac{\pi}{2}+\log(a)\log_a(8\pi)-\sqrt[5]{2}+\frac{55}{199}\right)\right)+\frac{1}{\phi}$$

Series representations:

$$64 \log_{0.99028421537390000}\left(\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)\right)-\pi+\frac{1}{\phi}=\frac{1}{\phi}-\pi+ 64 \log_{0.99028421537390000}\left(\frac{1}{4}\left(\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}+\log(-1+8\pi)-\sum_{k=1}^{\infty}\frac{(-1)^k(-1+8\pi)^{-k}}{k}\right)\right)$$

$$64 \log_{0.99028421537390000}\left(\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)\right)-\pi+\frac{1}{\phi}= \frac{1}{\phi}-\pi-\frac{64\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{741}{199}-\sqrt[5]{2}+\frac{\pi}{2}+\log(8\pi)\right)^k}{k}}{\log(0.99028421537390000)}$$

$$64 \log_{0.99028421537390000}\left(\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)\right)-\pi+\frac{1}{\phi}= \frac{1}{\phi}-\pi+64 \log_{0.99028421537390000}\left(\frac{1}{4}\left(\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}+ 2 i \pi\left\lfloor\frac{\arg(8\pi-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(8\pi-x)^k x^{-k}}{k}\right)\right) \quad \text{for } x<0$$

Integral representations:

$$64 \log_{0.99028421537390000}\left(\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)\right)-\pi+\frac{1}{\phi}= \frac{1}{\phi}-\pi+64 \log_{0.99028421537390000}\left(\frac{1}{4}\left(\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}+\int_1^{8\pi}\frac{1}{t}\,dt\right)\right)$$

$$64 \log_{0.99028421537390000}\left(\frac{1}{4}\left(-\frac{1}{2}\left(2\sqrt[5]{2}\right)+\left(\frac{55}{199}+\frac{\pi}{2}+\log(8\pi)\right)\right)\right)-\pi+\frac{1}{\phi}= \frac{1}{\phi}-\pi+64 \log_{0.99028421537390000}\left(\frac{1}{4}\left(\frac{55}{199}-\sqrt[5]{2}+\frac{\pi}{2}+ \frac{1}{2 i \pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{(-1+8\pi)^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)\right) \quad \text{for } -1<\gamma<0$$

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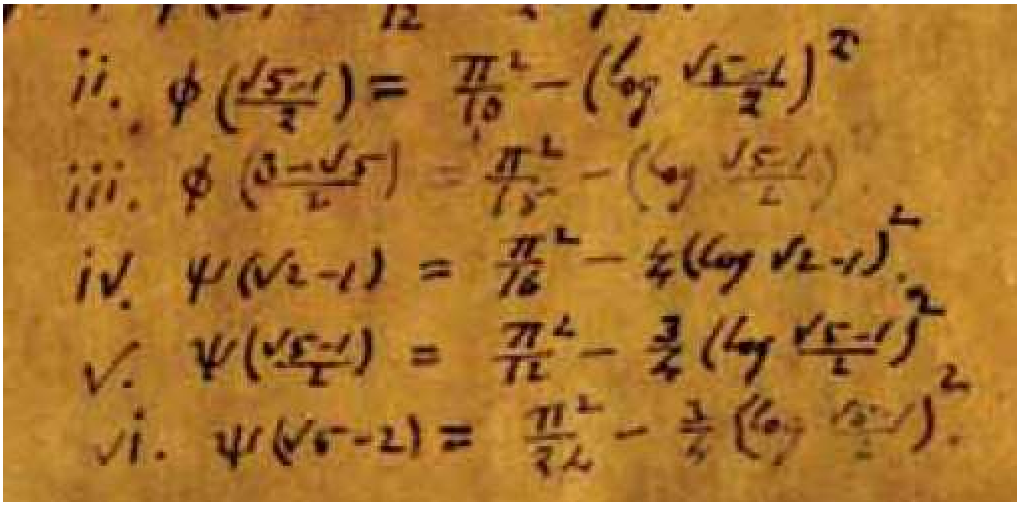

Pi^2/(10) –(((ln ((sqrt5-1)/2))))^2

Input:

$$\frac{\pi^2}{10} - \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)$$

$\log(x)$ is the natural logarithm

Decimal approximation:

0.755395619531741469386520028756082353514963590674780191826...

0.75539561953174....

Alternate forms:

$$\frac{\pi^2}{10} - \text{csch}^{-1}(2)^2$$

$$\frac{1}{10}\left(\pi^2 - 10\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)\right)$$

$$\frac{1}{10}\left(\pi^2 - 10\left(\log\left(\sqrt{5} - 1\right) - \log(2)\right)^2\right)$$

$\text{csch}^{-1}(x)$ is the inverse hyperbolic cosecant function

Alternative representations:

$$\frac{\pi^2}{10} - \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right) = \frac{\pi^2}{10} - \log_e^2\left(\frac{1}{2}\left(-1 + \sqrt{5}\right)\right)$$

$$\frac{\pi^2}{10} - \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right) = \frac{\pi^2}{10} - \left(\log(a)\log_a\left(\frac{1}{2}\left(-1 + \sqrt{5}\right)\right)\right)^2$$

$$\frac{\pi^2}{10} - \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right) = \frac{\pi^2}{10} - \left(-\text{Li}_1\left(1 + \frac{1}{2}\left(1 - \sqrt{5}\right)\right)\right)^2$$

Series representations:

$$\frac{\pi^2}{10} - \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right) = \frac{\pi^2}{10} - \left(\sum_{k=1}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-3 + \sqrt{5}\right)^k}{k}\right)^2$$

$$\frac{\pi^2}{10} - \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right) = \frac{\pi^2}{10} - \left(2 i \pi \left\lfloor \frac{\arg\left(-1 + \sqrt{5} - 2 x\right)}{2 \pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-1 + \sqrt{5} - 2 x\right)^k x^{-k}}{k}\right)^2 \quad \text{for } x < 0$$

$$\frac{\pi^2}{10} - \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right) = \frac{\pi^2}{10} - \left(2 i \pi \left\lfloor \frac{\arg\left(\frac{1}{2}\left(-1 + \sqrt{5}\right) - x\right)}{2 \pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-1 + \sqrt{5} - 2 x\right)^k x^{-k}}{k}\right)^2 \quad \text{for } x < 0$$

Integral representation:

$$\frac{\pi^2}{10} - \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right) = \frac{\pi^2}{10} - \left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)} \frac{1}{t} \, dt\right)^2$$

We note that:

0.755395619531741+(((ln ((sqrt5-1)/2))))^2

Input interpretation:

$$0.755395619531741 + \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)$$

log(x) is the natural logarithm

Result:

0.986960440108935...

0.986960440108935.... result very near to the dilaton value $\mathbf{0.989117352243 = \phi}$ (see Appendix)

Alternative representations:

$$0.7553956195317410000+\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)=$$
$$0.7553956195317410000+\log_e^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)$$

$$0.7553956195317410000+\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)=$$
$$0.7553956195317410000+\left(\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^2$$

$$0.7553956195317410000+\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)=$$
$$0.7553956195317410000+\left(-\text{Li}_1\left(1+\frac{1}{2}\left(1-\sqrt{5}\right)\right)\right)^2$$

Series representations:

$$0.7553956195317410000+\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)=$$
$$0.7553956195317410000+\left(\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-3+\sqrt{5}\right)^k}{k}\right)^2$$

$$0.7553956195317410000+\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)=$$
$$0.7553956195317410000+\log^2\left(\frac{1}{2}\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)\right)$$

$$0.7553956195317410000+\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)=0.7553956195317410000+$$
$$\left(2i\pi\left\lfloor\frac{\arg\left(\frac{1}{2}\left(-1-2x+\sqrt{5}\right)\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k x^{-k}\left(-1-2x+\sqrt{5}\right)^k}{k}\right)^2 \quad \text{for } x<0$$

Integral representation:

$$0.7553956195317410000+\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)=$$
$$0.7553956195317410000+\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2$$

64*log base 0.99345882657 (((0.755395619531741+(((ln ((sqrt5-1)/2))))^2)))-Pi+1/golden ratio

Input interpretation:

$$64 \log_{0.99345882657}\left(0.755395619531741 + \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)\right) - \pi + \frac{1}{\phi}$$

log(x) is the natural logarithm

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

ϕ is the golden ratio

Result:

125.476441...

125.4761441... result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 (see Appendix)

Alternative representations:

$$64 \log_{0.993458826570000}\left(0.7553956195317410000 + \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)\right) - \pi + \frac{1}{\phi} = -\pi + \frac{1}{\phi} + \frac{64 \log\left(0.7553956195317410000 + \log^2\left(\frac{1}{2}\left(-1 + \sqrt{5}\right)\right)\right)}{\log(0.993458826570000)}$$

$$64 \log_{0.993458826570000}\left(0.7553956195317410000 + \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)\right) - \pi + \frac{1}{\phi} = -\pi + 64 \log_{0.993458826570000}\left(0.7553956195317410000 + \log_e^2\left(\frac{1}{2}\left(-1 + \sqrt{5}\right)\right)\right) + \frac{1}{\phi}$$

$$64 \log_{0.993458826570000}\left(0.7553956195317410000 + \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)\right) - \pi + \frac{1}{\phi} = -\pi + 64 \log_{0.993458826570000}\left(0.7553956195317410000 + \left(\log(a) \log_a\left(\frac{1}{2}\left(-1 + \sqrt{5}\right)\right)\right)^2\right) + \frac{1}{\phi}$$

Series representations:

$$64 \log_{0.993458826570000}\left(0.7553956195317410000 + \log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right) - \pi + \frac{1}{\phi} =$$
$$\frac{1}{\phi} - \pi + 64 \log_{0.993458826570000}\left(0.7553956195317410000 + \left(\sum_{k=1}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-3+\sqrt{5}\right)^k}{k}\right)^2\right)$$

$$64 \log_{0.993458826570000}\left(0.7553956195317410000 + \log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right) - \pi + \frac{1}{\phi} =$$
$$\frac{1}{\phi} - \pi - \frac{64 \sum_{k=1}^{\infty} \frac{(-1)^k \left(-0.2446043804682590000 + \log^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^k}{k}}{\log(0.993458826570000)}$$

Integral representation:

$$64 \log_{0.993458826570000}\left(0.7553956195317410000 + \log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right) - \pi + \frac{1}{\phi} =$$
$$\frac{1}{\phi} - \pi + 64 \log_{0.993458826570000}\left(0.7553956195317410000 + \left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)} \frac{1}{t}\, dt\right)^2\right)$$

Pi^2/(15) –(((ln ((sqrt5-1)/2))))^2

Input:

$$\frac{\pi^2}{15} - \log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)$$

log(x) is the natural logarithm

Decimal approximation:

0.426408806162096182092036995426877315671173610433420504278...

