On the possible mathematical connections between some equations of certain Dirichlet series, some equations of D-Branes and Ramanujan formula that link π, *e* and the Golden Ratio. II

Michele Nardelli[1], **Antonio Nardelli**

Abstract

In this research thesis, we have described some new mathematical connections between some equations of certain Dirichlet series, some equations of D-Branes and Rogers-Ramanujan formulas that link π, e and ϕ.

[1] M.Nardelli have studied by Dipartimento di Scienze della Terra Università degli Studi di Napoli Federico II, Largo S. Marcellino, 10 - 80138 Napoli, Dipartimento di Matematica ed Applicazioni "R. Caccioppoli" - Università degli Studi di Napoli "Federico II" – Polo delle Scienze e delle Tecnologie Monte S. Angelo, Via Cintia (Fuorigrotta), 80126 Napoli, Italy

Anatoly Alexeyevich Karatsuba (Russian Mathematician)

https://commons.wikimedia.org/wiki/File:AnatolyA.Karatsuba.jpg

Srinivasa Ramanujan (Indian Mathematician)

https://www.britannica.com/biography/Srinivasa-Ramanujan

From:

Cosmological solutions of a nonlocal square root gravity
I.Dimitrijevic, B.Dragovich, A.S.Koshelev, Z.Rakic, J.Stankovic
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We have the following equations:

The related Friedmann equations to (7) are

$$\frac{\ddot{a}}{a} = -\frac{4\pi G}{3}(\bar{\rho} + 3\bar{p}) + \frac{\Lambda}{3}, \quad \frac{\dot{a}^2 + k}{a^2} = \frac{8\pi G}{3}\bar{\rho} + \frac{\Lambda}{3}, \qquad (12)$$

where $\bar{\rho}$ and $\bar{p}$ are analogs of the energy density and pressure of the dark side of the universe, respectively. Denote the corresponding equation of state as $\bar{p}(t) = \bar{w}(t)\,\bar{\rho}(t)$.

The scalar curvature is:

$$R(t) = \frac{4}{3}t^{-2} + \frac{22}{7}\Lambda + \frac{12}{49}\Lambda^2 t^2 \qquad (14)$$

(((4/3(13.801e+9)^-2)))+22/7(1.05e-35)+12/49((((1.05e-35)^2(13.801e+9)^2)))

Input interpretation:

$$\frac{\frac{4}{3}}{(13.801\times 10^9)^2} + \frac{22}{7}\times 1.05\times 10^{-35} + \frac{12}{49}\left((1.05\times 10^{-35})^2\,(13.801\times 10^9)^2\right)$$

Result:

$7.000315677485430284619200581700574035282578603803243 8... \times 10^{-21}$

$7.000315677... * 10^{-21}$

With regard the Hubble parameter:

$$H(t) = \frac{2}{3}t^{-1} + \frac{1}{7}\Lambda t. \qquad (15)$$

we have:

(((2/3(13.801e+9)^-1)))+1/7((((1.05e-35)(13.801e+9))))

Input interpretation:

$$\frac{\frac{2}{3}}{13.801\times 10^9} + \frac{1}{7}(1.05\times 10^{-35}\times 13.801\times 10^9)$$

Result:

$4.830567833248800466401479361398932444508852015554428 4... \times 10^{-11}$

$4.8305678... * 10^{-11}$

We note that, from the sum of the below results of Ramanujan continued fractions (Rogers-Ramanujan identities), we obtain:

2,0663656771 + 0,5683000031 + 1,0018674362 + 1,0000007913 = 4,6365339077

value that is very near to the above result 4.8305678

The ratio between H(t) and R(t) is:

(((((((2/3(13.801e+9)^-1)))+1/7((((1.05e-35)(13.801e+9)))))))) / 7.000315677e-21

Input interpretation:

$$\frac{\frac{\frac{2}{3}}{13.801\times 10^{9}}+\frac{1}{7}\left(1.05\times 10^{-35}\times 13.801\times 10^{9}\right)}{7.000315677\times 10^{-21}}$$

Result:

$6.900500000478479088453084001398716414640985076185484 17\ldots\times 10^{9}$

$6.900500000478\ldots * 10^{9}$

Multiplying R(t) with $(H(t))^2$, we obtain:

7.000315677e-21 * (((((((2/3(13.801e+9)^-1)))+1/7((((1.05e-35)(13.801e+9))))))))^2

Input interpretation:

$$7.000315677\times 10^{-21}\left(\frac{\frac{2}{3}}{13.801\times 10^{9}}+\frac{1}{7}\left(1.05\times 10^{-35}\times 13.801\times 10^{9}\right)\right)^{2}$$

Result:

$1.633480652701664818399569426908634924636321942914312 3\ldots\times 10^{-41}$

$1.63348065\ldots * 10^{-41}$

Dividing R(t) with $(H(t))^2$, we obtain:

7.000315677e-21 / (((((((2/3(13.801e+9)^-1)))+1/7((((1.05e-35)(13.801e+9))))))))^2

Input interpretation:

$$\frac{7.000315677\times 10^{-21}}{\left(\frac{\frac{2}{3}}{13.801\times 10^{9}}+\frac{1}{7}\left(1.05\times 10^{-35}\times 13.801\times 10^{9}\right)\right)^{2}}$$

Result:

2.999999999791979401937386678294778251357441812310562603449...

2.999999… ≈ 3

and multiplying by 8:

8* [7.000315677e-21 / (((((((2/3(13.801e+9)^-1)))+1/7((((1.05e-35)(13.801e+9))))))))^2]

Input interpretation:

$$8 \times \frac{7.000315677 \times 10^{-21}}{\left(\frac{\frac{2}{3}}{13.801 \times 10^9} + \frac{1}{7}\left(1.05 \times 10^{-35} \times 13.801 \times 10^9\right)\right)^2}$$

Result:

23.99999999833583521549909342635822601085953449848450082759...

23.999999… ≈ 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.

((((8* [7.000315677e-21 / (((((((2/3(13.801e+9)^-1)))+1/7((((1.05e-35)(13.801e+9))))))))^2]))))^1/(2Pi)

Input interpretation:

$$\sqrt[2\pi]{8 \times \frac{7.000315677 \times 10^{-21}}{\left(\frac{\frac{2}{3}}{13.801 \times 10^9} + \frac{1}{7}\left(1.05 \times 10^{-35} \times 13.801 \times 10^9\right)\right)^2}}$$

Result:

1.658316575227561533225737405120683636406835446157963141298...

1.65831657…. is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3$ = 1164,2696 i.e. 1,65578...

From the following equation:

$$\bar{\rho}(t) = \frac{2t^{-2} + \frac{9}{98}\Lambda^2 t^2 - \frac{9}{14}\Lambda}{12\pi G} \qquad (20)$$

For t = 13.801e+9 years, Λ = 1.05e-35 and G = 6.67e-11 we obtain:

(((2(13.801e+9)^-2 + 9/98(1.05e-35)^2(13.801e+9)^2 - 9/14(1.05e-35)))/(12Pi*6.67e-11)

Input interpretation:

$$\frac{\frac{2}{(13.801\times 10^9)^2} + \frac{9}{98}(1.05\times 10^{-35})^2(13.801\times 10^9)^2 - \frac{9}{14}\times 1.05\times 10^{-35}}{12\pi\times 6.67\times 10^{-11}}$$

Result:

$4.17592... \times 10^{-12}$

$4.17592... * 10^{-12}$

We note that, from the sum of the below results of Ramanujan continued fractions (Rogers-Ramanujan identities), we obtain:

2,0663656771 + 0,5269391135 + 0,9568666373 + 0,6556795424 = 4,2058509703

Value very near to the above result 4.17592...

From the universe volume 5e+32 ly^3 = cubic meters, we obtain:

Input interpretation:

convert 5×10^{32} ly^3 (cubic light years) to cubic meters

Result:

4.234×10^{80} m^3 (cubic meters)

$4.234 * 10^{80}$ = universe volume

From this result, we obtain the following Dark Side universe mass :

4.234e+80* (((((((2(13.801e+9)^-2 + 9/98(1.05e-35)^2(13.801e+9)^2 - 9/14(1.05e-35)))/(12Pi*6.67e-11))))))

Input interpretation:

$$4.234\times 10^{80}\times \frac{\frac{2}{(13.801\times 10^{9})^{2}}+\frac{9}{98}(1.05\times 10^{-35})^{2}(13.801\times 10^{9})^{2}-\frac{9}{14}\times 1.05\times 10^{-35}}{12\,\pi\times 6.67\times 10^{-11}}$$

Result:

$1.76808... \times 10^{69}$

1.76808... * 10^{69} = 1.768 * 10^{69} DS universe mass

Inserting the value of the mass 1.768000e+69 in the Hawking radiation calculator, supposing that the universe is a black hole of 8,888442e+38 solar masses, practically a "giant" supermassive black hole (perhaps the final and/or the initial singularity) we obtain:

Mass = 1.768000e+69

Radius = 2.625218e+42

Temperature = 6.941195e-47

From the Ramanujan-Nardelli mock formula, we obtain:

sqrt[[[[1/(((((((4*1.962364415e+19)/(5*0.0864055^2)))*1/(1.768e+69)* sqrt[[-((((6.941195e-47 * 4*Pi*(2.625218e+42)^3-(2.625218e+42)^2))))) / ((6.67*10^-11))]]]]]

Input interpretation:

$$\sqrt{1/\left(\frac{4\times 1.962364415\times 10^{19}}{5\times 0.0864055^{2}}\times \frac{1}{1.768\times 10^{69}}\sqrt{-\frac{6.941195\times 10^{-47}\times 4\,\pi\,(2.625218\times 10^{42})^{3}-(2.625218\times 10^{42})^{2}}{6.67\times 10^{-11}}}\right)}$$

Result:

1.618249085068872226043301285465633206637431498883965687315...

1.618249085…

And:

1/sqrt[[[[1/(((((((4*1.962364415e+19)/(5*0.0864055^2)))*1/(1.768e+69)* sqrt[[-((((6.941195e-47 * 4*Pi*(2.625218e+42)^3-(2.625218e+42)^2))))) / ((6.67*10^-11))]]]]]

Input interpretation:

$$\frac{1}{\sqrt{\frac{1}{\frac{4\times1.962364415\times10^{19}}{5\times0.0864055^2}\times\frac{1}{1.768\times10^{69}}\sqrt{-\frac{6.941195\times10^{-47}\times4\pi(2.625218\times10^{42})^3-(2.625218\times10^{42})^2}{6.67\times10^{-11}}}}}}$$

Result:

0.617951840187470448147192707290122925915122652073344452693...

0.61795184…

Note that 1768 (value less exponent), is the sum of the following numbers:

1729+34+5 = 1768, where 1729 is the Hardy-Ramanujan number $12^3 + 1$, 34 and 5 are Fibonacci's numbers.

Note that the value of the entropy of this giant SMBH is 3.600452e+154, thence a condition of very high asymmetry (disorder), however this value can be compared to the set of final (initial) information, that reworked, gives rise to a new cycle of the universe.

We have that:

R_{00} and G_{00} are:

$$R_{00} = \frac{2}{3}t^{-2} - \Lambda - \frac{3}{49}\Lambda^2 t^2, \quad G_{00} = \frac{4}{3}t^{-2} + \frac{4}{7}\Lambda + \frac{3}{49}\Lambda^2 t^2. \tag{18}$$

From t = 13.801e+9 years, Λ = 1.05e-35 and G = 6.67e-11 we obtain:

(((2/3(13.801e+9)^-2)))-1.05e-35-3/49((((1.05e-35)^2(13.801e+9)^2)))

Input interpretation:

$$\frac{\frac{2}{3}}{(13.801\times10^9)^2} - 1.05\times10^{-35} - \frac{3}{49}\left((1.05\times10^{-35})^2\,(13.801\times10^9)^2\right)$$

Result:

3.500157838742688142309600290846430048721039301901 6219... × 10^{-21}

3.50015783… * 10^{-21}

We note that, from the sum of the below results of Ramanujan continued fractions (Rogers-Ramanujan identities), we obtain:

1,0000007913 + 0,5269391135 + 0,9568666373 + 1,0018674362 = 3,4856739783

value that is very near to the above result 3.50015783...

(((4/3(13.801e+9)^-2)))+4/7(1.05e-35)+3/49((((1.05e-35)^2(13.801e+9)^2)))

Input interpretation:

$$\frac{\frac{4}{3}}{(13.801\times10^{9})^2}+\frac{4}{7}\times1.05\times10^{-35}+\frac{3}{49}\left((1.05\times10^{-35})^2\,(13.801\times10^{9})^2\right)$$

Result:

$7.00031567748540328461920058169671706636232860380324 38... \times 10^{-21}$

7.000315677… * 10^{-21}

2*(((((7.00031567748540328461920058169671706636232860380324 38 × 10^-21) + (3.50015783874268814230960029084643004872103930190162 19 × 10^-21)))))

Input interpretation:

$$2\,(7.0003156774854032846192005816967170663623286038032438\times10^{-21}+3.5001578387426881423096002908464300487210393019016219\times10^{-21})$$

Result:

$21.0009470324561828538576017450862942301667358114097 31\times10^{-21}$

21.000947032456182853857601745086294230166735811409731 × 10^-21

(21.000947032456182853857601745086294230166735811409731 × 10^-21)/(7.0003156774854032846192005816967170663623286038032438 × 10^-21)

Input interpretation:

$$\frac{21.000947032456182853857601745086294230166735811409731\times10^{-21}}{7.0003156774854032846192005816967170663623286038032438\times10^{-21}}$$

Result:

2.999999999999996143031079750002754853565143415173099841433...

