Relationship between Napier number e and Pi without i

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I am Yuji Masuda from Japan. I have a job of lending rooms to companies, which called “share office or share work place”. And I am working there as an hourly-employee.

The length √x, that x is a prime number, can be set in a geometric pattern composed of circles with a diameter 1. And in many lines or curves through the center of circles of prime, some limited conditions, which is on the center of the circles of x=3 and 7(Fig.1), shows some graphs. Especially, graph of Gauss’ prime number theorem. which meets the limited condition, shows relationship between Napier number e and π without imaginary number i.

Key Words: Napier number e, π, imaginary unit i

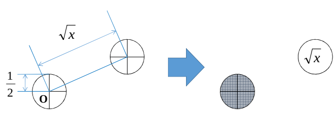
1. Introduction

There is unknown area in prime numbers. Therefore, this research aimed to deepen knowledge on unknown areas through basic research on prime numbers.

2. Geometric pattern and limited condition

The center of a circle with a close-packed structure of a circle with a radius of 1/2 is set as the O, is focused on x at a distance √x from O.

The limited the condition is go through the centers of two circles of x=3&7.



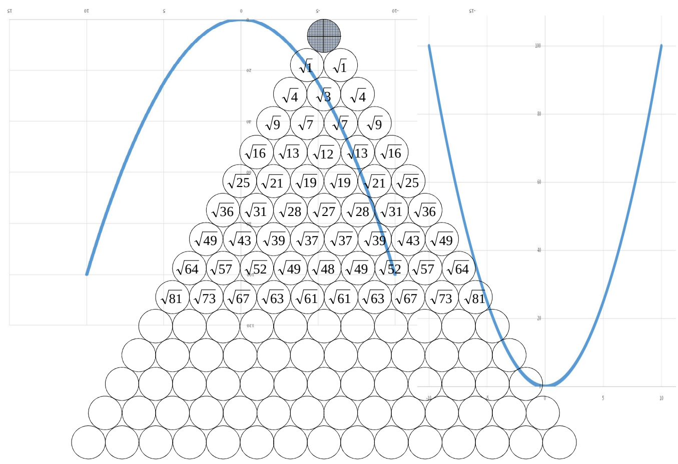


Fig.1 two curves which one meets the limited conditions and another doesn’t meet it.

3. Curve of Gauss’ prime number theorem graph

First, I thought of some quadratic curves. However, it did not give a desired result.

Second, I considered a curve of Gauss’ prime number theorem graph.

x=1.78131217...on the curve which meets the limited condition

$$x:\frac{x}{\log(x)}=1:\sqrt{3}$$

$$\log(x)=\frac{1}{\sqrt{3}}$$

$$x=e^{\frac{1}{\sqrt{3}}}=1.78131217\cdots$$

Next, I considered more deeply about the curve of the Gauss prime theorem graph.

4. Formula about Napier number e and pi without i.

I thought about b of the equation below.

$$e=\frac{a}{\log(a)}\qquad\left(\because a=e^{\frac{1}{\sqrt{3}}}+b\right)$$

And as a result,

$$a=e^{\frac{1}{\sqrt{3}}}+b\left(\because b=\frac{14}{15}\right)$$

$$\frac{a}{\log(a)}\cong e$$

And I thought two things below.

$$① \quad : \quad \left(e^{\frac{1}{\sqrt{3}}}\right)^2=3.17307306\cdots\cong\frac{10}{\pi}-\frac{1}{100}$$

$$② \quad : \quad \frac{\left(e^{\frac{1}{\sqrt{3}}}\right)^2}{\frac{1}{\pi}}=9.96850302\cdots\cong\pi^2 \qquad \sqrt{\pi}\times\left(e^{\frac{1}{\sqrt{3}}}\right)\cong\pi,$$

$$\log\left(\sqrt{\pi}\right)\cong\frac{1}{\sqrt{3}}$$

Here, I noticed below.

$$\frac{1}{\log\left(\sqrt{\pi}\right)}=1.74713705\cdots\cong\sqrt{14}-2$$

$$\sqrt{14}\times\log\left(\sqrt{\pi}\right)=2.14159352\cdots\cong\pi-1$$

And after trial & error, I could finally get the following equation.

$$A\cdot\left(\frac{B}{\pi+(-1)^{a_1}+(-1)^{a_1}\cdot\left(A\cdot\left(\frac{B}{\pi+(-1)^{a_2}+(-1)^{a_2}\cdot\left(A\cdot\left(\frac{B}{\pi+(-1)^{a_3}+(-1)^{a_3}\left(A\cdot(\cdots)\right)}\right)^{\pi}\right)}\right)^{\pi}\right)}\right)^{\pi}$$

$$=-1 \qquad (1)$$

$$\left(\because \sqrt{14}\cdot\ln\left(\sqrt{\pi}\right)-\pi=A,\sqrt{14}\cdot\ln\left(\sqrt{\pi}\right)+1=B\right)$$
$$\left(\because a_n=p\pm1,n=2^p\cdot(2\cdot q+1),(\because p,q=\mathrm{int}\,eger)\right)$$

5. Conclusion

The equation (1) that I found shows the relationship between Napier number e and π. Furthermore, the equation (1) doesn’t include imaginary unit i of e^(iπ)=−1.[1]

6. References

[1].新装版 オイラーの贈物一人類の至宝 e^iπ=−1 を学ぶ 吉田武（著）2010 年 1 月 1 日
(New edition Euler's gift-The treasure of humanity. Learn e ^ i π = 1. Takeshi Yoshida. 2010 Jan 1)(by google translation)