0.426408806162096...

Alternate forms:

$$\frac{\pi^2}{15} - \operatorname{csch}^{-1}(2)^2$$

$$\frac{1}{15}\left(\pi^2 - 15 \log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)$$

$$\frac{1}{15}\left(\pi^2 - 15\left(\log\left(\sqrt{5}-1\right) - \log(2)\right)^2\right)$$

$\operatorname{csch}^{-1}(x)$ is the inverse hyperbolic cosecant function

Alternative representations:

$$\frac{\pi^2}{15} - \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right) = \frac{\pi^2}{15} - \log_e^2\left(\frac{1}{2}\left(-1 + \sqrt{5}\right)\right)$$

$$\frac{\pi^2}{15} - \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right) = \frac{\pi^2}{15} - \left(\log(a)\log_a\left(\frac{1}{2}\left(-1 + \sqrt{5}\right)\right)\right)^2$$

$$\frac{\pi^2}{15} - \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right) = \frac{\pi^2}{15} - \left(-\text{Li}_1\left(1 + \frac{1}{2}\left(1 - \sqrt{5}\right)\right)\right)^2$$

Series representations:

$$\frac{\pi^2}{15} - \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right) = \frac{\pi^2}{15} - \left(\sum_{k=1}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-3 + \sqrt{5}\right)^k}{k}\right)^2$$

$$\frac{\pi^2}{15} - \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right) = \frac{\pi^2}{15} - \left(2 i \pi \left\lfloor \frac{\arg\left(-1 + \sqrt{5} - 2x\right)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-1 + \sqrt{5} - 2x\right)^k x^{-k}}{k}\right)^2 \quad \text{for } x < 0$$

$$\frac{\pi^2}{15} - \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right) = \frac{\pi^2}{15} - \left(2 i \pi \left\lfloor \frac{\arg\left(\frac{1}{2}\left(-1 + \sqrt{5}\right) - x\right)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-1 + \sqrt{5} - 2x\right)^k x^{-k}}{k}\right)^2 \quad \text{for } x < 0$$

Integral representation:

$$\frac{\pi^2}{15} - \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right) = \frac{\pi^2}{15} - \left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)} \frac{1}{t}\, dt\right)^2$$

1/10^27[1+(((11+4)/10^3+0.426408806162096 + (((ln ((sqrt5-1)/2))))^2))]

Input interpretation:

$$\frac{1}{10^{27}}\left(1 + \left(\frac{11+4}{10^3} + 0.426408806162096 + \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)\right)\right)$$

log(x) is the natural logarithm

Result:

$1.672973626739290... \times 10^{-27}$

1.67297362673...*10^-27 result practically equal to the proton mass

Alternative representations:

$$\frac{1+\left(\frac{11+4}{10^3}+0.4264088061620960000+\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)}{10^{27}} = \frac{1.4264088061620960000+\log_e^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)+\frac{15}{10^3}}{10^{27}}$$

$$\frac{1+\left(\frac{11+4}{10^3}+0.4264088061620960000+\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)}{10^{27}} = \frac{1.4264088061620960000+\left(\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^2+\frac{15}{10^3}}{10^{27}}$$

$$\frac{1+\left(\frac{11+4}{10^3}+0.4264088061620960000+\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)}{10^{27}} = \frac{1.4264088061620960000+\left(-\text{Li}_1\left(1+\frac{1}{2}\left(1-\sqrt{5}\right)\right)\right)^2+\frac{15}{10^3}}{10^{27}}$$

Integral representation:

$$\frac{1+\left(\frac{11+4}{10^3}+0.4264088061620960000+\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)}{10^{27}} = 1.4414088061620960000\times 10^{-27} + 1.0000000000000000000\times 10^{-27}\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2$$

[((0.426408806162096 + (((ln ((sqrt5-1)/2))))^2))]^1/64

Input interpretation:

$$\sqrt[64]{0.426408806162096+\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)}$$

log(x) is the natural logarithm

Result:

0.99348086689512454...

0.99348086689512454.... result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1}=1-\frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\dots}}}}\approx 0.9991104684$$

and to the dilaton value **0.989117352243 = ϕ** (see Appendix)

2 log base 0.993480866895 ((([((0.426408806162096 + (((ln ((sqrt5-1)/2))))^2))])))-Pi+1/golden ratio

Input interpretation:

$$2\log_{0.993480866895}\left(0.426408806162096+\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)-\pi+\frac{1}{\phi}$$

log(x) is the natural logarithm

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

ϕ is the golden ratio

Result:

125.4764413...

125.4764413... result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 (see Appendix)

Alternative representations:

$$2 \log_{0.9934808668950000}\left(0.4264088061620960000 + \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)\right) - \pi + \frac{1}{\phi} = -\pi + \frac{1}{\phi} + \frac{2 \log\left(0.4264088061620960000 + \log^2\left(\frac{1}{2}\left(-1 + \sqrt{5}\right)\right)\right)}{\log(0.9934808668950000)}$$

$$2 \log_{0.9934808668950000}\left(0.4264088061620960000 + \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)\right) - \pi + \frac{1}{\phi} = -\pi + 2 \log_{0.9934808668950000}\left(0.4264088061620960000 + \log_e^2\left(\frac{1}{2}\left(-1 + \sqrt{5}\right)\right)\right) + \frac{1}{\phi}$$

$$2 \log_{0.9934808668950000}\left(0.4264088061620960000 + \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)\right) - \pi + \frac{1}{\phi} = -\pi + 2 \log_{0.9934808668950000}\left(0.4264088061620960000 + \left(\log(a) \log_a\left(\frac{1}{2}\left(-1 + \sqrt{5}\right)\right)\right)^2\right) + \frac{1}{\phi}$$

Series representations:

$$2 \log_{0.9934808668950000}\left(0.4264088061620960000 + \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi + 2 \log_{0.9934808668950000}\left(0.4264088061620960000 + \left(\sum_{k=1}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-3 + \sqrt{5}\right)^k}{k}\right)^2\right)$$

$$2 \log_{0.9934808668950000}\left(0.4264088061620960000 + \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi - \frac{2 \sum_{k=1}^{\infty} \frac{(-1)^k \left(-0.5735911938379040000 + \log^2\left(\frac{1}{2}\left(-1 + \sqrt{5}\right)\right)\right)^k}{k}}{\log(0.9934808668950000)}$$

Integral representation:

$$2 \log_{0.9934808668950000}\left(0.4264088061620960000 + \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi + 2 \log_{0.9934808668950000}\left(0.4264088061620960000 + \left(\int_1^{\frac{1}{2}\left(-1 + \sqrt{5}\right)} \frac{1}{t}\, dt\right)^2\right)$$

Pi^2/(16) –1/4(((ln ((sqrt2-1)))))^2

Input:

$$\frac{\pi^2}{16} - \frac{1}{4}\log^2\left(\sqrt{2} - 1\right)$$

log(x) is the natural logarithm

Decimal approximation:

0.4226454250941609183020120099699047198053417593750606868488...

0.4226454250941609....

Alternative representations:

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

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

$$\frac{\pi^2}{16} - \frac{1}{4}\log^2\left(\sqrt{2} - 1\right) = \frac{\pi^2}{16} - \frac{1}{4}\left(-\text{Li}_1\left(2 - \sqrt{2}\right)\right)^2$$

Series representations:

$$\frac{\pi^2}{16} - \frac{1}{4}\log^2\left(\sqrt{2} - 1\right) = \frac{\pi^2}{16} - \frac{1}{4}\left(\sum_{k=1}^{\infty}\frac{(-1)^k\left(-2 + \sqrt{2}\right)^k}{k}\right)^2$$

$$\frac{\pi^2}{16} - \frac{1}{4}\log^2\left(\sqrt{2} - 1\right) = \frac{1}{16}\left(\pi^2 - 4\left(2 i \pi \left\lfloor\frac{\arg\left(-1 + \sqrt{2} - x\right)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k\left(-1 + \sqrt{2} - x\right)^k x^{-k}}{k}\right)^2\right) \text{ for } x < 0$$

$$\frac{\pi^2}{16} - \frac{1}{4}\log^2\left(\sqrt{2} - 1\right) = \frac{\pi^2}{16} - \frac{1}{4}\left(2 i \pi \left\lfloor\frac{\arg\left(-1 + \sqrt{2} - x\right)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k\left(-1 + \sqrt{2} - x\right)^k x^{-k}}{k}\right)^2 \text{ for } x < 0$$

Integral representation:

$$\frac{\pi^2}{16} - \frac{1}{4}\log^2\left(\sqrt{2}-1\right) = \frac{\pi^2}{16} - \frac{1}{4}\left(\int_1^{-1+\sqrt{2}} \frac{1}{t}\,dt\right)^2$$

[1/4(((ln ((sqrt2-1)))))^2 + 0.4226454250941609]^1/64

Input interpretation:

$$\sqrt[64]{\frac{1}{4}\log^2\left(\sqrt{2}-1\right) + 0.4226454250941609}$$

log(x) is the natural logarithm

Result:

0.992479531455390870...

0.992479531455.... result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1} = 1 - \frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\dots}}}} \approx 0.9991104684$$

and to the dilaton value $\mathbf{0.989117352243 = \phi}$ (see Appendix)

2 log base 0.99247953145539 ((([1/4(((ln ((sqrt2-1)))))^2 + 0.4226454250941609])))-Pi+1/golden ratio

Input interpretation:

$$2\log_{0.99247953145539}\left(\frac{1}{4}\log^2\left(\sqrt{2}-1\right) + 0.4226454250941609\right) - \pi + \frac{1}{\phi}$$

log(x) is the natural logarithm

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

ϕ is the golden ratio

Result:

125.476441335...