2.999999… ≈ 3

2.999999999999996143 * 8

Input interpretation:

$2.999999999999996143 \times 8$

Result:

23.99999999999969144

23.999999… ≈ 24

(2.999999999999996143 * 8)^1/(2Pi)

Input interpretation:

$\sqrt[2\pi]{2.999999999999996143 \times 8}$

Result:

$1.658316575245862103\ldots$

1.65831657...

13/10^3+(2.999999999999996143 * 8)^1/(2Pi)

Input interpretation:

$\frac{13}{10^3} + \sqrt[2\pi]{2.999999999999996143 \times 8}$

Result:

$1.671316575245862103\ldots$

1.67131657….

We note that 1.67131657... is a result practically equal to the value of the formula:

$m_{p\prime} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

Alternative representations:

$$\frac{13}{10^3} + \sqrt[2\pi]{2.9999999999999961430000 \times 8} = \sqrt[360^\circ]{23.9999999999999969144000} + \frac{13}{10^3}$$

- $$\frac{13}{10^3}+\sqrt[2\pi]{2.9999999999999961430000\times 8}=23.999999999999969144000^{-1/(2 i \log(-1))}+\frac{13}{10^3}$$

- $$\frac{13}{10^3}+\sqrt[2\pi]{2.9999999999999961430000\times 8}=\sqrt[2\cos^{-1}(-1)]{23.999999999999969144000}+\frac{13}{10^3}$$

$\log(x)$ is the natural logarithm

i is the imaginary unit

$\cos^{-1}(x)$ is the inverse cosine function

Series representations:

$$\frac{13}{10^3}+\sqrt[2\pi]{2.9999999999999961430000\times 8}=\frac{13}{1000}+\sqrt[8\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}]{23.999999999999969144000}$$

- $$\frac{13}{10^3}+\sqrt[2\pi]{2.9999999999999961430000\times 8}=\frac{13}{1000}+\sqrt[4\left(-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)]{23.999999999999969144000}$$

- $$\frac{13}{10^3}+\sqrt[2\pi]{2.9999999999999961430000\times 8}=\frac{13}{1000}+\sqrt[2x+4\sum_{k=1}^{\infty}\frac{\sin(kx)}{k}]{23.999999999999969144000} \quad \text{for } (x\in\mathbb{R} \text{ and } x>0)$$

$\binom{n}{m}$ is the binomial coefficient

$\mathbb{R}$ is the set of real numbers

Integral representations:

$$\frac{13}{10^3}+\sqrt[2\pi]{2.9999999999999961430000\times 8}=\frac{13}{1000}+e^{0.79451345758698608349507\Big/\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)}$$

-

$$\frac{13}{10^3} + \sqrt[2\pi]{2.99999999999999961430000 \times 8} =$$
$$\frac{13}{1000} + e^{0.397256728793493041747753/\left(\int_0^1 \sqrt{1-t^2}\,dt\right)}$$

- $$\frac{13}{10^3} + \sqrt[2\pi]{2.99999999999999961430000 \times 8} =$$
$$\frac{13}{1000} + e^{0.794513457586986083495507/\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)}$$

-13/10^3+(2.99999999999999996143 * 8)^1/(2Pi)

Input interpretation:

$$-\frac{13}{10^3} + \sqrt[2\pi]{2.9999999999999996143 \times 8}$$

Result:

1.645316575245862103...

1.64531657…. ≈ ζ(2) = $\frac{\pi^2}{6} = 1.644934$ ...

Alternative representations:

$$-\frac{13}{10^3} + \sqrt[2\pi]{2.99999999999999961430000 \times 8} =$$
$$\sqrt[360°]{23.99999999999999969144000} - \frac{13}{10^3}$$

- $$-\frac{13}{10^3} + \sqrt[2\pi]{2.99999999999999961430000 \times 8} =$$
$$23.99999999999999969144000^{-1/(2\,i\log(-1))} - \frac{13}{10^3}$$

- $$-\frac{13}{10^3} + \sqrt[2\pi]{2.99999999999999961430000 \times 8} =$$
$$\sqrt[2\cos^{-1}(-1)]{23.99999999999999969144000} - \frac{13}{10^3}$$

$\log(x)$ is the natural logarithm

i is the imaginary unit

$\cos^{-1}(x)$ is the inverse cosine function

Series representations:

$$-\frac{13}{10^3}+\sqrt[2\pi]{2.9999999999999961430000\times 8}=$$
$$-\frac{13}{1000}+\sqrt[8\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}]{23.999999999999969144000}$$

- $$-\frac{13}{10^3}+\sqrt[2\pi]{2.9999999999999961430000\times 8}=$$
$$-\frac{13}{1000}+\sqrt[4\left(-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)]{23.999999999999969144000}$$

- $$-\frac{13}{10^3}+\sqrt[2\pi]{2.9999999999999961430000\times 8}=$$
$$-\frac{13}{1000}+\sqrt[2x+4\sum_{k=1}^{\infty}\frac{\sin(kx)}{k}]{23.999999999999969144000} \quad \text{for } (x\in\mathbb{R} \text{ and } x>0)$$

$\binom{n}{m}$ is the binomial coefficient

$\mathbb{R}$ is the set of real numbers

Integral representations:

$$-\frac{13}{10^3}+\sqrt[2\pi]{2.9999999999999961430000\times 8}=$$
$$-\frac{13}{1000}+e^{0.79451345758698608349507/\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)}$$

- $$-\frac{13}{10^3}+\sqrt[2\pi]{2.9999999999999961430000\times 8}=$$
$$-\frac{13}{1000}+e^{0.39725672879349304174753/\left(\int_0^1 \sqrt{1-t^2}\,dt\right)}$$

- $$-\frac{13}{10^3}+\sqrt[2\pi]{2.9999999999999961430000\times 8}=$$
$$-\frac{13}{1000}+e^{0.79451345758698608349507/\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)}$$

(2/10^3+13/10^3-55/10^3)+(2.99999999999999996143 * 8)^1/(2Pi)

Input interpretation:

$$\left(\frac{2}{10^3}+\frac{13}{10^3}-\frac{55}{10^3}\right)+\sqrt[2\pi]{2.999999999999996143\times 8}$$

Result:

1.618316575245862103...

1.61831657…

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

Alternative representations:

$$\left(\frac{2}{10^3}+\frac{13}{10^3}-\frac{55}{10^3}\right)+\sqrt[2\pi]{2.99999999999999961430000\times 8}=\sqrt[360^\circ]{23.99999999999999969144000}-\frac{40}{10^3}$$

- $$\left(\frac{2}{10^3}+\frac{13}{10^3}-\frac{55}{10^3}\right)+\sqrt[2\pi]{2.99999999999999961430000\times 8}=23.99999999999999969144000^{-1/(2i\log(-1))}-\frac{40}{10^3}$$

- $$\left(\frac{2}{10^3}+\frac{13}{10^3}-\frac{55}{10^3}\right)+\sqrt[2\pi]{2.99999999999999961430000\times 8}=\sqrt[2\cos^{-1}(-1)]{23.99999999999999969144000}-\frac{40}{10^3}$$

$\log(x)$ is the natural logarithm

i is the imaginary unit

$\cos^{-1}(x)$ is the inverse cosine function

Series representations:

$$\left(\frac{2}{10^3}+\frac{13}{10^3}-\frac{55}{10^3}\right)+\sqrt[2\pi]{2.99999999999999961430000\times 8}=-\frac{1}{25}+\sqrt[8\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}]{23.99999999999999969144000}$$

- $$\left(\frac{2}{10^3}+\frac{13}{10^3}-\frac{55}{10^3}\right)+\sqrt[2\pi]{2.99999999999999961430000\times 8}=-\frac{1}{25}+\sqrt[4\left(-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)]{23.99999999999999969144000}$$

•

$$\left(\frac{2}{10^3}+\frac{13}{10^3}-\frac{55}{10^3}\right)+\sqrt[2\pi]{2.99999999999999961430000\times 8} = -\frac{1}{25}+\sqrt[2x+4\sum_{k=1}^{\infty}\frac{\sin(kx)}{k}]{23.99999999999969144000} \text{ for } (x\in\mathbb{R} \text{ and } x>0)$$

$\binom{n}{m}$ is the binomial coefficient

$\mathbb{R}$ is the set of real numbers

Integral representations:

$$\left(\frac{2}{10^3}+\frac{13}{10^3}-\frac{55}{10^3}\right)+\sqrt[2\pi]{2.99999999999999961430000\times 8} = -\frac{1}{25}+e^{0.794513457586986083495 07/\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)}$$

•

$$\left(\frac{2}{10^3}+\frac{13}{10^3}-\frac{55}{10^3}\right)+\sqrt[2\pi]{2.99999999999999961430000\times 8} = -\frac{1}{25}+e^{0.397256728793493041747 53/\left(\int_0^{1}\sqrt{1-t^2}\,dt\right)}$$

•

$$\left(\frac{2}{10^3}+\frac{13}{10^3}-\frac{55}{10^3}\right)+\sqrt[2\pi]{2.99999999999999961430000\times 8} = -\frac{1}{25}+e^{0.794513457586986083495 07/\left(\int_0^{\infty}\frac{\sin(t)}{t}\,dt\right)}$$

From the Friedmann equation $\frac{\dot{a}^2}{a^2}=\frac{8\pi G}{3}\bar{\rho}+\frac{\Lambda}{3}$, combined with expression (15) for the Hubble parameter, one can calculate the critical energy density ρ_c and the energy density of the dark matter $\bar{\rho}$ for the solution $a(t)=At^{\frac{2}{3}}e^{\frac{\Lambda}{14}t^2}$:

$$\rho_c=\frac{3}{8\pi G}H_0^2=8.51\cdot 10^{-30}\,\frac{\text{g}}{\text{cm}^3} \tag{22}$$

$$\bar{\rho}=\left(\frac{4}{9}t_0^{-2}-\frac{\Lambda}{7}+\frac{\Lambda^2}{49}t_0^2\right)\frac{3}{8\pi G}=2.26\cdot 10^{-30}\,\frac{\text{g}}{\text{cm}^3}. \tag{23}$$

21/10^3-5/10^3+((((8.51e-30)/(2.26e-30))))^1/e

Input interpretation:

$$\frac{21}{10^3} - \frac{5}{10^3} + \sqrt[e]{\frac{8.51 \times 10^{-30}}{2.26 \times 10^{-30}}}$$

Result:

1.644668707748584800198780459262795920365938831156296003309...

1.6446687…. ≈ ζ(2) = $\frac{\pi^2}{6} = 1.644934 \ldots$

(-21/10^3-5/10^3+21/10^3-5/10^3)+((((8.51e-30)/(2.26e-30))))^1/e

Input interpretation:

$$\left(-\frac{21}{10^3} - \frac{5}{10^3} + \frac{21}{10^3} - \frac{5}{10^3}\right) + \sqrt[e]{\frac{8.51 \times 10^{-30}}{2.26 \times 10^{-30}}}$$

Result:

1.618668707748584800198780459262795920365938831156296003309...

1.6186687…

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

From the dark matter energy density:

$$\bar{\rho} = \left(\frac{4}{9}t_0^{-2} - \frac{\Lambda}{7} + \frac{\Lambda^2}{49}t_0^2\right)\frac{3}{8\pi G} = 2.26 \cdot 10^{-30}\ \frac{\mathrm{g}}{\mathrm{cm}^3}.$$

-5/10^3+((((34*colog(((2.26e-30)))))))^1/16

Input interpretation:

$$-\frac{5}{10^3} + \sqrt[16]{34\left(-\log\left(2.26 \times 10^{-30}\right)\right)}$$

log(x) is the natural logarithm

Result:

1.61813146...

1.61813146…

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

From the universe volume 4.234 * 10^{80}, we obtain the Dark Matter mass:

(((2.26e-30)))*4.234e+80

Input interpretation:

$2.26 \times 10^{-30} \times 4.234 \times 10^{80}$

Scientific notation:

9.56884×10^{50}

9.56884 * 10^{50}

From the critical energy density:

$$\rho_c = \frac{3}{8\pi G} H_0^2 = 8.51 \cdot 10^{-30} \frac{\text{g}}{\text{cm}^3}$$

From the universe volume 4.234 * 10^{80}, we obtain the critical mass:

(((8.51e-30)))*4.234e+80

Input interpretation:

$8.51 \times 10^{-30} \times 4.234 \times 10^{80}$

Scientific notation:

3.603134×10^{51}

3.603134 * 10^{51} CM = critical mass

From the ratio between critical mass and DM mass, we obtain:

((((((((8.51e-30)))*4.234e+80))))) / ((((((((2.26e-30)))*4.234e+80)))))

Input interpretation:

$$\frac{8.51 \times 10^{-30} \times 4.234 \times 10^{80}}{2.26 \times 10^{-30} \times 4.234 \times 10^{80}}$$

Result:

3.765486725663716814159292035398230088495575221238938053097...