125.476441335... result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 (see Appendix)

Alternative representations:

$$2 \log_{0.992479531455390000}\left(\frac{1}{4} \log^2\left(\sqrt{2} - 1\right) + 0.42264542509416090000\right) - \pi + \frac{1}{\phi} = -\pi + \frac{1}{\phi} + \frac{2 \log\left(0.42264542509416090000 + \frac{1}{4} \log^2\left(-1 + \sqrt{2}\right)\right)}{\log(0.992479531455390000)}$$

$$2 \log_{0.992479531455390000}\left(\frac{1}{4} \log^2\left(\sqrt{2} - 1\right) + 0.42264542509416090000\right) - \pi + \frac{1}{\phi} = -\pi + 2 \log_{0.992479531455390000}\left(0.42264542509416090000 + \frac{1}{4} \log_e^2\left(-1 + \sqrt{2}\right)\right) + \frac{1}{\phi}$$

$$2 \log_{0.992479531455390000}\left(\frac{1}{4} \log^2\left(\sqrt{2} - 1\right) + 0.42264542509416090000\right) - \pi + \frac{1}{\phi} = -\pi + 2 \log_{0.992479531455390000}\left(0.42264542509416090000 + \frac{1}{4} \left(\log(a) \log_a\left(-1 + \sqrt{2}\right)\right)^2\right) + \frac{1}{\phi}$$

Series representations:

$$2 \log_{0.992479531455390000}\left(\frac{1}{4} \log^2\left(\sqrt{2} - 1\right) + 0.42264542509416090000\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi - \frac{2 \sum_{k=1}^{\infty} \frac{(-0.25000000000000000000)^k \left(-2.3094182996233564000 + \log^2\left(-1 + \sqrt{2}\right)\right)^k}{k}}{\log(0.992479531455390000)}$$

$$2\log_{0.992479531455390000}\left(\frac{1}{4}\log^2\left(\sqrt{2}-1\right)+0.42264542509416090000\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+2\log_{0.992479531455390000}\left(0.25000000000000000000\left(1.6905817003766436000+\left(\sum_{k=1}^{\infty}\frac{(-1)^k\left(-2+\sqrt{2}\right)^k}{k}\right)^2\right)\right)$$

Integral representation:

$$2\log_{0.992479531455390000}\left(\frac{1}{4}\log^2\left(\sqrt{2}-1\right)+0.42264542509416090000\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+2\log_{0.992479531455390000}\left(0.42264542509416090000+0.25000000000000000000\left(\int_1^{-1+\sqrt{2}}\frac{1}{t}\,dt\right)^2\right)$$

Pi^2/(12) –3/4(((ln ((sqrt5-1)/2))))^2

Input:

$$\frac{\pi^2}{12}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)$$

log(x) is the natural logarithm

Decimal approximation:

0.648793417991217423863510779899363024597170188066425065756...

0.648793417991217….

Alternate forms:

$$\frac{1}{12}\left(\pi^2-9\operatorname{csch}^{-1}(2)^2\right)$$

$$\frac{1}{12}\left(\pi^2-9\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)$$

$$\frac{1}{12}\left(\pi^2-9\left(\log\left(\sqrt{5}-1\right)-\log(2)\right)^2\right)$$

$\operatorname{csch}^{-1}(x)$ is the inverse hyperbolic cosecant function

Alternative representations:

$$\frac{\pi^2}{12} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{\pi^2}{12} - \frac{3}{4}\log_e^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)$$

$$\frac{\pi^2}{12} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{\pi^2}{12} - \frac{3}{4}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^2$$

$$\frac{\pi^2}{12} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{\pi^2}{12} - \frac{3}{4}\left(-\text{Li}_1\left(1+\frac{1}{2}\left(1-\sqrt{5}\right)\right)\right)^2$$

Series representations:

$$\frac{\pi^2}{12} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{\pi^2}{12} - \frac{3}{4}\left(\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-3+\sqrt{5}\right)^k}{k}\right)^2$$

$$\frac{\pi^2}{12} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{1}{12}\left(\pi^2 - 9\left(2\,i\,\pi\left\lfloor\frac{\arg\left(-1+\sqrt{5}-2x\right)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)^2\right)$$

for $x < 0$

$$\frac{\pi^2}{12} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{\pi^2}{12} - \frac{3}{4}\left(2\,i\,\pi\left\lfloor\frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right)-x\right)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)^2$$

for $x < 0$

Integral representation:

$$\frac{\pi^2}{12} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{\pi^2}{12} - \frac{3}{4}\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2$$

((((Pi^2/(12) –3/4(((ln ((sqrt5-1)/2))))^2))))^1/64

Input:

$$\sqrt[64]{\frac{\pi^2}{12} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)}$$

log(x) is the natural logarithm

Decimal approximation:

0.993262783105259960603637261160646797589051377925255098896...

0.993262783105…. result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1}=1-\frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\ldots}}}}\approx 0.9991104684$$

and to the dilaton value **0.989117352243** = $\boldsymbol{\phi}$ (see Appendix)

Alternate forms:

$$\frac{\sqrt[64]{\frac{1}{3}\left(\pi^2-9\,\mathrm{csch}^{-1}(2)^2\right)}}{\sqrt[32]{2}}$$

$$\sqrt[64]{\frac{\pi^2}{12}-\frac{3}{4}\left(\log\left(\sqrt{5}-1\right)-\log(2)\right)^2}$$

$$\frac{\sqrt[64]{\frac{1}{3}\left(\pi^2-9\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)}}{\sqrt[32]{2}}$$

$\mathrm{csch}^{-1}(x)$ is the inverse hyperbolic cosecant function

Alternative representations:

$$\sqrt[64]{\frac{\pi^2}{12}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3}=\sqrt[64]{\frac{\pi^2}{12}-\frac{3}{4}\log_e^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)}$$

$$\sqrt[64]{\frac{\pi^2}{12} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3} = \sqrt[64]{\frac{\pi^2}{12} - \frac{3}{4}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^2}$$

$$\sqrt[64]{\frac{\pi^2}{12} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3} = \sqrt[64]{\frac{\pi^2}{12} - \frac{3}{4}\left(-\text{Li}_1\left(1+\frac{1}{2}\left(1-\sqrt{5}\right)\right)\right)^2}$$

Integral representation:

$$\sqrt[64]{\frac{\pi^2}{12} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3} = \sqrt[64]{\frac{\pi^2}{12} - \frac{3}{4}\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2}$$

2 log base 0.99326278310525996 ((((Pi^2/(12) –3/4(((ln ((sqrt5-1)/2))))^2))))-Pi+1/golden ratio

Input interpretation:

$$2\log_{0.99326278310525996}\left(\frac{\pi^2}{12} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right) - \pi + \frac{1}{\phi}$$

log(x) is the natural logarithm

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

ϕ is the golden ratio

Result:

125.476441335160...

125.476441335… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 (see Appendix)

Alternative representations:

$$2\log_{0.99326278310525996000}\left(\frac{\pi^2}{12}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)-\pi+\frac{1}{\phi}=$$
$$-\pi+\frac{1}{\phi}+\frac{2\log\left(\frac{\pi^2}{12}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)}{\log(0.99326278310525996000)}$$

$$2\log_{0.99326278310525996000}\left(\frac{\pi^2}{12}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)-\pi+\frac{1}{\phi}=$$
$$-\pi+2\log_{0.99326278310525996000}\left(\frac{\pi^2}{12}-\frac{3}{4}\log_e^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)+\frac{1}{\phi}$$

$$2\log_{0.99326278310525996000}\left(\frac{\pi^2}{12}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)-\pi+\frac{1}{\phi}=$$
$$-\pi+2\log_{0.99326278310525996000}\left(\frac{\pi^2}{12}-\frac{3}{4}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^2\right)+\frac{1}{\phi}$$

Series representations:

$$2\log_{0.99326278310525996000}\left(\frac{\pi^2}{12}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+2\log_{0.99326278310525996000}\left(\frac{1}{12}\left(\pi^2-9\left(\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-3+\sqrt{5}\right)^k}{k}\right)^2\right)\right)$$

$$2\log_{0.99326278310525996000}\left(\frac{\pi^2}{12}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi-\frac{2\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{12}\right)^k\left(-12+\pi^2-9\log^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^k}{k}}{\log(0.99326278310525996000)}$$

Integral representation:

$$2\log_{0.99326278310525996000}\left(\frac{\pi^2}{12}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+2\log_{0.99326278310525996000}\left(\frac{1}{12}\left(\pi^2-9\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2\right)\right)$$

Pi^2/(24) –3/4(((ln ((sqrt5-1)/2))))^2

Input:

$$\frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)$$

log(x) is the natural logarithm

Decimal approximation:

0.2375599012791608147454069882378567272924327127647254563 22...

0.23755990127916….

Alternate forms:

$$\frac{1}{24}\left(\pi^2 - 18\,\operatorname{csch}^{-1}(2)^2\right)$$

$$\frac{1}{24}\left(\pi^2 - 18\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)\right)$$

$$\frac{1}{24}\left(\pi^2 - 18\left(\log\left(\sqrt{5} - 1\right) - \log(2)\right)^2\right)$$

$\operatorname{csch}^{-1}(x)$ is the inverse hyperbolic cosecant function

Alternative representations:

$$\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)3 = \frac{\pi^2}{24} - \frac{3}{4}\log_e^2\left(\frac{1}{2}\left(-1 + \sqrt{5}\right)\right)$$

$$\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)3 = \frac{\pi^2}{24} - \frac{3}{4}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1 + \sqrt{5}\right)\right)\right)^2$$

$$\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)3 = \frac{\pi^2}{24} - \frac{3}{4}\left(-\operatorname{Li}_1\left(1 + \frac{1}{2}\left(1 - \sqrt{5}\right)\right)\right)^2$$

Series representations:

$$\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)3 = \frac{\pi^2}{24} - \frac{3}{4}\left(\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-3 + \sqrt{5}\right)^k}{k}\right)^2$$

$$\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)3 = \frac{1}{24}\left(\pi^2 - 18\left(2 i \pi\left\lfloor\frac{\arg\left(-1 + \sqrt{5} - 2x\right)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1 + \sqrt{5} - 2x\right)^k x^{-k}}{k}\right)^2\right)$$

for $x < 0$

$$\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 =$$

$$\frac{\pi^2}{24} - \frac{3}{4}\left(2\,i\,\pi\left\lfloor\frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right)-x\right)}{2\,\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2\,x\right)^k x^{-k}}{k}\right)^2$$

for $x < 0$

Integral representation:

$$\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{\pi^2}{24} - \frac{3}{4}\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2$$

((((Pi^2/(24) –3/4(((ln ((sqrt5-1)/2))))^2))))^1/128

Input:

$$\sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)}$$

$\log(x)$ is the natural logarithm

Decimal approximation:

0.988833628580485387235048704408866760465401974342081212010...

0.988833628580…. result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1} = 1-\frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\dots}}}} \approx 0.9991104684$$

and to the dilaton value $\mathbf{0.989117352243} = \boldsymbol{\phi}$ (see Appendix)

Alternate forms:

$$\frac{\sqrt[128]{\frac{\pi^2}{3} - 6\,\text{csch}^{-1}(2)^2}}{2^{3/128}}$$

$$\sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\left(\log\left(\sqrt{5} - 1\right) - \log(2)\right)^2}$$

$$\frac{\sqrt[128]{\frac{1}{3}\left(\pi^2 - 18\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)\right)}}{2^{3/128}}$$

$\text{csch}^{-1}(x)$ is the inverse hyperbolic cosecant function

All 128th roots of π^2/24 - 3/4 log^2(1/2 (sqrt(5) - 1)):

$$e^0\sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)} \approx 0.98883$$ (real, principal root)

$$e^{(i\pi)/64}\sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)} \approx 0.98764 + 0.04852\,i$$

$$e^{(i\pi)/32}\sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)} \approx 0.98407 + 0.09692\,i$$

$$e^{(3i\pi)/64}\sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)} \approx 0.97813 + 0.14509\,i$$

$$e^{(i\pi)/16}\sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)} \approx 0.96983 + 0.19291\,i$$

Alternative representations:

$$\sqrt[128]{\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)3} = \sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\log_e^2\left(\frac{1}{2}\left(-1 + \sqrt{5}\right)\right)}$$

$$\sqrt[128]{\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)3} = \sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1 + \sqrt{5}\right)\right)\right)^2}$$

$$\sqrt[128]{\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3} = \sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\left(-\text{Li}_1\left(1+\frac{1}{2}\left(1-\sqrt{5}\right)\right)\right)^2}$$

Integral representation:

$$\sqrt[128]{\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3} = \sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2}$$

log base 0.988833628580485 ((((Pi^2/(24) –3/4(((ln ((sqrt5-1)/2))))^2))))-Pi+1/golden ratio

Input interpretation:

$$\log_{0.988833628580485}\left(\frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right) - \pi + \frac{1}{\phi}$$

$\log(x)$ is the natural logarithm

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

ϕ is the golden ratio

Result:

125.4764413352...

125.4764413352… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 (see Appendix)

Alternative representations:

$$\log_{0.9888336285804850000}\left(\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right) - \pi + \frac{1}{\phi} =$$
$$-\pi + \log_{0.9888336285804850000}\left(\frac{\pi^2}{24} - \frac{3}{4}\log_e^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right) + \frac{1}{\phi}$$

$$\log_{0.9888336285804850000}\left(\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right) - \pi + \frac{1}{\phi} = -\pi + \frac{1}{\phi} + \frac{\log\left(\frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)}{\log(0.9888336285804850000)}$$

$$\log_{0.9888336285804850000}\left(\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right) - \pi + \frac{1}{\phi} = -\pi + \log_{0.9888336285804850000}\left(\frac{\pi^2}{24} - \frac{3}{4}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^2\right) + \frac{1}{\phi}$$

Series representations:

$$\log_{0.9888336285804850000}\left(\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi + \log_{0.9888336285804850000}\left(\frac{1}{24}\left(\pi^2 - 18\left(\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-3+\sqrt{5}\right)^k}{k}\right)^2\right)\right)$$

$$\log_{0.9888336285804850000}\left(\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi - \frac{\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{24}\right)^k\left(-24+\pi^2-18\log^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^k}{k}}{\log(0.9888336285804850000)}$$

Integral representation:

$$\log_{0.9888336285804850000}\left(\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi + \log_{0.9888336285804850000}\left(\frac{1}{24}\left(\pi^2 - 18\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2\right)\right)$$

From the multiplication of these results

0.75539561953174.... 0.426408806162096... 0.4226454250941609....

0.648793417991217…. 0.23755990127916….

we obtain:

55/(0.75539561953174*0.426408806162096*0.4226454250941609*0.648793417991217*0.23755990127916)+24

Input interpretation:

$$55/(0.75539561953174\times 0.426408806162096\times 0.4226454250941609\times 0.648793417991217\times 0.23755990127916)+24$$

Result:

2645.237174596988348018205398208368800154815071382453829710...

2645.2371745... result practically equal to the rest mass of charmed Xi baryon 2645.9

golden ratio^2+55(0.75539561953174+0.426408806162096+0.4226454250941609+0.648793417991217+0.23755990127916)

Input interpretation:

$$\phi^2+55\,(0.75539561953174+0.426408806162096+0.4226454250941609+0.648793417991217+0.23755990127916)$$

ϕ is the golden ratio

Result:

139.61220834196...

139.612208… result practically equal to the rest mass of Pion meson 139.57

Alternative representations:

$$\phi^2+55\,(0.7553956195317400000+0.4264088061620960000+0.4226454250941609000+0.6487934179912170000+0.2375599012791600000)=136.9941743532105645+(2\sin(54\,°))^2$$

$$\phi^2+55\,(0.7553956195317400000+0.4264088061620960000+0.4226454250941609000+0.6487934179912170000+0.2375599012791600000)=136.9941743532105645+(-2\cos(216\,°))^2$$

$$\phi^2+55\,(0.7553956195317400000+0.4264088061620960000+0.4226454250941609000+0.6487934179912170000+0.2375599012791600000)=136.9941743532105645+(-2\sin(666\,°))^2$$

Pi^2/(12)-1/2(ln2)^2

Input:

$$\frac{\pi^2}{12} - \frac{1}{2}\log^2(2)$$

log(x) is the natural logarithm

Exact result:

$$\frac{\pi^2}{12} - \frac{\log^2(2)}{2}$$

Decimal approximation:

0.5822405264650125059026563201596801087441984748061264254 34...

0.582240526465…..

Alternate form:

$$\frac{1}{12}\left(\pi^2 - 6\log^2(2)\right)$$

Alternative representations:

$$\frac{\pi^2}{12} - \frac{\log^2(2)}{2} = \frac{\pi^2}{12} - \frac{1}{2}\log_e^2(2)$$

$$\frac{\pi^2}{12} - \frac{\log^2(2)}{2} = \frac{\pi^2}{12} - \frac{1}{2}\left(\log(a)\log_a(2)\right)^2$$

$$\frac{\pi^2}{12} - \frac{\log^2(2)}{2} = \frac{\pi^2}{12} - \frac{1}{2}\left(2\coth^{-1}(3)\right)^2$$

Series representations:

$$\frac{\pi^2}{12} - \frac{\log^2(2)}{2} = \frac{\pi^2}{12} - \frac{1}{2}\left(2 i \pi \left\lfloor \frac{\arg(2-x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (2-x)^k x^{-k}}{k}\right)^2 \quad \text{for } x < 0$$

$$\frac{\pi^2}{12} - \frac{\log^2(2)}{2} = \frac{\pi^2}{12} - \frac{1}{2}\left(\log(z_0) + \left\lfloor \frac{\arg(2-z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k (2-z_0)^k z_0^{-k}}{k}\right)^2$$

$$\frac{\pi^2}{12} - \frac{\log^2(2)}{2} = \frac{\pi^2}{12} - \frac{1}{2}\left(2 i \pi \left\lfloor \frac{\pi - \arg\left(\frac{1}{z_0}\right) - \arg(z_0)}{2\pi} \right\rfloor + \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (2-z_0)^k z_0^{-k}}{k}\right)^2$$

Integral representations:

$$\frac{\pi^2}{12} - \frac{\log^2(2)}{2} = \frac{\pi^2}{12} - \frac{1}{2}\left(\int_1^2 \frac{1}{t}\, dt\right)^2$$

$$\frac{\pi^2}{12} - \frac{\log^2(2)}{2} = \frac{\pi^2}{12} + \frac{\left(\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\Gamma(-s)^2\, \Gamma(1+s)}{\Gamma(1-s)}\, ds\right)^2}{8\pi^2} \quad \text{for } -1 < \gamma < 0$$

(((Pi^2/(12)-1/2(ln2)^2)))^1/64

Input:

$$\sqrt[64]{\frac{\pi^2}{12} - \frac{1}{2}\log^2(2)}$$

log(x) is the natural logarithm

Exact result:

$$\sqrt[64]{\frac{\pi^2}{12} - \frac{\log^2(2)}{2}}$$

Decimal approximation:

0.9915844909339018479706590586580577777050755714684505633364...

0.9915844909339… result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1} = 1-\frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\dots}}}} \approx 0.9991104684$$

and to the dilaton value **0.989117352243** = $\boldsymbol{\phi}$ (see Appendix)

Alternate form:

$$\frac{\sqrt[64]{\frac{1}{3}\left(\pi^2-6\log^2(2)\right)}}{\sqrt[32]{2}}$$

All 64th roots of π^2/12 - (log^2(2))/2:

$$e^0 \sqrt[64]{\frac{\pi^2}{12}-\frac{\log^2(2)}{2}} \approx 0.991584 \text{ (real, principal root)}$$

$$e^{(i\pi)/32} \sqrt[64]{\frac{\pi^2}{12}-\frac{\log^2(2)}{2}} \approx 0.98681+0.09719\,i$$

$$e^{(i\pi)/16} \sqrt[64]{\frac{\pi^2}{12}-\frac{\log^2(2)}{2}} \approx 0.97253+0.19345\,i$$

$$e^{(3i\pi)/32} \sqrt[64]{\frac{\pi^2}{12}-\frac{\log^2(2)}{2}} \approx 0.94889+0.28784\,i$$

$$e^{(i\pi)/8} \sqrt[64]{\frac{\pi^2}{12}-\frac{\log^2(2)}{2}} \approx 0.91610+0.37946\,i$$

Alternative representations:

$$\sqrt[64]{\frac{\pi^2}{12}-\frac{\log^2(2)}{2}} = \sqrt[64]{\frac{\pi^2}{12}-\frac{1}{2}\log_e^2(2)}$$

$$\sqrt[64]{\frac{\pi^2}{12} - \frac{\log^2(2)}{2}} = \sqrt[64]{\frac{\pi^2}{12} - \frac{1}{2}\left(2\coth^{-1}(3)\right)^2}$$

$$\sqrt[64]{\frac{\pi^2}{12} - \frac{\log^2(2)}{2}} = \sqrt[64]{\frac{\pi^2}{12} - \frac{1}{2}\left(\log(a)\log_a(2)\right)^2}$$