3.7654867…

(3/10^3-21/10^3)+sqrt[((((((((8.51e-30)))*4.234e+80))))) / ((((((((2.26e-30)))*4.234e+80))))))-1]

Input interpretation:

$$\left(\frac{3}{10^3}-\frac{21}{10^3}\right)+\sqrt{\frac{8.51\times10^{-30}\times4.234\times10^{80}}{2.26\times10^{-30}\times4.234\times10^{80}}-1}$$

Result:

1.6449752630943482600529790445906366819918206070143444435926...

1.644975263…. ≈ ζ(2) = $\frac{\pi^2}{6} = 1.644934$ ...

sqrt(((((6*((((((3/10^3-21/10^3)+sqrt[((((((((8.51e-30)))*4.234e+80))))) / ((((((((2.26e-30)))*4.234e+80))))))-1]))))))))))

Input interpretation:

$$\sqrt{6\left(\left(\frac{3}{10^3}-\frac{21}{10^3}\right)+\sqrt{\frac{8.51\times10^{-30}\times4.234\times10^{80}}{2.26\times10^{-30}\times4.234\times10^{80}}-1}\right)}$$

Result:

3.1416319928607312233496341395632920333673106953395671236 23...

3.141631992…. ≈ π

Inserting the value of the mass 9.56884e+50 in the Hawking radiation calculator, we obtain:

Mass = 9.568840e+50

Radius = 1.420831e+24

Temperature = 1.282499e-28

From the Ramanujan-Nardelli mock formula, we obtain:

sqrt[[[[1/(((((((4*1.962364415e+19)/(5*0.0864055^2)))*1/(9.568840e+50)* sqrt[[-((((1.282499e-28 * 4*Pi*(1.420831e+24)^3-(1.420831e+24)^2))))) / ((6.67*10^-11))]]]]]

Input interpretation:

$$\sqrt{1/\left(\frac{4\times 1.962364415\times 10^{19}}{5\times 0.0864055^2}\times\frac{1}{9.568840\times 10^{50}}\sqrt{-\frac{1.282499\times 10^{-28}\times 4\pi\,(1.420831\times 10^{24})^3-(1.420831\times 10^{24})^2}{6.67\times 10^{-11}}}\right)}$$

Result:

1.6182490501705778529805385575110630908732593803556707892 31...

1.61824905…

1/sqrt[[[[1/(((((((4*1.962364415e+19)/(5*0.0864055^2)))*1/(9.568840e+50)* sqrt[[-((((1.282499e-28 * 4*Pi*(1.420831e+24)^3-(1.420831e+24)^2))))) / ((6.67*10^-11))]]]]]

Input interpretation:

$$1/\left(\sqrt{1/\left(\frac{4\times 1.962364415\times 10^{19}}{5\times 0.0864055^2}\times\frac{1}{9.568840\times 10^{50}}\sqrt{-\frac{1.282499\times 10^{-28}\times 4\pi\,(1.420831\times 10^{24})^3-(1.420831\times 10^{24})^2}{6.67\times 10^{-11}}}\right)}\right)$$

Result:

0.61795185351388965720836136505229789796917340804633833555 0...

0.6179518…

We have that:

$$\bar{\rho}(t)=\frac{\Lambda}{8\pi G}\left(\frac{\Lambda}{3}t^2-1\right)$$

From t = 13.801e+9 years, Λ = 1.05e-35 and G = 6.67e-11 we obtain:

((1.05e-35 / (8Pi*6.67e-11)) * (((((((1.05e-35)/3*(13.801e+9)^2)))-1))))

Input interpretation:

$$\frac{1.05\times 10^{-35}}{8\pi\times 6.67\times 10^{-11}}\left(\frac{1.05\times 10^{-35}}{3}(13.801\times 10^{9})^{2}-1\right)$$

Result:

$$-6.26359...\times 10^{-27}$$

-6.26359... * 10^{-27}

We note that, from the sum of the below results of Ramanujan continued fractions (Rogers-Ramanujan identities), we obtain:

2,0663656771 + 0,9991104684 + 0,9568666373 + 1,0000007913 + 1,0018674362 + 0,5269391135 = 6,5511501238 value very near to the above result 6.26359...

For 4.234 * 10^{80} = universe volume, we obtain:

4.234e+80 ((((((1.05e-35 / (8Pi*6.67e-11)) * (((((((1.05e-35)/3*(13.801e+9)^2)))-1))))))))

Input interpretation:

$$4.234\times 10^{80}\left(\frac{1.05\times 10^{-35}}{8\pi\times 6.67\times 10^{-11}}\left(\frac{1.05\times 10^{-35}}{3}(13.801\times 10^{9})^{2}-1\right)\right)$$

Result:

$$-2.65201...\times 10^{54}$$

-2.65201... * 10^{54}

Note that:

-sqrt(2.65200573652 × 10^54)

Input interpretation:

$$-\sqrt{2.65200573652\times 10^{54}}$$

Result:

$$-1.62849800016...\times 10^{27}$$

$-1.628498\ldots * 10^{27}$

1/(-sqrt(2.65200573652 × 10^54))

Input interpretation:

$$-\frac{1}{\sqrt{2.65200573652\times 10^{54}}}$$

Result:

$-6.14062774350\ldots\times 10^{-28}$

-6.14062774350 × 10^-28 = -0.614062774350 × 10^-27

Input interpretation:

$-1.614062774350\times 10^{-27}+1\times 10^{-27}$

$-1.614062774350 * 10^{-27}$

Result:

$-6.1406277435\times 10^{-28}$

-0.614062774350 × 10^-27

Note that $-1.614062774350 * 10^{-27}$ is an approximation to the proton mass with minus sign

We have that:

$$\bar{\rho}(t)=\frac{-\frac{\Lambda}{2}+\frac{3k}{A^2}e^{\mp\sqrt{\frac{2}{3}\Lambda}\,t}}{8\pi G}$$

From t = 13.801e+9 years, Λ = 1.05e-35 and G = 6.67e-11 we obtain:

(((((((-1.05e-35*(1/2)+3*e^(((((sqrt(((2/3*1.05e-35)))*13.801e+9)))))))))) / 8Pi*6.67e-11

(((((sqrt(((2/3*1.05e-35)))*13.801e+9)))))

Input interpretation:

$$\sqrt{\frac{2}{3}\times 1.05\times 10^{-35}}\times 13.801\times 10^{9}$$

Result:

$3.65140... \times 10^{-8}$

3.65140e-8

Input interpretation:

$-1.05 \times 10^{-35} \times \frac{1}{2} + 3$

Result:

2.99999999999999999999999999999999999475

2.9999999

(((2.9999999 * exp(3.65140e-8))) / (((8Pi*6.67e-11)))

Input interpretation:

$$\frac{2.9999999 \exp(3.65140 \times 10^{-8})}{8 \pi \times 6.67 \times 10^{-11}}$$

Result:

$1.78960... \times 10^9$

$1.78960… * 10^9$

For $4.234 * 10^{80}$ = universe volume, we obtain:

4.234e+80 (((((((2.9999999 * exp(3.65140e-8))) / (((8Pi*6.67e-11))))))))

Input interpretation:

$$4.234 \times 10^{80} \times \frac{2.9999999 \exp(3.65140 \times 10^{-8})}{8 \pi \times 6.67 \times 10^{-11}}$$

Result:

$7.57716... \times 10^{89}$

$7.57716... * 10^{89}$

The ratio between the two densities is:

4.234e+80 (((((((2.9999999 * exp(3.65140e-8))) / (((8Pi*6.67e-11)))))))) *1/(-2.65201 * 10^54)

Input interpretation:

$$4.234\times 10^{80}\times \frac{2.9999999\exp(3.65140\times 10^{-8})}{8\pi\times 6.67\times 10^{-11}}\left(-\frac{1}{2.65201\times 10^{54}}\right)$$

Result:

$-2.85714...\times 10^{35}$

-2.85714... * 10^{35}

Note that:

[4.234e+80 (((((((2.9999999 * exp(3.65140e-8))) / (((8Pi*6.67e-11)))))))) *-1/(-2.65201 * 10^54)]^1/165

Input interpretation:

$$\sqrt[165]{-\frac{4.234\times 10^{80}\times \frac{2.9999999\exp(3.65140\times 10^{-8})}{8\pi\times 6.67\times 10^{-11}}\times(-1)}{2.65201\times 10^{54}}}$$

Result:

1.6401533...

1.6401533.... ≈ ζ(2) = $\frac{\pi^2}{6} = 1.644934$ ...

Now:

$$\mathcal{F}\left(2\lambda^2\right)=\frac{1}{96\pi GC\Lambda}+\frac{2}{3}f_0,\quad \mathcal{F}'\left(2\lambda^2\right)=0,\quad k=-4a_0^2\Lambda\sigma\tau. \qquad (23)$$

From $A_1 = A_2 = A_3 = 0$ one obtains the following system of equations:

$$12\lambda^2(3\mathcal{F}(2\lambda^2)-2f_0)=\frac{1}{8\pi GC},\qquad \mathcal{F}'(2\lambda^2)=0, \qquad (41)$$

$$144\lambda^4(3\mathcal{F}(2\lambda^2)-2f_0)=\frac{\Lambda}{2\pi GC}. \qquad (42)$$

Finally, we get

$$\lambda^2 = \frac{\Lambda}{3}, \quad \mathcal{F}(2\lambda^2) = \frac{1}{96\Lambda\pi GC} + \frac{2}{3} f_0, \quad \mathcal{F}'(2\lambda^2) = 0, \tag{43}$$

From:

$$144\lambda^4(3\mathcal{F}(2\lambda^2) - 2f_0) - \frac{\Lambda}{2\pi GC}.$$

((((((((2Pi* 144*(1.05e-35/3)^2*((3*1/(96*1.05e-35*Pi)+2/3)-2))))))))

Input interpretation:

$$2\pi \times 144 \left(\frac{1.05 \times 10^{-35}}{3}\right)^2 \left(\left(3 \times \frac{1}{96 \times 1.05 \times 10^{-35}\,\pi} + \frac{2}{3}\right) - 2\right)$$

Result:

$1.049999999999999999999999999999999852219481575136126 06... \times 10^{-35}$

$1.05000... \times 10^{-35}$

$1.05 * 10^{-35}$

We have:

$\Gamma(1/4) / (2^{11/8}\,\pi^{3/4}) = 0.592382781$ that is the Dedekind eta function $\eta(\tau)$ = q^(1/24)*$P_{n>0}${(1-q^n)}, where q=exp(2πτi) is the 'nome'. This function is a modular form.

Now: 1+0.592382781 = 1.592382781

(1+0.592382781)((((((((2Pi* 144*(1.05e-35/3)^2*((3*1/(96*1.05e-35*Pi)+2/3)-2))))))))

Input interpretation:

$$(1 + 0.592382781)\left(2\pi \times 144 \left(\frac{1.05 \times 10^{-35}}{3}\right)^2 \left(\left(3 \times \frac{1}{96 \times 1.05 \times 10^{-35}\,\pi} + \frac{2}{3}\right) - 2\right)\right)$$

Result:

$1.67200... \times 10^{-35}$

$1.672 * 10^{-35}$

Multiplying 1.592382781 by 10^8, we obtain:

(1+0.592382781)*10^8 ((((((((2Pi* 144*(1.05e-35/3)^2*((3*1/(96*1.05e-35*Pi)+2/3)-2)))))))))

Input interpretation:

$$(1+0.592382781)\times 10^8\left(2\,\pi\times 144\left(\frac{1.05\times 10^{-35}}{3}\right)^2\left(\left(3\times\frac{1}{96\times 1.05\times 10^{-35}\,\pi}+\frac{2}{3}\right)-2\right)\right)$$

Result:

$1.67200... \times 10^{-27}$

$1.672 * 10^{-27}$ result that is equal to the proton mass

From the sum of following Ramanujan mock theta functions $\boldsymbol{\phi(q)}$ = **0.50970737445...** and 1.0823205, that is equal to 1,59202787445, multiplied by 10^8, we obtain:

(1.59202787445)*10^8 ((((((((2Pi* 144*(1.05e-35/3)^2*((3*1/(96*1.05e-35*Pi)+2/3)-2)))))))))

Input interpretation:

$$1.59202787445\times 10^8\left(2\,\pi\times 144\left(\frac{1.05\times 10^{-35}}{3}\right)^2\left(\left(3\times\frac{1}{96\times 1.05\times 10^{-35}\,\pi}+\frac{2}{3}\right)-2\right)\right)$$