Series representations:

$$\sqrt[64]{\frac{\pi^2}{12} - \frac{\log^2(2)}{2}} = \sqrt[64]{\frac{\pi^2}{12} - \frac{1}{2}\left(2 i \pi \left\lfloor \frac{\arg(2-x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (2-x)^k x^{-k}}{k}\right)^2}$$

for $x < 0$

$$\sqrt[64]{\frac{\pi^2}{12} - \frac{\log^2(2)}{2}} =$$
$$\sqrt[64]{\frac{\pi^2}{12} - \frac{1}{2}\left(\log(z_0) + \left\lfloor \frac{\arg(2-z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k (2-z_0)^k z_0^{-k}}{k}\right)^2}$$

$$\sqrt[64]{\frac{\pi^2}{12} - \frac{\log^2(2)}{2}} =$$
$$\sqrt[64]{\frac{\pi^2}{12} - \frac{1}{2}\left(2 i \pi \left\lfloor \frac{\pi - \arg\left(\frac{1}{z_0}\right) - \arg(z_0)}{2\pi} \right\rfloor + \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (2-z_0)^k z_0^{-k}}{k}\right)^2}$$

Integral representations:

$$\sqrt[64]{\frac{\pi^2}{12} - \frac{\log^2(2)}{2}} = \sqrt[64]{\frac{\pi^2}{12} - \frac{1}{2}\left(\int_1^2 \frac{1}{t}\,dt\right)^2}$$

$$\sqrt[64]{\frac{\pi^2}{12} - \frac{\log^2(2)}{2}} = \sqrt[64]{\frac{\pi^2}{12} + \frac{\left(\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^2}{8\pi^2}} \quad \text{for } -1 < \gamma < 0$$

2 log base 0.9915844909339 (((Pi^2/(12)-1/2(ln2)^2)))-Pi+1/golden ratio

Input interpretation:

$$2 \log_{0.9915844909339}\left(\frac{\pi^2}{12} - \frac{1}{2}\log^2(2)\right) - \pi + \frac{1}{\phi}$$

$\log(x)$ is the natural logarithm

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

ϕ is the golden ratio

Result:

125.47644134...

125.47644134... result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 (see Appendix)

Alternative representations:

$$2 \log_{0.99158449093390000}\left(\frac{\pi^2}{12} - \frac{\log^2(2)}{2}\right) - \pi + \frac{1}{\phi} = -\pi + \frac{1}{\phi} + \frac{2 \log\left(\frac{\pi^2}{12} - \frac{\log^2(2)}{2}\right)}{\log(0.99158449093390000)}$$

$$2 \log_{0.99158449093390000}\left(\frac{\pi^2}{12} - \frac{\log^2(2)}{2}\right) - \pi + \frac{1}{\phi} = -\pi + 2 \log_{0.99158449093390000}\left(\frac{\pi^2}{12} - \frac{1}{2}\log_e^2(2)\right) + \frac{1}{\phi}$$

$$2 \log_{0.99158449093390000}\left(\frac{\pi^2}{12} - \frac{\log^2(2)}{2}\right) - \pi + \frac{1}{\phi} = -\pi + 2 \log_{0.99158449093390000}\left(\frac{\pi^2}{12} - \frac{1}{2}(\log(a)\log_a(2))^2\right) + \frac{1}{\phi}$$

Series representations:

$$2 \log_{0.99158449093390000}\left(\frac{\pi^2}{12} - \frac{\log^2(2)}{2}\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi - \frac{2 \sum_{k=1}^{\infty} \frac{\left(-\frac{1}{12}\right)^k \left(\pi^2 - 6\left(2 + \log^2(2)\right)\right)^k}{k}}{\log(0.99158449093390000)}$$

$$2\log_{0.99158449093390000}\left(\frac{\pi^2}{12}-\frac{\log^2(2)}{2}\right)-\pi+\frac{1}{\phi}=\frac{1.00000000000000}{\phi}-$$
$$1.00000000000000\,\pi-236.656448860183\log\left(\frac{1}{12}\left(\pi^2-6\log^2(2)\right)\right)-$$
$$2.00000000000000\log\left(\frac{1}{12}\left(\pi^2-6\log^2(2)\right)\right)\sum_{k=0}^{\infty}(-0.00841550906610000)^k\,G(k)$$
$$\text{for}\left(G(0)=0\text{ and }\frac{(-1)^k\,k}{2\,(1+k)\,(2+k)}+G(k)=\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

$$2\log_{0.99158449093390000}\left(\frac{\pi^2}{12}-\frac{\log^2(2)}{2}\right)-\pi+\frac{1}{\phi}=\frac{1.00000000000000}{\phi}-$$
$$1.00000000000000\,\pi-236.656448860183\log\left(\frac{1}{12}\left(\pi^2-6\log^2(2)\right)\right)-$$
$$2.00000000000000\log\left(\frac{1}{12}\left(\pi^2-6\log^2(2)\right)\right)\sum_{k=0}^{\infty}(-0.00841550906610000)^k\,G(k)$$
$$\text{for}\left(G(0)=0\text{ and }G(k)=\frac{(-1)^{1+k}\,k}{2\,(1+k)\,(2+k)}+\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

Integral representations:

$$2\log_{0.99158449093390000}\left(\frac{\pi^2}{12}-\frac{\log^2(2)}{2}\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+2\log_{0.99158449093390000}\left(\frac{1}{12}\left(\pi^2-6\left(\int_1^2\frac{1}{t}\,dt\right)^2\right)\right)$$

$$2\log_{0.99158449093390000}\left(\frac{\pi^2}{12}-\frac{\log^2(2)}{2}\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+2\log_{0.99158449093390000}\left(\frac{\pi^2}{12}-\frac{\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^2}{8\,i^2\,\pi^2}\right)\quad\text{for }-1<\gamma<0$$

Thence, in total, we have:

0.75539561953174.... 0.426408806162096... 0.4226454250941609....

0.648793417991217…. 0.23755990127916….0.582240526465

From the sum:

(0.75539561953174+0.426408806162096+0.4226454250941609+0.648793417991217+0.23755990127916+0.582240526465)^7-11

Where 11 is a Lucas number

Input interpretation:

$(0.75539561953174 + 0.426408806162096 + 0.4226454250941609 + 0.648793417991217 + 0.23755990127916 + 0.582240526465)^7 - 11$

Result:

2577.1005773529731265359563924448712390448090658267534490 82...

2577.100577..... result practically equal to the rest mass of charmed Xi prime baryon 2577.9

And:

(0.75539561953174+0.426408806162096+0.4226454250941609+0.648793417991217+0.23755990127916+0.582240526465)^7-(843+18-2)

Input interpretation:

$(0.75539561953174 + 0.426408806162096 + 0.4226454250941609 + 0.648793417991217 + 0.23755990127916 + 0.582240526465)^7 - (843 + 18 - 2)$

Result:

1729.1005773529731265359563924448712390448090658267534490 82...

1729.100577....

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

From the multiplication of results:

21/(0.75539561953174*0.426408806162096*0.4226454250941609*0.648793417991217*0.23755990127916*0.582240526465)+47+18

where 21 is a Fibonacci number and 18, 47 are Lucas numbers

Input interpretation:

21 / (0.75539561953174 × 0.426408806162096 × 0.4226454250941609 × 0.6487934179912170 × 0.23755990127916 × 0.582240526465) + 47 + 18

Result:

1783.939109572636327559181562052733211177542071275630478748...

1783.9391095.... result in the range of the hypothetical mass of Gluino (gluino = 1785.16 GeV).

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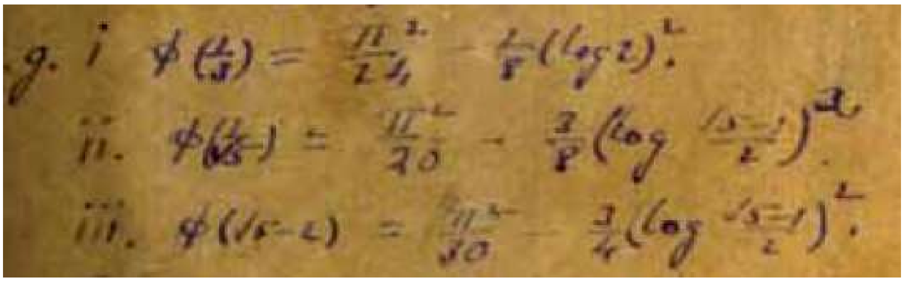

Pi^2/(24) – 1/8(ln2)^2

Input:

$$\frac{\pi^2}{24} - \frac{1}{8}\log^2(2)$$

log(x) is the natural logarithm

Exact result:

$$\frac{\pi^2}{24} - \frac{\log^2(2)}{8}$$

Decimal approximation:

0.351176889972281431034715975870673175838418356352381411075...

0.351176889972281…..

Alternate form:

$$\frac{1}{24}\left(\pi^2 - 3\log^2(2)\right)$$

Alternative representations:

$$\frac{\pi^2}{24} - \frac{\log^2(2)}{8} = \frac{\pi^2}{24} - \frac{1}{8} \log_e^2(2)$$

$$\frac{\pi^2}{24} - \frac{\log^2(2)}{8} = \frac{\pi^2}{24} - \frac{1}{8} (\log(a) \log_a(2))^2$$

$$\frac{\pi^2}{24} - \frac{\log^2(2)}{8} = \frac{\pi^2}{24} - \frac{1}{8} \left(2 \coth^{-1}(3)\right)^2$$

Series representations:

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

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

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

Integral representations:

$$\frac{\pi^2}{24} - \frac{\log^2(2)}{8} = \frac{\pi^2}{24} - \frac{1}{8} \left(\int_1^2 \frac{1}{t} \, dt\right)^2$$

$$\frac{\pi^2}{24} - \frac{\log^2(2)}{8} = \frac{\pi^2}{24} + \frac{\left(\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\Gamma(-s)^2 \Gamma(1+s)}{\Gamma(1-s)} \, ds\right)^2}{32\pi^2} \quad \text{for } -1 < \gamma < 0$$

Pi^2/(20)-3/8(((ln ((sqrt5-1)/2))))^2

Input:

$$\frac{\pi^2}{20} - \frac{3}{8} \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)$$

log(x) is the natural logarithm

Decimal approximation:

0.4066434123380200337553761482819827717595325890935524547 64...

0.40664341233802003…..