Result:

$1.6716292681724999999999999999999764729295366944904 74... \times 10^{-27}$

$1.671629... * 10^{-27}$

We note that $1.671629... * 10^{-27}$ kg is a result practically equal to the value of the formula:

$$m_{p\prime} = 2\times\frac{\eta}{R}m_P = 1.6714213\times 10^{-24} \text{ gm}$$

that is the holographic proton mass

$$12\lambda^2(3\mathcal{F}(2\lambda^2)-2f_0)=\frac{1}{8\pi GC},$$

8Pi* 12*(1.05e-35)^2 * (((((3*1/(96*1.05e-35*Pi)+2/3))-2)))

Input interpretation:

$$8\pi \times 12\,(1.05 \times 10^{-35})^2 \left(\left(3 \times \frac{1}{96 \times 1.05 \times 10^{-35}\,\pi} + \frac{2}{3}\right) - 2\right)$$

Result:

$3.15000... \times 10^{-35}$

3.15 * 10^{-35}

We have also:

(((5/10^3+2/10^3)+(Pi/6))) * (((((8Pi* 12*(1.05e-35)^2 * (((((3*1/(96*1.05e-35*Pi)+2/3))-2))))))))

Input interpretation:

$$\left(\left(\frac{5}{10^3} + \frac{2}{10^3}\right) + \frac{\pi}{6}\right)\left(8\pi \times 12\,(1.05 \times 10^{-35})^2 \left(\left(3 \times \frac{1}{96 \times 1.05 \times 10^{-35}\,\pi} + \frac{2}{3}\right) - 2\right)\right)$$

Result:

$1.6713861431346414501928877762217366618386499292333698... \times 10^{-35}$

1.671386143… * 10^{-35}

From the ratio between eqs. (42) and (41), we obtain:

3.15e-35 *1/ ((((((((2Pi* 144*(1.05e-35/3)^2*((3*1/(96*1.05e-35*Pi)+2/3)-2))))))))

Input interpretation:

$$3.15 \times 10^{-35} \times \frac{1}{2\pi \times 144 \left(\frac{1.05 \times 10^{-35}}{3}\right)^2 \left(\left(3 \times \frac{1}{96 \times 1.05 \times 10^{-35}\,\pi} + \frac{2}{3}\right) - 2\right)}$$

Result:

3.000000000000000000000000000000004222300526424682112493792...

3

From the development of the above equation,

$$12\lambda^2(3\mathcal{F}(2\lambda^2) - 2f_0) = \frac{1}{8\pi GC},$$

we obtain also this interesting result:

1/ (((((3*1/(96*1.05e-35*Pi)+2/3))-2)))*1/(((8Pi* 12*(1.05e-35)^2))) (a)

Input interpretation:

$$\frac{1}{\left(3\times\frac{1}{96\times1.05\times10^{-35}\,\pi}+\frac{2}{3}\right)-2}\times\frac{1}{8\,\pi\times12\,(1.05\times10^{-35})^2}$$

Result:

$3.17460... \times 10^{34}$

3.17460... * 10^{34}

And the inverse of this expression, provide us the previous result! Indeed:

1/(((((1/ (((((3*1/(96*1.05e-35*Pi)+2/3))-2)))*1/(((8Pi* 12*(1.05e-35)^2)))))))

Input interpretation:

$$\frac{1}{\frac{1}{\left(3\times\frac{1}{96\times1.05\times10^{-35}\,\pi}+\frac{2}{3}\right)-2}\times\frac{1}{8\,\pi\times12\,(1.05\times10^{-35})^2}}$$

Result:

$3.15000... \times 10^{-35}$

3.15 * 10^{-35}

From (a) we obtain also:

(16/(Pi))*1/ (((((3*1/(96*1.05e-35*Pi)+2/3))-2)))*1/(((8Pi* 12*(1.05e-35)^2)))

Input interpretation:

$$\frac{16}{\pi}\times\frac{1}{\left(3\times\frac{1}{96\times1.05\times10^{-35}\,\pi}+\frac{2}{3}\right)-2}\times\frac{1}{8\,\pi\times12\,(1.05\times10^{-35})^2}$$

Result:

$1.6168121202986192840013588660064973819373678297443194... \times 10^{35}$

1.61681212… * 10^{35}

And:

1/(((((16/(Pi))*1/ (((((3*1/(96*1.05e-35*Pi)+2/3))-2)))*1/(((8Pi* 12*(1.05e-35)^2)))))))

Input interpretation:

$$\frac{1}{\frac{16}{\pi}\times\frac{1}{\left(3\times\frac{1}{96\times1.05\times10^{-35}\,\pi}+\frac{2}{3}\right)-2}\times\frac{1}{8\,\pi\times12\,(1.05\times10^{-35})^2}}$$

Result:

$6.18501... \times 10^{-36}$

6.18501 × 10^-36 = 0.618501 × 10^-35

$6.18501\times10^{-36} = 0.618501\times10^{-35}$

$0.618501 * 10^{-35}$

Thence:

1*10^-35 + 1/((((((16/(Pi))*1/ (((((3*1/(96*1.05e-35*Pi)+2/3))-2)))*1/(((8Pi* 12*(1.05e-35)^2)))))))

Input interpretation:

$$1\times10^{-35}+\frac{1}{\frac{16}{\pi}\times\frac{1}{\left(3\times\frac{1}{96\times1.05\times10^{-35}\,\pi}+\frac{2}{3}\right)-2}\times\frac{1}{8\,\pi\times12\,(1.05\times10^{-35})^2}}$$

Result:

$1.618501053675490543822332916083151259827209549420543 7... \times 10^{-35}$

$1.618501… * 10^{-35}$

This result is a sub-multiple (Planck scale) very near to the value of the golden ratio 1,618033988749...

From:

$$144\lambda^4(3\mathcal{F}(2\lambda^2)-2f_0)=\frac{\Lambda}{2\pi GC}.$$

as the previous expression, we obtain:

1/((((3*1/(96*1.05e-35*Pi)+2/3)-2))) * 1/(((2Pi* 144*(1.05e-35/3)^2)))

Input interpretation:

$$\frac{1}{\left(3\times\frac{1}{96\times1.05\times10^{-35}\,\pi}+\frac{2}{3}\right)-2}\times\frac{1}{2\,\pi\times144\left(\frac{1.05\times10^{-35}}{3}\right)^2}$$

Result:

$$9.52381... \times 10^{34}$$

9.52381... * 10^{34}

(55-2)/Pi * 1/((((3*1/(96*1.05e-35*Pi)+2/3)-2))) * 1/(((2Pi* 144*(1.05e-35/3)^2)))

Input interpretation:

$$\frac{55-2}{\pi} \times \frac{1}{\left(3 \times \frac{1}{96 \times 1.05 \times 10^{-35} \pi} + \frac{2}{3}\right) - 2} \times \frac{1}{2 \pi \times 144 \left(\frac{1.05 \times 10^{-35}}{3}\right)^2}$$

Result:

$$1.60671... \times 10^{36}$$

1.60671... * 10^{36}

And:

1*10^-36+1/ (((((55-2)/Pi * 1/((((3*1/(96*1.05e-35*Pi)+2/3)-2))) * 1/(((2Pi* 144*(1.05e-35/3)^2)))))))

Input interpretation:

$$1 \times 10^{-36} + \frac{1}{\frac{55-2}{\pi} \times \frac{1}{\left(3 \times \frac{1}{96 \times 1.05 \times 10^{-35} \pi} + \frac{2}{3}\right) - 2} \times \frac{1}{2 \pi \times 144 \left(\frac{1.05 \times 10^{-35}}{3}\right)^2}}$$

Result:

$$1.62239... \times 10^{-36}$$

1.62239... * 10^{-36}

From the ratio between the two results 1.62239... * 10^{-36} and 1.618501… * 10^{-35}, we obtain:

(1.618501e-35) / (1.62239e-36)

Input interpretation:

$$\frac{1.618501 \times 10^{-35}}{1.62239 \times 10^{-36}}$$

Result:

9.9760291915014269072171302831008573770794938331720486442 84...

9.976029…

sqrt(((((1.618501e-35) / (1.62239e-36)))))

Input interpretation:

$$\sqrt{\frac{1.618501\times10^{-35}}{1.62239\times10^{-36}}}$$

Result:

3.158485268526897357518323789398954552667200652871341206964...

3.15848526…

-55+(((((1.618501e-35) / (1.62239e-36)))))^Pi

Input interpretation:

$$-55+\left(\frac{1.618501\times10^{-35}}{1.62239\times10^{-36}}\right)^{\pi}$$

Result:

1320.05...

1320.05 result very near to the rest mass of Xi baryon 1321.71

(233*2-55-34-21-2)+(((((1.618501e-35) / (1.62239e-36)))))^Pi

Input interpretation:

$$(233\times2-55-34-21-2)+\left(\frac{1.618501\times10^{-35}}{1.62239\times10^{-36}}\right)^{\pi}$$

Result:

1729.05...

1729.05….

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

(((((233*2-55-34-21-2)+(((((1.618501e-35) / (1.62239e-36)))))^Pi))))^1/15

Input interpretation:

$$\sqrt[15]{(233\times 2-55-34-21-2)+\left(\frac{1.618501\times 10^{-35}}{1.62239\times 10^{-36}}\right)^{\pi}}$$

Result:

1.64382...

$1.64382\ldots \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

(233*2-55)+(((((1.618501e-35) / (1.62239e-36)))))^Pi

Input interpretation:

$$(233\times 2-55)+\left(\frac{1.618501\times 10^{-35}}{1.62239\times 10^{-36}}\right)^{\pi}$$

Result:

1786.05...

1786.05…. result in the range of the hypothetical mass of Gluino (gluino = 1785.16 GeV).

Note that, from the following expression, we obtain:

1/ ((((((((((2sqrt(((((1.618501e-35) / (1.62239e-36)))))))))) / (2Pi)))))) (b)

Input interpretation:

$$\frac{1}{\frac{2\sqrt{\frac{1.618501\times 10^{-35}}{1.62239\times 10^{-36}}}}{2\pi}}$$

Result:

0.99465167208299731755814850557471691135563029160454079 1963...

0.99465167... result that is a very good approximation to the result of the following wonderful Ramanujan formula, that link π, e and ϕ:

$$\cfrac{1}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-4\pi}}{1+\cfrac{e^{-6\pi}}{1+\cfrac{e^{-8\pi}}{1+\cfrac{e^{-10\pi}}{\ddots}}}}}} = \left(\sqrt{\frac{5+\sqrt{5}}{2}} - \frac{1+\sqrt{5}}{2}\right) e^{2\pi/5}$$

(c)

0.9981360445985093321500244590470747353113829947630439821 85... =

0.99813604459850933215002445904707473531138299476304398 2185... ≈

≈ 0.99465167208299731755814850557471691135563029160454079 1963...

Furthermore, from the above formula (b) we have also that:

-55+10^3 / (((((((((2sqrt(((((1.618501e-35) *1/ (1.62239e-36))))))))) *1/ (2Pi))))))

Input interpretation:

$$-55 + \frac{10^3}{\left(2\sqrt{1.618501\times10^{-35}\times\frac{1}{1.62239\times10^{-36}}}\right)\times\frac{1}{2\pi}}$$

Result:

939.652...

939.652... result practically equal to the neutron mass in MeV 939.565378

From the formula (c) we notice that e, π and ϕ, have been wonderfully combined, by the mathematician S. Ramanujan.
The equation from which the neutron mass was found in MeV, is an example of how, from the result of expression (c), particle-like solutions are obtained. We have noticed, and we continue to notice, that from the most different physical parameters, using Ramanujan's mathematics and its formulas, we always obtain the golden ratio, ζ (2) and golden values very close, if not equal, to the mass of the proton . It is therefore possible to hypothesize that the formula (c) will certainly become part of the mathematics of a future TOE, capable of unifying microcosm and macrocosm. Thus, the universe could manifest itself through the various and incommensurable combinations of these 3 Mathematical Constants, which also assume a physical meaning (information). All this without the need to use difficult formulas, but with

simple and at the same time elegant equations that, as Ramanujan stated, "would have no meaning if they did not express a thought of God"

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that the vacuum energy density at the Planck scale ρ_ℓ, can be given as,

$$\rho_\ell = \frac{m_\ell}{PSU} = 9.86\times10^{93}\ \mathrm{g/cm^3}\ .$$

The vacuum energy density at the quantum scale is thus $\rho_\ell = 9.86\times10^{93}\ \mathrm{g/cm^3}$ instead of the value $\rho_{vac} = 5.16\times10^{93}\ \mathrm{g/cm^3}$ given in Equation (8).

In the case of the proton, the mass-energy in terms of Planck mass was calculated as $M_R = Rm_\ell = 2.45\times10^{55}\,\mathrm{g}$, which is equivalent to the mass of the observable universe (*i.e.* $M_u = 136\times2^{256}\times m_p = N_{Edd}m_p = 2.63\times10^{55}\,\mathrm{g}$ in terms of the Eddington number; and $M_u \approx 3.63\times10^{55}\,\mathrm{g}$ from density measurements). Since these values for the mass of the observable universe are just approximations, we will take the mass of the observable universe to be the mass-energy of the proton, as calculated above. The mass-energy density of the universe can thus be defined in terms of the mass-energy density of the proton. Thus, at the cosmological scale the mass-energy density, or vacuum energy density, is calculated to be,

$$\rho_u = \rho_R = \frac{M_R}{V_U} = \frac{Rm_\ell}{V_U} = 2.26\times10^{-30}\,\mathrm{g/cm^3} = 0.265\rho_{crit} \tag{15}$$

where $V_U = 1.08\times10^{85}\,\mathrm{cm^3}$ and was found by taking r_U as the Hubble radius $r_H = c/H_o = 1.37\times10^{28}\,\mathrm{cm}$. Thus, when the vacuum energy density of the Universe is considered in terms of the proton density and the protons PSU packing (*i.e.* its volume entropy, *R*) we find the density scales by a factor of 10^{122}. As well, it should be noted that this value for the mass-energy density is found to be equivalent to the dark matter density, $\rho_d = 0.268\rho_{crit}$.

Similarly, the vacuum energy density can be considered in terms of the PSU surface tiling (*i.e.* its surface entropy, η), as the radius expands from the Planck scale ρ_ℓ to the cosmological scale. The vacuum density at the cosmological scale is thus given as,

$$\rho_u = \frac{\rho_\ell}{\eta} = 8.53\times10^{-30}\,\mathrm{g/cm^3}\,(=\rho_{crit}) \tag{16}$$

where η is found by assuming a spherical shell Universe of radius $r_U = r_H$.

It should as well be noted that the equivalence found between the critical density and that found from the surface entropy (Equation (16)) yields a critical mass that obeys the Schwarzschild solution for a universe with a radius of the Hubble radius,

$$M_{crit} = \frac{\rho_\ell}{\eta}V_u = \frac{m_\ell}{\phi} = 9.24\times10^{55}\,\mathrm{g}\left(\equiv\frac{r_s c^2}{2G}\right) \tag{19}$$

We note that, from (16) and V_U = 1.08e+85, we obtain:

(8.53e-30 * 1.08e+85)

Input interpretation:

$8.53 \times 10^{-30} \times 1.08 \times 10^{85}$

Scientific notation:

9.2124×10^{55}

$9.2124 * 10^{55}$ value practically equal to the result of eq. (19)

From the eq. (15) and V_U = 1.08e+85, we obtain:

(2.26e-30 * 1.08e+85)

Input interpretation:

$2.26 \times 10^{-30} \times 1.08 \times 10^{85}$

Scientific notation:

2.4408×10^{55}

$2.4408 * 10^{55}$

The result is practically equal to the case of the proton, where the mass-energy in terms of Planck mass was calculated as $2.45 * 10^{55}$g which is equivalent to the mass of the observable universe $2.63 * 10^{55}$ g

From the ratio between the two masses, we obtain:

(9.2124 * 10^55)/(2.4408 * 10^55)

Input interpretation:

$$\frac{9.2124 \times 10^{55}}{2.4408 \times 10^{55}}$$

Result:

3.774336283185840707964601769911504424778761061946902654867...

3.77433628…

Note that, from the following formula, for q = 0.5 (as for the usual Ramanujan expressions) n =2, x = 3 and τ = 1, (for $\sum$ n = 0 to 2, we take n = 2) we obtain:

$$(33) \qquad Z^{(\mathbb{C}^3,\mathcal{D}_\tau)}(g_s, \mathbf{x} = (x,0,0,..)) = \sum_{n\geq 0} \mathcal{H}_{(n)}(q;\tau)x^n$$
$$= \sum_{n\geq 0} \frac{(-1)^{n(\tau-1)} q^{\frac{n(n-1)}{2}\tau + \frac{n^2}{2}}}{(1-q)(1-q^2)\cdots(1-q^n)} x^n,$$

$$\frac{0.5^3 \times 9}{(1-0.5^1)(1-0.5^2)(1-0.5^3)(1-0.5^4)(1-0.5^5)}$$

3.775115207373271889400921658986175115207373271889400921658...

3.7751152… result very near to the above solution, i.e. 3.77433628…

Thence:

$$\frac{9.2124 \times 10^{55}}{2.4408 \times 10^{55}} \approx \frac{0.5^3 \times 9}{(1-0.5^1)(1-0.5^2)(1-0.5^3)(1-0.5^4)(1-0.5^5)}$$

Pi(((9.2124 * 10^55)/(2.4408 * 10^55)))

Input interpretation:

$$\pi \times \frac{9.2124 \times 10^{55}}{2.4408 \times 10^{55}}$$

Result:

11.8574...

11.8574... result very near to the black hole entropy 11.8477

Alternative representations:

$$\frac{\pi(9.2124 \times 10^{55})}{2.4408 \times 10^{55}} = \frac{1658.23° \, 10^{55}}{2.4408 \times 10^{55}}$$

-

$$\frac{\pi(9.2124 \times 10^{55})}{2.4408 \times 10^{55}} = -\frac{9.2124\, i \log(-1)\, 10^{55}}{2.4408 \times 10^{55}}$$

-

$$\frac{\pi(9.2124\times 10^{55})}{2.4408\times 10^{55}} = \frac{9.2124\cos^{-1}(-1)\,10^{55}}{2.4408\times 10^{55}}$$

$\log(x)$ is the natural logarithm

i is the imaginary unit

$\cos^{-1}(x)$ is the inverse cosine function

Series representations:

$$\frac{\pi(9.2124\times 10^{55})}{2.4408\times 10^{55}} = 15.0973\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

- $$\frac{\pi(9.2124\times 10^{55})}{2.4408\times 10^{55}} = -7.54867+7.54867\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}$$

- $$\frac{\pi(9.2124\times 10^{55})}{2.4408\times 10^{55}} = 3.77434\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}$$

$\binom{n}{m}$ is the binomial coefficient

Integral representations:

$$\frac{\pi(9.2124\times 10^{55})}{2.4408\times 10^{55}} = 7.54867\int_0^{\infty}\frac{1}{1+t^2}\,dt$$

- $$\frac{\pi(9.2124\times 10^{55})}{2.4408\times 10^{55}} = 15.0973\int_0^{1}\sqrt{1-t^2}\,dt$$

- $$\frac{\pi(9.2124\times 10^{55})}{2.4408\times 10^{55}} = 7.54867\int_0^{\infty}\frac{\sin(t)}{t}\,dt$$

From the result 11.8574, considered as an entropy, we obtain:

Mass = 3.208474e-8

Radius = 4.764107e-35

Temperature = 3.824882e+30

From the Ramanujan-Nardelli mock formula, we obtain:

sqrt[[[[1/(((((((4*1.962364415e+19)/(5*0.0864055^2)))*1/(3.208474e-8)* sqrt[[-((((3.824882e+30 * 4*Pi*(4.764107e-35)^3-(4.764107e-35)^2))))) / ((6.67*10^-11))]]]]]

Input interpretation:

$$\sqrt{\left(1\Big/\left(\frac{4\times 1.962364415\times 10^{19}}{5\times 0.0864055^2}\times\frac{1}{3.208474\times 10^{-8}}\sqrt{-\frac{3.824882\times 10^{30}\times 4\pi(4.764107\times 10^{-35})^3-(4.764107\times 10^{-35})^2}{6.67\times 10^{-11}}}\right)\right)}$$

Result:

1.618249327122968064345114956197180760910505037781652440430...

1.6182493…

And:

(((Pi(((9.2124 * 10^55)/(2.4408 * 10^55))))))^1/5

Input interpretation:

$$\sqrt[5]{\pi\times\frac{9.2124\times 10^{55}}{2.4408\times 10^{55}}}$$

Result:

1.63983...

$1.63983\ldots. \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Note that, from this expression, we obtain also:

-21/10^3+(((Pi(((9.2124 * 10^55)/(2.4408 * 10^55))))))^1/5

Input interpretation:

$$-\frac{21}{10^3}+\sqrt[5]{\pi\times\frac{9.2124\times10^{55}}{2.4408\times10^{55}}}$$

Result:

1.618827226864767242547847735775412436813914794688398444895...

1.618827226…

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

Alternative representations:

$$-\frac{21}{10^3}+\sqrt[5]{\frac{\pi(9.2124\times10^{55})}{2.4408\times10^{55}}}=-\frac{21}{10^3}+\sqrt[5]{\frac{1658.23\,°\,10^{55}}{2.4408\times10^{55}}}$$

- $$-\frac{21}{10^3}+\sqrt[5]{\frac{\pi(9.2124\times10^{55})}{2.4408\times10^{55}}}=-\frac{21}{10^3}+\sqrt[5]{-\frac{9.2124\,i\log(-1)\,10^{55}}{2.4408\times10^{55}}}$$

- $$-\frac{21}{10^3}+\sqrt[5]{\frac{\pi(9.2124\times10^{55})}{2.4408\times10^{55}}}=-\frac{21}{10^3}+\sqrt[5]{\frac{9.2124\cos^{-1}(-1)\,10^{55}}{2.4408\times10^{55}}}$$

$\log(x)$ is the natural logarithm

i is the imaginary unit

$\cos^{-1}(x)$ is the inverse cosine function

Series representations:

$$-\frac{21}{10^3}+\sqrt[5]{\frac{\pi(9.2124\times10^{55})}{2.4408\times10^{55}}}=-0.021+1.721\sqrt[5]{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}$$

- $$-\frac{21}{10^3}+\sqrt[5]{\frac{\pi(9.2124\times10^{55})}{2.4408\times10^{55}}}=-0.021+1.49821\sqrt[5]{-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}}$$

- $$-\frac{21}{10^3}+\sqrt[5]{\frac{\pi(9.2124\times10^{55})}{2.4408\times10^{55}}}=-0.021+1.30427\sqrt[5]{\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}}$$

$\binom{n}{m}$ is the binomial coefficient

Integral representations:

$$-\frac{21}{10^3}+\sqrt[5]{\frac{\pi(9.2124\times10^{55})}{2.4408\times10^{55}}}=-0.021+1.49821\sqrt[5]{\int_0^{\infty}\frac{1}{1+t^2}\,dt}$$

- $$-\frac{21}{10^3}+\sqrt[5]{\frac{\pi(9.2124\times10^{55})}{2.4408\times10^{55}}}=-0.021+1.721\sqrt[5]{\int_0^{1}\sqrt{1-t^2}\,dt}$$

- $$-\frac{21}{10^3}+\sqrt[5]{\frac{\pi(9.2124\times10^{55})}{2.4408\times10^{55}}}=-0.021+1.49821\sqrt[5]{\int_0^{\infty}\frac{\sin(t)}{t}\,dt}$$

We have also that:

-21*2+1/10^6((((-1+2e*1/((((1/(((9.2124 * 10^55)+(2.4408 * 10^55)))*1/(1.6714213e-24)^2))))))))

Input interpretation:

$$-21\times2+\frac{1}{10^6}\left(-1+2e\times\frac{1}{\frac{1}{9.2124\times10^{55}+2.4408\times10^{55}}\times\frac{1}{(1.6714213\times10^{-24})^2}}\right)$$

Result:

1727.87...

1727.87...

This result is very near to the mass of candidate glueball $f_0(1710)$ meson. Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. As a consequence, it is sometimes called a Zagier as a pun on the Gross–Zagier theorem. The number 1728 is one less than the Hardy–Ramanujan number 1729

[-21*2+1/10^6((((-1+2e*1/((((1/(((9.2124 * 10^55)+(2.4408 * 10^55)))*1/(1.6714213e-24)^2)))))))))]^1/15

Input interpretation:

$$\sqrt[15]{-21\times 2+\frac{1}{10^6}\left(-1+2\,e\times\frac{1}{\frac{1}{9.2124\times 10^{55}+2.4408\times 10^{55}}\times\frac{1}{(1.6714213\times 10^{-24})^2}}\right)}$$

Result:

1.643743630166333773412992362286002178790781559708169982015...

1.64374363.... ≈ $\zeta(2) = \frac{\pi^2}{6} = 1.644934$ ...

sqrt((((6*[-21*2+1/10^6((((-1+2e*1/((((1/(((9.2124 * 10^55)+(2.4408 * 10^55)))*1/(1.6714213e-24)^2)))))))))]^1/15))))

Input interpretation:

$$\sqrt{6\sqrt[15]{-21\times 2+\frac{1}{10^6}\left(-1+2\,e\times\frac{1}{\frac{1}{9.2124\times 10^{55}+2.4408\times 10^{55}}\times\frac{1}{(1.6714213\times 10^{-24})^2}}\right)}}$$

Result:

3.140455664549016148150998931406256825502557069388855467923...

3.14045566.... ≈ π

Note that, from:

that the vacuum energy density at the Planck scale ρ_ℓ, can be given as,

$$\rho_\ell = \frac{m_\ell}{PSU} = 9.86 \times 10^{93} \text{ g/cm}^3 .$$

We obtain:

(9.86e+93)^1/189

Input interpretation:

$$\sqrt[189]{9.86 \times 10^{93}}$$

Result:

3.142838756428274548831882070081312847878638508771049557028...