Alternate forms:

$$\frac{\pi^2}{20} - \frac{3}{8} \operatorname{csch}^{-1}(2)^2$$

$$\frac{1}{40}\left(2\pi^2 - 15\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)$$

$$\frac{\pi^2}{20} - \frac{3}{8}\left(\log\left(\sqrt{5}-1\right) - \log(2)\right)^2$$

$\operatorname{csch}^{-1}(x)$ is the inverse hyperbolic cosecant function

Alternative representations:

$$\frac{\pi^2}{20} - \frac{1}{8}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{\pi^2}{20} - \frac{3}{8}\log_e^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)$$

$$\frac{\pi^2}{20} - \frac{1}{8}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{\pi^2}{20} - \frac{3}{8}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^2$$

$$\frac{\pi^2}{20} - \frac{1}{8}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{\pi^2}{20} - \frac{3}{8}\left(-\operatorname{Li}_1\left(1+\frac{1}{2}\left(1-\sqrt{5}\right)\right)\right)^2$$

Series representations:

$$\frac{\pi^2}{20} - \frac{1}{8}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{\pi^2}{20} - \frac{3}{8}\left(\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-3+\sqrt{5}\right)^k}{k}\right)^2$$

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

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

Integral representation:

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

Pi^2/(30)-3/4(((ln ((sqrt5-1)/2))))^2

Input:

$$\frac{\pi^2}{30} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)$$

log(x) is the natural logarithm

Decimal approximation:

0.155313197936749492921786229905555467831485217704385534435...

0.155313197936749…..

Alternate forms:

$$\frac{\pi^2}{30} - \frac{3}{4}\operatorname{csch}^{-1}(2)^2$$

$$\frac{1}{60}\left(2\pi^2 - 45\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)\right)$$

$$\frac{\pi^2}{30} - \frac{3}{4}\left(\log\left(\sqrt{5} - 1\right) - \log(2)\right)^2$$

csch$^{-1}(x)$ is the inverse hyperbolic cosecant function

Alternative representations:

$$\frac{\pi^2}{30} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)3 = \frac{\pi^2}{30} - \frac{3}{4}\log_e^2\left(\frac{1}{2}\left(-1 + \sqrt{5}\right)\right)$$

$$\frac{\pi^2}{30} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)3 = \frac{\pi^2}{30} - \frac{3}{4}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1 + \sqrt{5}\right)\right)\right)^2$$

$$\frac{\pi^2}{30} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)3 = \frac{\pi^2}{30} - \frac{3}{4}\left(-\mathrm{Li}_1\left(1 + \frac{1}{2}\left(1 - \sqrt{5}\right)\right)\right)^2$$

Series representations:

$$\frac{\pi^2}{30}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3=\frac{\pi^2}{30}-\frac{3}{4}\left(\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-3+\sqrt{5}\right)^k}{k}\right)^2$$

$$\frac{\pi^2}{30}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3=$$
$$\frac{\pi^2}{30}+\frac{3}{4}\left(2\pi\left\lfloor\frac{\arg(-1+\sqrt{5}-2x)}{2\pi}\right\rfloor-i\left(\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)\right)^2$$
for $x<0$

$$\frac{\pi^2}{30}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3=$$
$$\frac{\pi^2}{30}-\frac{3}{4}\left(2i\pi\left\lfloor\frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right)-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)^2$$
for $x<0$

Integral representation:

$$\frac{\pi^2}{30}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3=\frac{\pi^2}{30}-\frac{3}{4}\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2$$

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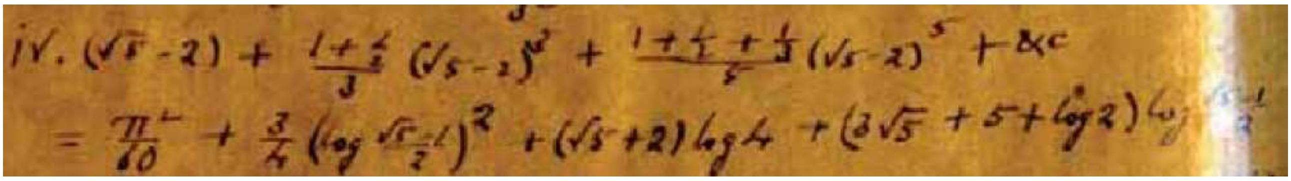
iv. $(\sqrt{5}-2)+\frac{1+\frac{1}{2}}{3}(\sqrt{5}-2)^3+\frac{1+\frac{1}{2}+\frac{1}{3}}{5}(\sqrt{5}-2)^5+\&c$
$=\frac{\pi^2}{60}+\frac{3}{4}\left(\log\frac{\sqrt{5}-1}{2}\right)^2+(\sqrt{5}+2)\log 4+(3\sqrt{5}+5+\log 2)\log\frac{\sqrt{5}-1}{2}$

Pi^2/(60)+ 3/4(((ln ((sqrt5-1)/2))))^2+(sqrt5+2) ln4 + (3sqrt5+5+ln2)*((ln ((sqrt5-1)/2)))

Input:

$$\frac{\pi^2}{60}+\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)+\left(\sqrt{5}+2\right)\log(4)+\left(3\sqrt{5}+5+\log(2)\right)\log\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)$$

$\log(x)$ is the natural logarithm

Decimal approximation:

0.242927370325999289096060777200874716712732726005641102986...

0.242927370325999289…..

Alternate forms:

$$\frac{\pi^2}{60}+\sqrt{5}\log(4)+\log(16)+\frac{3}{4}\operatorname{csch}^{-1}(2)^2-\left(5+3\sqrt{5}+\log(2)\right)\operatorname{csch}^{-1}(2)$$

$$\frac{1}{60}\left(\pi^2+15\left(3\log^2\left(\sqrt{5}-1\right)-\log(2)\left(4\left(1+\sqrt{5}\right)+\log(2)\right)-2\left(\log(2)-2\left(5+3\sqrt{5}\right)\right)\log\left(\sqrt{5}-1\right)\right)\right)$$

$$\frac{\pi^2}{60}+\frac{1}{4}\left(3\log^2\left(\sqrt{5}-1\right)-\log(2)\left(4\left(1+\sqrt{5}\right)+\log(2)\right)-2\left(\log(2)-2\left(5+3\sqrt{5}\right)\right)\log\left(\sqrt{5}-1\right)\right)$$

$\operatorname{csch}^{-1}(x)$ is the inverse hyperbolic cosecant function

Alternative representations:

$$\frac{\pi^2}{60}+\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3+\left(\sqrt{5}+2\right)\log(4)+\left(3\sqrt{5}+5+\log(2)\right)\log\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)=\frac{\pi^2}{60}+\frac{3}{4}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^2+\log(a)\log_a(4)\left(2+\sqrt{5}\right)+\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\left(5+\log(a)\log_a(2)+3\sqrt{5}\right)$$

$$\frac{\pi^2}{60}+\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3+\left(\sqrt{5}+2\right)\log(4)+\left(3\sqrt{5}+5+\log(2)\right)\log\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)=\frac{\pi^2}{60}+\frac{3}{4}\log_e^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)+\log_e(4)\left(2+\sqrt{5}\right)+\log_e\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\left(5+\log_e(2)+3\sqrt{5}\right)$$

$$\frac{\pi^2}{60}+\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3+\left(\sqrt{5}+2\right)\log(4)+\left(3\sqrt{5}+5+\log(2)\right)\log\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)=\frac{\pi^2}{60}+\frac{3}{4}\left(-\operatorname{Li}_1\left(1+\frac{1}{2}\left(1-\sqrt{5}\right)\right)\right)^2-\operatorname{Li}_1(-3)\left(2+\sqrt{5}\right)-\operatorname{Li}_1\left(1+\frac{1}{2}\left(1-\sqrt{5}\right)\right)\left(5-\operatorname{Li}_1(-1)+3\sqrt{5}\right)$$

Series representations:

$$\frac{\pi^2}{60}+\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3+\left(\sqrt{5}+2\right)\log(4)+\left(3\sqrt{5}+5+\log(2)\right)\log\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)=$$

$$\frac{\pi^2}{60}+\frac{3}{4}\left(\log(z_0)+\left\lfloor\frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right)-z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2z_0\right)^k z_0^{-k}}{k}\right)^2+$$
$$\left(\log(z_0)+\left\lfloor\frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right)-z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2z_0\right)^k z_0^{-k}}{k}\right)$$
$$\left(5+3\sqrt{5}+\log(z_0)+\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)+$$
$$\left(2+\sqrt{5}\right)\left(\log(z_0)+\left\lfloor\frac{\arg(4-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(4-z_0)^k z_0^{-k}}{k}\right)$$

$$\frac{\pi^2}{60}+\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3+\left(\sqrt{5}+2\right)\log(4)+\left(3\sqrt{5}+5+\log(2)\right)\log\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)=$$

$$\frac{1}{60}\left(\pi^2+840\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor+480\,i\sqrt{5}\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor-\right.$$

$$420\,\pi^2\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor^2+420\log(z_0)+240\sqrt{5}\log(z_0)+$$

$$420\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor\log(z_0)+105\log^2(z_0)-300$$

$$\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2\,z_0\right)^k z_0^{-k}}{k}-180\sqrt{5}\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2\,z_0\right)^k z_0^{-k}}{k}-$$

$$300\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2\,z_0\right)^k z_0^{-k}}{k}-$$

$$150\log(z_0)\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2\,z_0\right)^k z_0^{-k}}{k}+$$

$$45\left(\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2\,z_0\right)^k z_0^{-k}}{k}\right)^2-120\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor$$

$$\sum_{k=1}^{\infty}\frac{(-1)^k\,(2-z_0)^k z_0^{-k}}{k}-60\log(z_0)\sum_{k=1}^{\infty}\frac{(-1)^k\,(2-z_0)^k z_0^{-k}}{k}-$$

$$120\sum_{k=1}^{\infty}\frac{(-1)^k\,(4-z_0)^k z_0^{-k}}{k}-60\sqrt{5}\sum_{k=1}^{\infty}\frac{(-1)^k\,(4-z_0)^k z_0^{-k}}{k}+$$

$$\left.60\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\frac{(-1)^{k_1+k_2}\,(2-z_0)^{k_1}\left(\frac{1}{2}\left(-1+\sqrt{5}\right)-z_0\right)^{k_2} z_0^{-k_1-k_2}}{k_1\,k_2}\right)$$

$$\frac{\pi^2}{60} + \frac{1}{4} \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right) 3 + \left(\sqrt{5} + 2\right) \log(4) + \left(3\sqrt{5} + 5 + \log(2)\right) \log\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right) =$$

$$\frac{1}{60}\left(\pi^2 + 240\, i\, \pi \left\lfloor \frac{\arg(4-x)}{2\pi} \right\rfloor + 120\, i \sqrt{5}\, \pi \left\lfloor \frac{\arg(4-x)}{2\pi} \right\rfloor + \right.$$