3.14283875…

Or:

(9.86e+93)^1/(3^3*8-3^3)

$$\sqrt[3^3 \times 8 - 3^3]{9.86 \times 10^{93}}$$

3.142838756428274548831882070081312847878638508771049557028...

Note that 3^3 = 27 and 27 = √729, thence:

(9.86e+93)^1/(((sqrt(729)*7)))

Input interpretation:

$$\sqrt[\sqrt{729} \times 7]{9.86 \times 10^{93}}$$

Result:

3.142838756428274548831882070081312847878638508771049557028...

3.14283875… as above.

From: **Karatsuba Zeta cosmology**

А. А. Карацуба, **Космология и Дзета**. Доклад в Москве,
Совр. пробл. матем., 2016, выпуск 23, 17–23
DOI: https://doi.org/10.4213/spm58

Now, we have that:

$$\varkappa p(t_0) \geqslant \frac{2-\beta}{c_1} \log\log\gamma_k - c_2\frac{1}{\gamma_k},$$
$$E(t_0) \geqslant \frac{2(\beta-1)}{c_1} \log\log\gamma_k - c_3\frac{1}{\gamma_k}.$$

Mock theta functions (a) 3.462585… and (b) 2.17261904

For γ_k = 0,36562516 c_1 = 1.28996596; (3.462585 – 2.17261904) c_2 = 2.17261904 and c_3 = 3.462585 $1 < \beta < 2$

β = 1,593737759... (3.462585 / 2.17261904)

$\gamma_{k+1} - \gamma_k \leqslant 1$ = 0.9243408 (mock theta functions)

$\gamma_{k+1} - \gamma_k \leqslant c_1$ = 1.28996593

2(1.593737759-1)/1.28996596 * ln(ln 0.36562516) – 3.462585/0.36562516 (a)

Or

2(1.5-1)/2 * ln(ln 0.8) – 4/0.2 (b)

2(1.593737759-1)/1.28996596 * ln(ln 0.36562516) – 3.462585*1/0.36562516

Input interpretation:

$$2 \times \frac{1.593737759 - 1}{1.28996596} \log(\log(0.36562516)) + \frac{1}{0.36562516} \times (-3.462585)$$

log(x) is the natural logarithm

Result:

$-9.464673\ldots +$
$2.891987\ldots\, i$

Polar coordinates:

$r = 9.89665$ (radius), $\theta = 163.009°$ (angle)

$9.89665 = E(t_0) \approx \pi^2$

Alternative representations:

$$\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997} - \frac{3.46259}{0.365625} = -\frac{3.46259}{0.365625} + \frac{1.18748\log_e(\log(0.365625))}{1.28997}$$

-

$$\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997} - \frac{3.46259}{0.365625} = -\frac{3.46259}{0.365625} + \frac{1.18748\log(a)\log_a(\log(0.365625))}{1.28997}$$

-

$$\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997} - \frac{3.46259}{0.365625} = -\frac{3.46259}{0.365625} - \frac{1.18748\,\mathrm{Li}_1(1-\log(0.365625))}{1.28997}$$

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

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations:

$$\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997} - \frac{3.46259}{0.365625} = -9.47031 + 0.920548\log(-1+\log(0.365625)) - 0.920548\sum_{k=1}^{\infty}\frac{(-1)^k(-1+\log(0.365625))^{-k}}{k}$$

-

$$\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997} - \frac{3.46259}{0.365625} = -9.47031 + 1.8411\, i\,\pi\left\lfloor\frac{\arg(-x+\log(0.365625))}{2\pi}\right\rfloor + 0.920548\log(x) - 0.920548\sum_{k=1}^{\infty}\frac{(-1)^k x^{-k}(-x+\log(0.365625))^k}{k} \quad \text{for } x<0$$

-

$$\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997}-\frac{3.46259}{0.365625}=$$

$$-9.47031+0.920548\left\lfloor\frac{\arg(\log(0.365625)-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+$$
$$0.920548\log(z_0)+0.920548\left\lfloor\frac{\arg(\log(0.365625)-z_0)}{2\pi}\right\rfloor\log(z_0)-$$
$$0.920548\sum_{k=1}^{\infty}\frac{(-1)^k(\log(0.365625)-z_0)^k z_0^{-k}}{k}$$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

i is the imaginary unit

Integral representation:

$$\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997}-\frac{3.46259}{0.365625}=$$
$$-9.47031+0.920548\int_1^{\log(0.365625)}\frac{1}{t}\,dt$$

sqrt(((((2(1.593737759-1)/1.28996596 * ln(ln 0.36562516) – 3.462585*1/0.36562516)))))

Input interpretation:

$$\sqrt{2\times\frac{1.593737759-1}{1.28996596}\log(\log(0.36562516))+\frac{1}{0.36562516}\times(-3.462585)}$$

$\log(x)$ is the natural logarithm

Result:

0.4647440... +
3.111376... i

Polar coordinates:

$r = 3.14589$ (radius), $\theta = 81.5046°$ (angle)

3.14589

All 2nd roots of -9.46467 + 2.89199 i:

Polar form

$3.14589\, e^{1.42252\, i} \approx 0.46474 + 3.1114\, i$ (principal root)

- $3.14589\, e^{-1.71907\, i} \approx -0.46474 - 3.1114\, i$

Alternative representations:

$$\sqrt{\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997}-\frac{3.46259}{0.365625}} = \sqrt{-\frac{3.46259}{0.365625}+\frac{1.18748\log_e(\log(0.365625))}{1.28997}}$$

-

$$\sqrt{\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997}-\frac{3.46259}{0.365625}} = \sqrt{-\frac{3.46259}{0.365625}+\frac{1.18748\log(a)\log_a(\log(0.365625))}{1.28997}}$$

-

$$\sqrt{\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997}-\frac{3.46259}{0.365625}} = \sqrt{-\frac{3.46259}{0.365625}-\frac{1.18748\,\mathrm{Li}_1(1-\log(0.365625))}{1.28997}}$$

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

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations:

$$\sqrt{\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997}-\frac{3.46259}{0.365625}} = \sqrt{-9.47031+0.920548\left(\log(-1+\log(0.365625))-\sum_{k=1}^{\infty}\frac{(-1)^k(-1+\log(0.365625))^{-k}}{k}\right)}$$

-

$$\sqrt{\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997}-\frac{3.46259}{0.365625}} = \sqrt{-10.4703+0.920548\log(\log(0.365625))}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}(-10.4703+0.920548\log(\log(0.365625)))^{-k}$$

-

$$\sqrt{\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997}-\frac{3.46259}{0.365625}} =$$
$$\sqrt{-10.4703+0.920548\log(\log(0.365625))}\sum_{k=0}^{\infty}\frac{(-1)^k(-10.4703+0.920548\log(\log(0.365625)))^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

Integral representation:

$$\sqrt{\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997}-\frac{3.46259}{0.365625}} = \sqrt{-9.47031+0.920548\int_1^{\log(0.365625)}\frac{1}{t}\,dt}$$

1/6(((((2(1.593737759-1)/1.28996596 * ln(ln 0.36562516) – 3.462585*1/0.36562516)))))

Input interpretation:

$$\frac{1}{6}\left(2\times\frac{1.593737759-1}{1.28996596}\log(\log(0.36562516))+\frac{1}{0.36562516}\times(-3.462585)\right)$$

$\log(x)$ is the natural logarithm

Result:

$-1.577445\ldots + 0.4819978\ldots i$

Polar coordinates:

$r = 1.64944$ (radius), $\theta = 163.009°$ (angle)

$1.64944 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

Alternative representations:

$$\frac{1}{6}\left(\frac{2(1.59374-1)\log(\log(0.365625))}{1.28997}-\frac{3.46259}{0.365625}\right) = \frac{1}{6}\left(-\frac{3.46259}{0.365625}+\frac{1.18748\log_e(\log(0.365625))}{1.28997}\right)$$

- $$\frac{1}{6}\left(\frac{2\,(1.59374-1)\log(\log(0.365625))}{1.28997}-\frac{3.46259}{0.365625}\right)=\frac{1}{6}\left(-\frac{3.46259}{0.365625}+\frac{1.18748\log(a)\log_a(\log(0.365625))}{1.28997}\right)$$

- $$\frac{1}{6}\left(\frac{2\,(1.59374-1)\log(\log(0.365625))}{1.28997}-\frac{3.46259}{0.365625}\right)=\frac{1}{6}\left(-\frac{3.46259}{0.365625}-\frac{1.18748\,\text{Li}_1(1-\log(0.365625))}{1.28997}\right)$$

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

$\text{Li}_n(x)$ is the polylogarithm function

Series representations:

$$\frac{1}{6}\left(\frac{2\,(1.59374-1)\log(\log(0.365625))}{1.28997}-\frac{3.46259}{0.365625}\right)=-1.57839+0.153425\log(-1+\log(0.365625))-0.153425\sum_{k=1}^{\infty}\frac{(-1)^k\,(-1+\log(0.365625))^{-k}}{k}$$

- $$\frac{1}{6}\left(\frac{2\,(1.59374-1)\log(\log(0.365625))}{1.28997}-\frac{3.46259}{0.365625}\right)=-1.57839+0.306849\,i\,\pi\left\lfloor\frac{\arg(-x+\log(0.365625))}{2\,\pi}\right\rfloor+0.153425\log(x)-0.153425\sum_{k=1}^{\infty}\frac{(-1)^k\,x^{-k}\,(-x+\log(0.365625))^k}{k}\quad\text{for } x<0$$

- $$\frac{1}{6}\left(\frac{2\,(1.59374-1)\log(\log(0.365625))}{1.28997}-\frac{3.46259}{0.365625}\right)=-1.57839+0.153425\left\lfloor\frac{\arg(\log(0.365625)-z_0)}{2\,\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+0.153425\log(z_0)+0.153425\left\lfloor\frac{\arg(\log(0.365625)-z_0)}{2\,\pi}\right\rfloor\log(z_0)-0.153425\sum_{k=1}^{\infty}\frac{(-1)^k\,(\log(0.365625)-z_0)^k\,z_0^{-k}}{k}$$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

i is the imaginary unit

Integral representation:

$$\frac{1}{6}\left(\frac{2\,(1.59374-1)\log(\log(0.365625))}{1.28997}-\frac{3.46259}{0.365625}\right)=$$
$$-1.57839+0.153425\int_1^{\log(0.365625)}\frac{1}{t}\,dt$$

From

$$E(t_0) \geqslant \frac{2(\beta-1)}{c_1} - c_3\frac{1}{\gamma_k} > 0$$

for these other values

2(1.5-1)/2 * ln(ln 0.8) – 4/0.2 (b),

we obtain:

Input:

$$2\left(\frac{1}{2}\,(1.5-1)\right)\log(\log(0.8))-\frac{4}{0.2}$$

$\log(x)$ is the natural logarithm

Result:

$-20.7500\ldots+$
$1.57080\ldots\, i$

Polar coordinates:

$r=20.8093$ (radius), $\theta=175.671°$ (angle)

20.8093

Alternative representations:

$$\frac{1}{2}\,(2\log(\log(0.8)))\,(1.5-1)-\frac{4}{0.2}=0.5\log_e(\log(0.8))-\frac{4}{0.2}$$

- $$\frac{1}{2}\,(2\log(\log(0.8)))\,(1.5-1)-\frac{4}{0.2}=0.5\log(a)\log_a(\log(0.8))-\frac{4}{0.2}$$

- $$\frac{1}{2}\,(2\log(\log(0.8)))\,(1.5-1)-\frac{4}{0.2}=-0.5\,\text{Li}_1(1-\log(0.8))-\frac{4}{0.2}$$

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

$\text{Li}_n(x)$ is the polylogarithm function

Series representations:

$$\frac{1}{2}(2\log(\log(0.8)))(1.5-1)-\frac{4}{0.2}= -20+0.5\log(-1+\log(0.8))-0.5\sum_{k=1}^{\infty}\frac{(-1)^k(-1+\log(0.8))^{-k}}{k}$$

- $$\frac{1}{2}(2\log(\log(0.8)))(1.5-1)-\frac{4}{0.2}=-20+i\pi\left\lfloor\frac{\arg(-x+\log(0.8))}{2\pi}\right\rfloor+ 0.5\log(x)-0.5\sum_{k=1}^{\infty}\frac{(-1)^k x^{-k}(-x+\log(0.8))^k}{k}\quad \text{for } x<0$$

- $$\frac{1}{2}(2\log(\log(0.8)))(1.5-1)-\frac{4}{0.2}=-20+0.5\left\lfloor\frac{\arg(\log(0.8)-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+ 0.5\log(z_0)+0.5\left\lfloor\frac{\arg(\log(0.8)-z_0)}{2\pi}\right\rfloor\log(z_0)-0.5\sum_{k=1}^{\infty}\frac{(-1)^k(\log(0.8)-z_0)^k z_0^{-k}}{k}$$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

i is the imaginary unit

Integral representation:

$$\frac{1}{2}(2\log(\log(0.8)))(1.5-1)-\frac{4}{0.2}=-20+0.5\int_1^{\log(0.8)}\frac{1}{t}\,dt$$

(((((2(1.5-1)/2 * ln(ln 0.8) – 4/0.2)))))^1/6

Input:

$$\sqrt[6]{2\left(\frac{1}{2}(1.5-1)\right)\log(\log(0.8))-\frac{4}{0.2}}$$

$\log(x)$ is the natural logarithm

Result:

1.446612... +
0.8110868... i

Polar coordinates:

$r = 1.65848$ (radius), $\theta = 29.2785°$ (angle)

1.65848 is very near to the 14th root of the following Ramanujan’s class invariant $Q=\left(G_{505}/G_{101/5}\right)^3$ = 1164,2696 i.e. 1,65578...

From the following formula

$$\varkappa p(t_0) \geqslant \frac{2-\beta}{c_1} \log\log \gamma_k - c_2 \frac{1}{\gamma_k},$$

For the above values, we obtain:

((((2-1.593737759)/1.28996596 * ln(ln 0.36562516) – 2.17261904/0.36562516)))

Input interpretation:

$$\frac{2-1.593737759}{1.28996596} \log(\log(0.36562516)) - \frac{2.17261904}{0.36562516}$$

$\log(x)$ is the natural logarithm

Result:

$-5.9402734\ldots +$
$0.98941407\ldots i$

Polar coordinates:

$r = 6.02211$ (radius), $\theta = 170.544°$ (angle)

6.02211

Alternative representations:

$$\frac{\log(\log(0.365625))(2-1.59374)}{1.28997} - \frac{2.17262}{0.365625} = -\frac{2.17262}{0.365625} + \frac{0.406262 \log_e(\log(0.365625))}{1.28997}$$

- $$\frac{\log(\log(0.365625))(2-1.59374)}{1.28997} - \frac{2.17262}{0.365625} = -\frac{2.17262}{0.365625} + \frac{0.406262 \log(a) \log_a(\log(0.365625))}{1.28997}$$

- $$\frac{\log(\log(0.365625))(2-1.59374)}{1.28997} - \frac{2.17262}{0.365625} = -\frac{2.17262}{0.365625} - \frac{0.406262 \operatorname{Li}_1(1-\log(0.365625))}{1.28997}$$

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

$\operatorname{Li}_n(x)$ is the polylogarithm function

Series representations:

$$\frac{\log(\log(0.365625))(2-1.59374)}{1.28997}-\frac{2.17262}{0.365625}=-5.9422+0.31494\log(-1+\log(0.365625))-0.31494\sum_{k=1}^{\infty}\frac{(-1)^k(-1+\log(0.365625))^{-k}}{k}$$

- $$\frac{\log(\log(0.365625))(2-1.59374)}{1.28997}-\frac{2.17262}{0.365625}=-5.9422+0.629881\,i\,\pi\left\lfloor\frac{\arg(-x+\log(0.365625))}{2\,\pi}\right\rfloor+0.31494\log(x)-0.31494\sum_{k=1}^{\infty}\frac{(-1)^k x^{-k}(-x+\log(0.365625))^k}{k}\quad\text{for } x<0$$

- $$\frac{\log(\log(0.365625))(2-1.59374)}{1.28997}-\frac{2.17262}{0.365625}=-5.9422+0.31494\left\lfloor\frac{\arg(\log(0.365625)-z_0)}{2\,\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+0.31494\log(z_0)+0.31494\left\lfloor\frac{\arg(\log(0.365625)-z_0)}{2\,\pi}\right\rfloor\log(z_0)-0.31494\sum_{k=1}^{\infty}\frac{(-1)^k(\log(0.365625)-z_0)^k z_0^{-k}}{k}$$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

i is the imaginary unit

Integral representation:

$$\frac{\log(\log(0.365625))(2-1.59374)}{1.28997}-\frac{2.17262}{0.365625}=-5.9422+0.31494\int_1^{\log(0.365625)}\frac{1}{t}\,dt$$

From the ratio between the previous result 9.89665 and this last solution 6.02211 , we obtain:

((((2(1.593737759-1)/1.28996596 * ln(ln 0.36562516) – 3.462585*1/0.36562516)))) / ((((2-1.593737759)/1.28996596 * ln(ln 0.36562516) – 2.17261904/0.36562516)))

Input interpretation:

$$\frac{2\times\frac{1.593737759-1}{1.28996596}\log(\log(0.36562516))+\frac{1}{0.36562516}\times(-3.462585)}{\frac{2-1.593737759}{1.28996596}\log(\log(0.36562516))-\frac{2.17261904}{0.36562516}}$$

$\log(x)$ is the natural logarithm

Result:

$1.629197\ldots -$
$0.2154844\ldots i$

Polar coordinates:

$r = 1.64339$ (radius), $\theta = -7.53445°$ (angle)

$$1.64339 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$$

Alternative representations:

$$\frac{\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997} - \frac{3.46259}{0.365625}}{\frac{\log(\log(0.365625))(2-1.59374)}{1.28997} - \frac{2.17262}{0.365625}} = \frac{-\frac{3.46259}{0.365625} + \frac{1.18748\log_e(\log(0.365625))}{1.28997}}{-\frac{2.17262}{0.365625} + \frac{0.406262\log_e(\log(0.365625))}{1.28997}}$$

-

$$\frac{\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997} - \frac{3.46259}{0.365625}}{\frac{\log(\log(0.365625))(2-1.59374)}{1.28997} - \frac{2.17262}{0.365625}} = \frac{-\frac{3.46259}{0.365625} + \frac{1.18748\log(a)\log_a(\log(0.365625))}{1.28997}}{-\frac{2.17262}{0.365625} + \frac{0.406262\log(a)\log_a(\log(0.365625))}{1.28997}}$$

-

$$\frac{\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997} - \frac{3.46259}{0.365625}}{\frac{\log(\log(0.365625))(2-1.59374)}{1.28997} - \frac{2.17262}{0.365625}} = \frac{-\frac{3.46259}{0.365625} - \frac{1.18748\,\mathrm{Li}_1(1-\log(0.365625))}{1.28997}}{-\frac{2.17262}{0.365625} - \frac{0.406262\,\mathrm{Li}_1(1-\log(0.365625))}{1.28997}}$$

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

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations:

$$\frac{\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997} - \frac{3.46259}{0.365625}}{\frac{\log(\log(0.365625))(2-1.59374)}{1.28997} - \frac{2.17262}{0.365625}} = \frac{2.92293\left(-10.2877 + \log(-1+\log(0.365625)) - \sum_{k=1}^{\infty}\frac{(-1)^k(-1+\log(0.365625))^{-k}}{k}\right)}{-18.8677 + \log(-1+\log(0.365625)) - \sum_{k=1}^{\infty}\frac{(-1)^k(-1+\log(0.365625))^{-k}}{k}}$$

-

$$\frac{\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997}-\frac{3.46259}{0.365625}}{\frac{\log(\log(0.365625))(2-1.59374)}{1.28997}-\frac{2.17262}{0.365625}} = \left(2.92293\left(-5.14385+i\pi\left\lfloor\frac{\arg(-x+\log(0.365625))}{2\pi}\right\rfloor + 0.5\log(x)-0.5\sum_{k=1}^{\infty}\frac{(-1)^k x^{-k}(-x+\log(0.365625))^k}{k}\right)\right) \Big/ \left(-9.43386+i\pi\left\lfloor\frac{\arg(-x+\log(0.365625))}{2\pi}\right\rfloor+0.5\log(x)-0.5\sum_{k=1}^{\infty}\frac{(-1)^k x^{-k}(-x+\log(0.365625))^k}{k}\right) \text{ for } x<0$$

- $$\frac{\frac{(2\log(\log(0.365625)))(1.59374-1)}{1.28997}-\frac{3.46259}{0.365625}}{\frac{\log(\log(0.365625))(2-1.59374)}{1.28997}-\frac{2.17262}{0.365625}} = \left(2.92293\left(-5.14385+i\pi\left\lfloor-\frac{-\pi+\arg\left(\frac{\log(0.365625)}{z_0}\right)+\arg(z_0)}{2\pi}\right\rfloor + 0.5\log(z_0)-0.5\sum_{k=1}^{\infty}\frac{(-1)^k(\log(0.365625)-z_0)^k z_0^{-k}}{k}\right)\right) \Big/ \left(-9.43386+i\pi\left\lfloor-\frac{-\pi+\arg\left(\frac{\log(0.365625)}{z_0}\right)+\arg(z_0)}{2\pi}\right\rfloor+0.5\log(z_0)-0.5\sum_{k=1}^{\infty}\frac{(-1)^k(\log(0.365625)-z_0)^k z_0^{-k}}{k}\right)$$

$\arg(z)$ is the complex argument

$\lfloor x \rfloor$ is the floor function

i is the imaginary unit

Now, we have that:

Следовательно, при $t \geqslant 1$

$$|K(t)| \leqslant \sum_{1\leqslant n\leqslant t}\frac{1}{t^2}+\sum_{n>t+1}\frac{1}{4n^2}+2t^2\sum_{1\leqslant n\leqslant t}\frac{1}{t^4}+2t^2\sum_{n>t+1}\frac{1}{16n^4}+\frac{1}{t^2}+\frac{2}{t^2}\leqslant\frac{8}{t}.$$

Так как $\gamma_{k+1}-\gamma_k \leqslant 1$ при $k \geqslant k_0$, то при $k \geqslant k_0$ и $\gamma_k < t < \gamma_{k+1}$ имеем

$$\frac{a(k)}{(t-\gamma_k)^2} \geqslant 1, \qquad \frac{d}{dt}\frac{Z'(t)}{Z(t)} \leqslant -1+\frac{8}{\gamma_k} < 0.$$

$Z(t) \geqslant 0$ = 0.8730077; $1 < \beta < 2$; β = 1,593737759... (3.462585 / 2.17261904)

Where 0.8730077, 3.462585 and 2.17261904 are Ramanujan mock theta functions

From:

$$\alpha(t_0) = \frac{c}{|Z(t_0)|}\left\{\beta\sum_{k=1}^{\infty}\frac{a(k)}{(t_0-\gamma_k)^2}\right\}^{-1/2}, \tag{19}$$

And

$$Z(t) = e^{i\theta(t)}\zeta\left(\frac{1}{2}+it\right).$$

For t = 3:

e^(i*theta(3)) * zeta (1/2 + 3i)

Input:

$e^{i\,\theta(3)}\,\zeta\left(\frac{1}{2}+3\,i\right)$

$\theta(x)$ is the Heaviside step function

$\zeta(s)$ is the Riemann zeta function

i is the imaginary unit

Result:

$e^{i}\,\zeta\left(\frac{1}{2}+3\,i\right)\approx 0.354228+0.405654\,i$

Input interpretation:

$0.354228+0.405654\,i$

i is the imaginary unit

Result:

0.354228... +
0.405654... i

Polar coordinates:

$r = 0.538547$ (radius), $\theta = 48.8717°$ (angle)

0.538547

We can to obtain also:

Z(t) = exp(i*1.7917594692) zeta(1/2+3i)

(Note that, 1.7917594692 = ln(6), indeed:

Input:
log(6)

Decimal approximation:
1.791759469228055000812477358380702272722990692183004705855...