$$600\, i\, \pi \left\lfloor \frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right) - x\right)}{2\pi} \right\rfloor + 360\, i \sqrt{5}\, \pi \left\lfloor \frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right) - x\right)}{2\pi} \right\rfloor -$$

$$240\, \pi^2 \left\lfloor \frac{\arg(2-x)}{2\pi} \right\rfloor \left\lfloor \frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right) - x\right)}{2\pi} \right\rfloor -$$

$$180\, \pi^2 \left\lfloor \frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right) - x\right)}{2\pi} \right\rfloor^2 + 420 \log(x) + 240\sqrt{5} \log(x) +$$

$$120\, i\, \pi \left\lfloor \frac{\arg(2-x)}{2\pi} \right\rfloor \log(x) + 300\, i\, \pi \left\lfloor \frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right) - x\right)}{2\pi} \right\rfloor \log(x) +$$

$$105 \log^2(x) - 300 \sum_{k=1}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-1+\sqrt{5} - 2x\right)^k x^{-k}}{k} -$$

$$180\sqrt{5} \sum_{k=1}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-1+\sqrt{5} - 2x\right)^k x^{-k}}{k} -$$

$$120\, i\, \pi \left\lfloor \frac{\arg(2-x)}{2\pi} \right\rfloor \sum_{k=1}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-1+\sqrt{5} - 2x\right)^k x^{-k}}{k} -$$

$$180\, i\, \pi \left\lfloor \frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right) - x\right)}{2\pi} \right\rfloor \sum_{k=1}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-1+\sqrt{5} - 2x\right)^k x^{-k}}{k} -$$

$$150 \log(x) \sum_{k=1}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-1+\sqrt{5} - 2x\right)^k x^{-k}}{k} +$$

$$45 \left(\sum_{k=1}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-1+\sqrt{5} - 2x\right)^k x^{-k}}{k}\right)^2 - 120\, i\, \pi \left\lfloor \frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right) - x\right)}{2\pi} \right\rfloor$$

$$\sum_{k=1}^{\infty} \frac{(-1)^k (2-x)^k x^{-k}}{k} - 60 \log(x) \sum_{k=1}^{\infty} \frac{(-1)^k (2-x)^k x^{-k}}{k} -$$

$$120 \sum_{k=1}^{\infty} \frac{(-1)^k (4-x)^k x^{-k}}{k} - 60\sqrt{5} \sum_{k=1}^{\infty} \frac{(-1)^k (4-x)^k x^{-k}}{k} +$$

$$\left. 60 \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} \frac{(-1)^{k_1+k_2} (2-x)^{k_1} \left(\frac{1}{2}\left(-1+\sqrt{5}\right) - x\right)^{k_2} x^{-k_1-k_2}}{k_1\, k_2} \right) \quad \text{for } x < 0$$

Integral representation:

$$\frac{\pi^2}{60}+\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3+\left(\sqrt{5}+2\right)\log(4)+\left(3\sqrt{5}+5+\log(2)\right)\log\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)=$$
$$\frac{1}{60}\left(\pi^2+45\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2+60\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{-30-22\sqrt{5}+6\left(7+4\sqrt{5}\right)t}{t\left(-9+\sqrt{5}+6t\right)}\,dt+\right.$$
$$\left.2\int_0^1\int_0^1\frac{1}{(1+t_1)\left(2+\left(-3+\sqrt{5}\right)t_2\right)}\,dt_2\,dt_1\right)$$

From the sum of the results, we obtain:

10^3*2/(0.351176889972281+0.40664341233802003+0.155313197936749+0.242927370325999289)-2

Input interpretation:

$10^3\times 2/(0.351176889972281+0.40664341233802003+0.155313197936749+0.242927370325999289)-2$

Result:

1728.0127103243425188219468499667657425100373119817590294 39...

1728.01271....

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

1/(0.351176889972281+0.40664341233802003+0.155313197936749+0.242927370325999289)^1/16

Input interpretation:

$1/((0.351176889972281+0.40664341233802003+0.155313197936749+0.242927370325999289)\wedge(1/16))$

Result:

0.99097729950757135...

0.9909772995.... result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1}=1-\cfrac{e^{-\pi\sqrt{5}}}{1+\cfrac{e^{-2\pi\sqrt{5}}}{1+\cfrac{e^{-3\pi\sqrt{5}}}{1+\cfrac{e^{-4\pi\sqrt{5}}}{1+\dots}}}}\approx 0.9991104684$$

and to the dilaton value **0.989117352243** = $\boldsymbol{\phi}$ (see Appendix)

8 log base 0.990977299507571350000 → 8 log base 0.990977299507571 35 (((1/(0.351176889972281+0.406643412338020 03+0.155313197936749+0.242927370325999289))))-Pi+1/golden ratio

Input interpretation:

$$8 \log_{0.990977299507571 35}(1/(0.351176889972281+0.40664341233802003+0.155313197936749+0.242927370325999289))-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.47644133516...

125.47644133516… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 (see Appendix)

Alternative representation:

$$8 \log_{0.99097729950757135000 0}(1/(0.35117688997228100 00+0.40664341233802003 0000+0.15531319793674900 00+0.24292737032599928 90000))-\pi+\frac{1}{\phi}=-\pi+\frac{1}{\phi}+\frac{8\log\left(\frac{1}{1.15606087057304931 90}\right)}{\log(0.99097729950757135 0000)}$$

Series representations:

$$8 \log_{0.9909772995075713500000}(1/(0.3511768899722810000 + 0.4066434123380200300000 + 0.1553131979367490000 + 0.24292737032599992890000)) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi - \frac{8 \sum_{k=1}^{\infty} \frac{(-1)^k (-0.134993644837828740 6)^k}{k}}{\log(0.9909772995075713500000)}$$

$$8 \log_{0.9909772995075713500000}(1/(0.3511768899722810000 + 0.4066434123380200300000 + 0.1553131979367490000 + 0.24292737032599992890000)) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi - 882.6525057229990566 \log(0.8650063551621712594) - 8 \log(0.8650063551621712594) \sum_{k=0}^{\infty} (-0.00902270049242865 0000)^k G(k)$$

$$\text{for } \left(G(0) = 0 \text{ and } G(k) = \frac{(-1)^{1+k} k}{2(1+k)(2+k)} + \sum_{j=1}^{k} \frac{(-1)^{1+j} G(-j+k)}{1+j}\right)$$

Appendix

From:

Rotating strings confronting PDG mesons
Jacob Sonnenschein and Dorin Weissman - arXiv:1402.5603v1 [hep-ph] 23 Feb 2014

$c\bar{c}$. **The Ψ trajectory:** The left side of figure (15) depicts the Ψ trajectory. Here we use the states $J/\Psi(1S)(3097)1^{--}, \chi_{c1}(1P)(3510)1^{++}$, and $\Psi(3770)1^{--}$. Since no $J = 3$ state has been observed, we use three states with $J = 1$, but with increasing orbital angular momentum ($L = 0, 1, 2$) and do the fit to L instead of J. To give an idea of the shifts in mass involved, the $J^{PC} = 2^{++}$ state χ_{c2} has a mass of 3556 MeV, and the $J^{PC} = 3^{--}$ state is expected to lie 30 – 60 MeV above the $\Psi(3770)$[23].

The best linear fit is

$$\alpha' = 0.418, a = -4.04$$

with $\chi_l^2 = 3.41 \times 10^{-4}$, but the optimal fit is far from the linear, with endpoint masses in the range of the constituent c quark mass:

$$m_c = 1500, \alpha' = 0.979, a = -0.09$$

with $\chi_m^2 = 5 \times 10^{-7}$ ($\chi_m^2/\chi_l^2 = 0.002$). Aside from the improvement in χ^2, by adding the mass we also get a value for the slope (and to a lesser extent, the intercept) that is much closer to that obtained in fits for the light meson trajectories.

where α' is the Regge slope (string tension)

We know also that:

ω	6	$m_{u/d} = 0 - 60$	0.910 – 0.918
ω/ω_3	5 + 3	$m_{u/d} = 255 - 390$	0.988 – 1.18
ω/ω_3	5 + 3	$m_{u/d} = 240 - 345$	0.937 – 1.000

The average of the various Regge slope of Omega mesons are:

1/7 * (0.979 + 0.910 + 0.918 + 0.988 + 0.937 + 1.18 +1) = 0.987428571

result very near to the value of dilaton and to the solution 0.987516007… of the above expression.

From:

Astronomy & Astrophysics manuscript no. ms c ESO 2019 - September 24, 2019
Planck 2018 results. VI. Cosmological parameters

The primordial fluctuations are consistent with Gaussian purely adiabatic scalar perturbations characterized by a power spectrum with a spectral index $n_s = 0.965 \pm 0.004$, consistent with the predictions of slow-roll, single-field, inflation.

from:

Modular equations and approximations to π - *Srinivasa Ramanujan*
Quarterly Journal of Mathematics, XLV, 1914, 350 – 372

We have that:

Hence

$$64g_{22}^{24} = e^{\pi\sqrt{22}} - 24 + 276e^{-\pi\sqrt{22}} - \cdots,$$
$$64g_{22}^{-24} = 4096e^{-\pi\sqrt{22}} + \cdots,$$

so that

$$64(g_{22}^{24} + g_{22}^{-24}) = e^{\pi\sqrt{22}} - 24 + 4372e^{-\pi\sqrt{22}} + \cdots = 64\{(1+\sqrt{2})^{12} + (1-\sqrt{2})^{12}\}.$$

Hence

$$e^{\pi\sqrt{22}} = 2508951.9982\ldots$$

Again

$$G_{37} = (6+\sqrt{37})^{\frac{1}{4}},$$

$$64G_{37}^{24} = e^{\pi\sqrt{37}} + 24 + 276e^{-\pi\sqrt{37}} + \cdots,$$
$$64G_{37}^{-24} = 4096e^{-\pi\sqrt{37}} - \cdots,$$

so that

$$64(G_{37}^{24} + G_{37}^{-24}) = e^{\pi\sqrt{37}} + 24 + 4372e^{-\pi\sqrt{37}} - \cdots = 64\{(6+\sqrt{37})^6 + (6-\sqrt{37})^6\}.$$

Hence

$$e^{\pi\sqrt{37}} = 199148647.999978\ldots.$$

Similarly, from

$$g_{58} = \sqrt{\left(\frac{5+\sqrt{29}}{2}\right)},$$

we obtain

$$64(g_{58}^{24} + g_{58}^{-24}) = e^{\pi\sqrt{58}} - 24 + 4372e^{-\pi\sqrt{58}} + \cdots = 64\left\{\left(\frac{5+\sqrt{29}}{2}\right)^{12} + \left(\frac{5-\sqrt{29}}{2}\right)^{12}\right\}.$$

Hence

$$e^{\pi\sqrt{58}} = 24591257751.99999982\ldots.$$

From:

An Update on Brane Supersymmetry Breaking
J. Mourad and A. Sagnotti - arXiv:1711.11494v1 [hep-th] 30 Nov 2017

From the following vacuum equations:

$$T\, e^{\gamma_E \phi} = -\frac{\beta_E^{(p)}\, h^2}{\gamma_E}\, e^{-2(8-p)C + 2\beta_E^{(p)}\phi}$$

$$16\, k'\, e^{\;\;2C} = \frac{h^2\left(p + 1 - \frac{2\beta_E^{(p)}}{\gamma_E}\right) e^{-2(8-p)C+2\beta_E^{(p)}\phi}}{(7 - p)}$$

$$(A')^2 - k\, e^{-2A} + \frac{h^2}{16(p+1)}\left(7 - p + \frac{2\beta_E^{(p)}}{\gamma_E}\right) e^{-2(8-p)C+2\beta_E^{(p)}\phi}$$

we have obtained, from the results almost equals of the equations, putting

$4096\, e^{-\pi\sqrt{18}}$ instead of

$$e^{-2(8-p)C+2\beta_E^{(p)}\phi}$$

a new possible mathematical connection between the two exponentials. Thence, also the values concerning p, C, β_E and ϕ correspond to the exponents of e (i.e. of exp). Thence we obtain for p = 5 and $\beta_E = 1/2$:

$$e^{-6C+\phi} = 4096 e^{-\pi\sqrt{18}}$$

Therefore, with respect to the exponentials of the vacuum equations, the Ramanujan's exponential has a coefficient of 4096 which is equal to 64^2, while -6C+ϕ is equal to -$\pi\sqrt{18}$. From this it follows that it is possible to establish mathematically, the dilaton value.

For

exp((-Pi*sqrt(18)) we obtain:

Input:

$\exp\left(-\pi\sqrt{18}\right)$

Exact result:

$e^{-3\sqrt{2}\,\pi}$

Decimal approximation:

$1.6272016226072509292942156739117979541838581136954016... \times 10^{-6}$

1.6272016… * 10^{-6}

Property:

$e^{-3\sqrt{2}\,\pi}$ is a transcendental number

Series representations:

$$e^{-\pi\sqrt{18}} = e^{-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now, we have the following calculations:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

$$e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10^{-6}$$

from which:

$$\frac{1}{4096}e^{-6C+\phi} = 1.6272016\ldots * 10^{-6}$$

$$0.000244140625\, e^{-6C+\phi} = e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10^{-6}$$

Now:

$$\ln\left(e^{-\pi\sqrt{18}}\right) = -13.328648814475 = -\pi\sqrt{18}$$

And:

(1.6272016* 10^-6) *1/ (0.000244140625)

Input interpretation:

$$\frac{1.6272016}{10^6} \times \frac{1}{0.000244140625}$$

Result:

0.0066650177536

0.006665017...

Thence:

$$0.000244140625\ e^{-6C+\phi} = e^{-\pi\sqrt{18}}$$

Dividing both sides by 0.000244140625, we obtain:

$$\frac{0.000244140625}{0.000244140625} e^{-6C+\phi} = \frac{1}{0.000244140625} e^{-\pi\sqrt{18}}$$

$$e^{-6C+\phi} = 0.0066650177536$$

((((exp((-Pi*sqrt(18)))))))*1/0.000244140625

Input interpretation:

$$\exp\left(-\pi\sqrt{18}\right) \times \frac{1}{0.000244140625}$$

Result:

0.00666501785...

0.00666501785…

Series representations:

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096\exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}17^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096\exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096\exp\left(-\frac{\pi\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now:

$$e^{-6C+\phi} = 0.0066650177536$$

$$\exp\left(-\pi\sqrt{18}\right)\times\frac{1}{0.000244140625} =$$

$$e^{-\pi\sqrt{18}}\times\frac{1}{0.000244140625}$$

$$= 0.00666501785\ldots$$

From:

ln(0.00666501784619)

Input interpretation:

log(0.00666501784619)

Result:

-5.010882647757…

-5.010882647757…

Alternative representations:

$$\log(0.006665017846190000) = \log_e(0.006665017846190000)$$

$$\log(0.006665017846190000) = \log(a)\log_a(0.006665017846190000)$$

$$\log(0.006665017846190000) = -\text{Li}_1(0.993334982153810000)$$

Series representations:

$$\log(0.006665017846190000) = -\sum_{k=1}^{\infty} \frac{(-1)^k (-0.993334982153810000)^k}{k}$$

$$\log(0.006665017846190000) = 2 i \pi \left\lfloor \frac{\arg(0.006665017846190000 - x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\log(0.006665017846190000) = \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2\pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - z_0)^k z_0^{-k}}{k}$$

Integral representation:

$$\log(0.006665017846190000) = \int_1^{0.006665017846190000} \frac{1}{t}\, dt$$

In conclusion:

$$-6C + \phi = -5.010882647757 \ldots$$

and for C = 1, we obtain:

$\phi = -5.010882647757 + 6 = \mathbf{0.989117352243} = \boldsymbol{\phi}$

Note that the values of n_s (spectral index) 0.965, of the average of the Omega mesons Regge slope 0.987428571 and of the dilaton 0.989117352243, are also connected to the following two Rogers-Ramanujan continued fractions:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1} = 1 - \cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\dots}}}} \approx 0.9568666373$$

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1} = 1 - \cfrac{e^{-\pi\sqrt{5}}}{1+\cfrac{e^{-2\pi\sqrt{5}}}{1+\cfrac{e^{-3\pi\sqrt{5}}}{1+\cfrac{e^{-4\pi\sqrt{5}}}{1+\dots}}}} \approx 0.9991104684$$

(http://www.bitman.name/math/article/102/109/)

Also performing the 512th root of the inverse value of the Pion meson rest mass 139.57, we obtain:

((1/(139.57)))^1/512

Input interpretation:

$$\sqrt[512]{\frac{1}{139.57}}$$

Result:

0.990400732708644027550973755713301415460732796178555551684...

0.99040073.... result very near to the dilaton value **0.989117352243** = $\boldsymbol{\phi}$ and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5 \sqrt[4]{5^3}}-1}}-\varphi+1} = 1 - \cfrac{e^{-\pi\sqrt{5}}}{1+\cfrac{e^{-2\pi\sqrt{5}}}{1+\cfrac{e^{-3\pi\sqrt{5}}}{1+\cfrac{e^{-4\pi\sqrt{5}}}{1+\dots}}}} \approx 0.9991104684$$

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Generalized dilaton–axion models of inflation, de Sitter vacua and spontaneous SUSY breaking in supergravity

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Table 1 The predictions for the inflationary parameters (n_s, r), and the values of φ at the horizon crossing (φ_i) and at the end of inflation (φ_f), in the case $3 \leq \alpha \leq \alpha_*$ with both signs of ω_1. The α parameter is taken to be integer, except of the upper limit $\alpha_* \equiv (7+\sqrt{33})/2$

α	3	4		5	6		α_*
sgn(ω_1)	−	+	−	+/−	+	−	−
n_s	0.9650	0.9649	0.9640	0.9639	0.9634	0.9637	0.9632
r	0.0035	0.0010	0.0013	0.0007	0.0005	0.0004	0.0003
$-\kappa\varphi_i$	5.3529	3.5542	3.9899	3.2657	3.0215	2.7427	2.5674
$-\kappa\varphi_f$	0.9402	0.7426	0.8067	0.7163	0.6935	0.6488	0.6276

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Gravitational waves from walking technicolor

Kohtaroh Miura, Hiroshi Ohki, Saeko Otani and Koichi Yamawaki

The phase transition dynamics is modified via the shift of $(2f_2/N_f)(s^0)^2 \to (\Delta m_s)^2 + (2f_2/N_f)(s^0)^2$ in $m^2_{s^i}$ with finite Δm_s. The details of the mass spectra at one loop with $(\Delta m_s)^2$ are summarized in appendix A. Using eq. (4.18), the total effective potential becomes,

$$V_{\text{eff}}(s^0, \Delta m_p, \Delta m_s, T) = \frac{N_f^2 - 1}{64\pi^2} \mathcal{M}^4_{s^i}(s^0, \Delta m_p, \Delta m_s, T) \left(\ln \frac{\mathcal{M}^2_{s^i}(s^0, \Delta m_p, \Delta m_s, T)}{\mu^2_{\text{GW}}} - \frac{3}{2} \right), \\ + \frac{T^4}{2\pi^2}(N_f^2 - 1) J_B \left(\mathcal{M}^2_{s^i}(s^0, \Delta m_p, \Delta m_s, T)/T^2 \right) + C(T), \tag{4.19}$$

with,

$$\mathcal{M}^2_{s^i}(s^0, \Delta m_p, \Delta m_s, T) - m^2_{s^i}(s^0, \Delta m_p, \Delta m_s) + \Pi(T), \tag{4.20}$$

where the thermal mass $\Pi(T)$ is given in eq. (3.3). We require that the following properties remain intact for arbitrary Δm_s; (1) the vev $\langle s^0 \rangle (T = 0)$ determined by the minimum of the potential eq. (4.19) is identified with the dilaton decay constant favored by the walking technicolor model, $F_\phi = 1.25\,\text{TeV}$ or $1\,\text{TeV}$, (2) the dilaton mass given by the potential curvature at the vacuum is identified with the observed SM Higgs mass, $m_{s^0} = 125\,\text{GeV}$.

Thence $F_\phi = 1.25$ TeV

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References

Manuscript Book Of Srinivasa Ramanujan Volume 2

Andrews, G.E.: Some **formulae for the Fibonacci sequence with generalizations. Fibonacci** Q. **7**, 113–130 (1969) zbMATH Google Scholar

Andrews, G.E.: **A polynomial identity which implies the Rogers–Ramanujan identities**. Scr. Math. **28**, 297–305 (1970) Google Scholar

The Continued Fractions Found in the Unorganized Portions of Ramanujan's Notebooks (Memoirs of the American Mathematical Society), *by Bruce C. Berndt, L. Jacobsen, R. L. Lamphere, George E. Andrews (Editor)*, Srinivasa Ramanujan Aiyangar (Editor) (American Mathematical Society, 1993, ISBN 0-8218-2538-0)