Property:
log(6) is a transcendental number

Alternative representations:
$\log(6) = \log_e(6)$

$\log(6) = \log(a) \log_a(6)$

$\log(6) = -\text{Li}_1(-5)$

Integral representations:
$$\log(6) = \int_1^6 \frac{1}{t}\, dt$$

$$\log(6) = -\frac{i}{2\pi} \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{5^{-s}\, \Gamma(-s)^2\, \Gamma(1+s)}{\Gamma(1-s)}\, ds \quad \text{for } -1 < \gamma < 0$$
)

Thence:

Z(t) = exp(i*1.7917594692) zeta(1/2+3i)

Input interpretation:
$\exp(i \times 1.7917594692)\, \zeta\left(\frac{1}{2} + 3\, i\right)$

$\zeta(s)$ is the Riemann zeta function

i is the imaginary unit

Result:
$-0.039781315591\ldots + 0.53707584880\ldots\, i$

Polar coordinates:
$r = 0.53854713854$ (radius), $\theta = 94.23617405°$ (angle)

0.538547…

Alternative representations:

$$\exp(i\ 1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)=\exp(1.79175946920000\,i)\,\zeta\left(\frac{1}{2}+3\,i,\ 1\right)$$

- $$\exp(i\ 1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)=\exp(1.79175946920000\,i)\,\zeta\left(\frac{1}{2}+3\,i,\ 1\right)$$

- $$\exp(i\ 1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)=\exp(1.79175946920000\,i)\,S_{-\frac{1}{2}+3\,i,1}(1)$$

$\zeta(s,\ a)$ is the Hurwitz zeta function

$\zeta(s,\ a)$ is the generalized Riemann zeta function

$S_{n,p}(x)$ is the Nielsen generalized polylogarithm function

Series representations:

$$\exp(i\ 1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)=-\frac{\exp(1.79175946920000\,i)\sum_{k=1}^{\infty}(-1)^k\,k^{-1/2-3\,i}}{1-2^{1/2-3\,i}}$$

- $$\exp(i\ 1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)=\frac{2\exp(1.79175946920000\,i)\sum_{n=0}^{\infty}\frac{\sum_{k=0}^{n}(-1)^k\,(1+k)^{1/2-3\,i}\binom{n}{k}}{1+n}}{-1+6\,i}$$

- $$\exp(i\ 1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)=\gamma\exp(1.79175946920000\,i)+\frac{2\exp(1.79175946920000\,i)}{-1+6\,i}+\exp(1.79175946920000\,i)\sum_{k=1}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}+3\,i\right)^k\gamma_k}{k!}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

γ_n is the n^{th} Stieltjes constant

γ is the Euler-Mascheroni constant

Integral representations:

$$\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right) = -\frac{1}{2}(1+6\,i)\exp(1.79175946920000\,i)\int_0^\infty t^{-1/2+3\,i}\operatorname{frac}\left(\frac{1}{t}\right)dt$$

- $$\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right) = \frac{\exp(1.79175946920000\,i)}{\left(1-2^{1/2-3\,i}\right)\Gamma\left(\frac{1}{2}+3\,i\right)}\int_0^\infty \frac{t^{-1/2+3\,i}}{1+e^t}\,dt$$

- $$\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right) = -\frac{2^{-1/2+6\,i}\exp(1.79175946920000\,i)}{\left(\sqrt{2}-2^{3\,i}\right)\Gamma\left(\frac{3}{2}+3\,i\right)}\int_0^\infty t^{1/2+3\,i}\operatorname{sech}^2(t)\,dt$$

frac(x) is the fractional part function

Γ(x) is the gamma function

sech(x) is the hyperbolic secant function

From (19), we obtain:

3*10^8 / 0.53854713854 (1.5*2)^(-1/2)

Input interpretation:

$$\frac{3\times 10^8}{0.53854713854}(1.5\times 2)^{-1/2}$$

Result:

$3.21615\ldots\times 10^8$

3.21615... * 10^8

Or, for c = 1:

1 / 0.53854713854 (1.5*2)^(-1/2)

Input interpretation:

$$\frac{1}{0.53854713854}(1.5\times 2)^{-1/2}$$

Result:

1.072051502779906989326529493627411179536896386440740545427...

1.072051502779...

We note that, the inverse of the above result 0,9327910062... is very near to the following value of Ramanujan continued fraction (Rogers-Ramanujan identities):

0,9568666373

Now, from

$$R(t)=\alpha(t_0)|Z(t)|,$$

We obtain:

3.21615* 10^8 * exp(i*1.7917594692) zeta(1/2+3i)

Input interpretation:

$$3.21615\times 10^8 \exp(i\times 1.7917594692)\,\zeta\left(\frac{1}{2}+3\,i\right)$$

$\zeta(s)$ is the Riemann zeta function

i is the imaginary unit

Result:

$$-1.27943...\times 10^7 + 1.72732...\times 10^8\,i$$

Polar coordinates:

$r = 1.73205\times 10^8$ (radius), $\theta = 94.2362°$ (angle)

$1.73205 * 10^8$

Alternative representations:

$$3.21615\times 10^8 \exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right) = 3.21615\exp(1.79175946920000\,i)\,\zeta\left(\frac{1}{2}+3\,i,\,1\right)10^8$$

- $$3.21615\times 10^8 \exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right) = 3.21615 \exp(1.79175946920000\,i)\,10^8\,\zeta\left(\frac{1}{2}+3\,i,\,1\right)$$

- $$3.21615\times 10^8 \exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right) = \left(3.21615 \exp(1.79175946920000\,i)\,S_{-\frac{1}{2}+3\,i,1}(1)\,10^8 = 3.21615\times 10^8 \exp(1.79175946920000\,i)\,S_{-\frac{1}{2}+3\,i,1}(1)\right)$$

$\zeta(s, a)$ is the Hurwitz zeta function

$\zeta(s, a)$ is the generalized Riemann zeta function

$S_{n,p}(x)$ is the Nielsen generalized polylogarithm function

Series representations:

$$3.21615\times 10^8 \exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right) = -\frac{3.21615\times 10^8\times 8^i \exp(1.79175946920000\,i)\sum_{k=1}^{\infty}(-1)^k\,k^{-1/2-3\,i}}{-1.41421+8^i}$$

- $$3.21615\times 10^8 \exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right) = \frac{1.07205\times 10^8 \exp(1.79175946920000\,i)\sum_{n=0}^{\infty}\frac{\sum_{k=0}^{n}(-1)^k\,(1+k)^{1/2-3\,i}\binom{n}{k}}{1+n}}{-0.166667+i}$$

- $$3.21615\times 10^8 \exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right) = 3.21615\times 10^8\,\gamma \exp(1.79175946920000\,i) + \frac{6.4323\times 10^8 \exp(1.79175946920000\,i)}{-1+6\,i} + 3.21615\times 10^8 \exp(1.79175946920000\,i)\sum_{k=1}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}+3\,i\right)^k\gamma_k}{k!}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

γ_n is the n^{th} Stieltjes constant

γ is the Euler-Mascheroni constant

Integral representations:

$$3.21615 \times 10^8 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right) = -9.64845 \times 10^8 \,(0.166667 + i) \exp(1.79175946920000\, i) \int_0^\infty t^{-1/2+3\, i} \operatorname{frac}\left(\frac{1}{t}\right) dt$$

- $$3.21615 \times 10^8 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right) = \frac{3.21615 \times 10^8 \times 8^i \exp(1.79175946920000\, i)}{\left(-1.41421 + 8^i\right) \Gamma\left(\frac{1}{2} + 3\, i\right)} \int_0^\infty \frac{t^{-1/2+3\, i}}{1 + e^t}\, dt$$

- $$3.21615 \times 10^8 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right) = -\frac{2.27416 \times 10^8 \times 64^i \exp(1.79175946920000\, i)}{\left(1.41421 - 8^i\right) \Gamma\left(\frac{3}{2} + 3\, i\right)} \int_0^\infty t^{1/2+3\, i} \operatorname{sech}^2(t)\, dt$$

we have also:

(((3.21615* 10^8 * exp(i*1.7917594692) zeta(1/2+3i))))^1/38

Input interpretation:

$$\sqrt[38]{3.21615 \times 10^8 \exp(i \times 1.7917594692)\, \zeta\left(\frac{1}{2} + 3\, i\right)}$$

$\zeta(s)$ is the Riemann zeta function

i is the imaginary unit

Result:

1.6458767... +
0.071282024... i

Polar coordinates:

$r = 1.64742$ (radius), $\theta = 2.4799°$ (angle)

$1.64742 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

sqrt(((((6*(((3.21615* 10^8 * exp(i*1.7917594692) zeta(1/2+3i))))^1/38)))))

Input interpretation:

$$\sqrt{6 \sqrt[38]{3.21615 \times 10^8 \exp(i \times 1.7917594692) \zeta\left(\frac{1}{2} + 3 i\right)}}$$

$\zeta(s)$ is the Riemann zeta function

i is the imaginary unit

Result:

3.1432290... +
0.068033882... i

Polar coordinates:

$r = 3.14397$ (radius), $\theta = 1.23995°$ (angle)

$3.14397 \approx \pi$

All 2nd roots of 9.87526 + 0.427692 i:

Polar form

$3.14397 e^{0.0216412 i} \approx 3.1432 + 0.068034 i$ (principal root)

- $3.14397 e^{-3.11995 i} \approx -3.1432 - 0.068034 i$

Alternative representations:

$$\sqrt{6 \sqrt[38]{3.21615 \times 10^8 \exp(i\, 1.79175946920000) \zeta\left(\frac{1}{2} + 3 i\right)}} = \sqrt{6 \sqrt[38]{3.21615 \exp(1.79175946920000\, i)\, 10^8 \zeta\left(\frac{1}{2} + 3 i, 1\right)}}$$

-

$$\sqrt{6\sqrt[38]{3.21615\times 10^8 \exp(i\, 1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)}} = \sqrt{6\sqrt[38]{\frac{3.21615\exp(1.79175946920000\,i)\,10^8\,\zeta\left(\frac{1}{2}+3\,i,\ \frac{1}{2}\right)}{-1+2^{1/2+3\,i}}}}$$

•

$$\sqrt{6\sqrt[38]{3.21615\times 10^8 \exp(i\, 1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)}} = \sqrt{6\sqrt[38]{3.21615\times 10^8 \exp(i\, 1.79175946920000)\left(\zeta\left(\frac{1}{2}+3\,i,\ n\right)+\sum_{k=1}^{n-1}\frac{1}{k^{1/2+3\,i}}\right)}}$$

for ($n \in \mathbb{Z}$ and $n > 0$)

$\zeta(s, a)$ is the generalized Riemann zeta function

$\mathbb{Z}$ is the set of integers

Series representations:

$$\sqrt{6\sqrt[38]{3.21615\times 10^8 \exp(i\, 1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)}} = \exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg\left(-x+10.0468\sqrt[38]{\exp(1.79175946920000\,i)\,\zeta\left(\frac{1}{2}+3\,i\right)}\right)}{2\,\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\,x^{-k}\left(-\frac{1}{2}\right)_k\left(-x+10.0468\sqrt[38]{\exp(1.79175946920000\,i)\,\zeta\left(\frac{1}{2}+3\,i\right)}\right)^k}{k!}$$

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

•

$$\sqrt{6\sqrt[38]{3.21615\times 10^8 \exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)}} = \left(\frac{1}{z_0}\right)^{1/2\left\lfloor \arg\left(-z_0+10.0468\sqrt[38]{\exp(1.79175946920000\,i)\,\zeta\left(\frac{1}{2}+3\,i\right)}\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor \arg\left(-z_0+10.0468\sqrt[38]{\exp(1.79175946920000\,i)\,\zeta\left(\frac{1}{2}+3\,i\right)}\right)/(2\pi)\right\rfloor\right)} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k z_0^{-k} \left(-z_0+10.0468\sqrt[38]{\exp(1.79175946920000\,i)\,\zeta\left(\frac{1}{2}+3\,i\right)}\right)^k}{k!}$$

$\arg(z)$ is the complex argument

$\lfloor x \rfloor$ is the floor function

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

Integral representations:

$$\sqrt{6\sqrt[38]{3.21615\times 10^8 \exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)}} = \sqrt{9.86522\sqrt[38]{-(1+6\,i)\exp(1.79175946920000\,i)\int_0^{\infty} t^{-1/2+3\,i}\,\mathrm{frac}\left(\frac{1}{t}\right)dt}}$$

-

$$\sqrt{6\sqrt[38]{3.21615\times 10^8 \exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)}} = \sqrt{10.0468\sqrt[38]{\frac{\exp(1.79175946920000\,i)}{\left(1-2^{1/2-3\,i}\right)\Gamma\left(\frac{1}{2}+3\,i\right)}\int_0^{\infty}\frac{t^{-1/2+3\,i}}{1+e^t}\,dt}}$$

-

$$\sqrt{6\sqrt[38]{3.21615\times 10^{8}\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)}} =$$

$$\sqrt{10.0468\sqrt[38]{\frac{2^{-1/2+3\,i}\exp(1.79175946920000\,i)}{\left(1-2^{1/2-3\,i}\right)\Gamma\left(\frac{3}{2}+3\,i\right)}\int_0^\infty t^{1/2+3\,i}\operatorname{sech}^2(t)\,dt}}$$

frac(x) is the fractional part function

$\Gamma(x)$ is the gamma function

sech(x) is the hyperbolic secant function

We also obtain:

(21/10^3+3/10^3)+(((3.21615* 10^8 * exp(i*1.7917594692) zeta(1/2+3i))))^1/38

Input interpretation:

$$\left(\frac{21}{10^3}+\frac{3}{10^3}\right)+\sqrt[38]{3.21615\times 10^{8}\exp(i\times 1.7917594692)\,\zeta\left(\frac{1}{2}+3\,i\right)}$$

$\zeta(s)$ is the Riemann zeta function

i is the imaginary unit

Result:

1.6698767... +
0.071282024... i

Polar coordinates:

$r = 1.6714$ (radius), $\theta = 2.4443°$ (angle)

1.6714

We note that 1.6714 is a result practically equal to the value of the formula:

$m_{p'} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

Alternative representations:

$$\left(\frac{21}{10^3}+\frac{3}{10^3}\right)+\sqrt[38]{3.21615\times 10^8 \exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} = \frac{24}{10^3}+\sqrt[38]{3.21615\exp(1.79175946920000\,i)\,\zeta\left(\frac{1}{2}+3\,i,\,1\right)10^8}$$

-

$$\left(\frac{21}{10^3}+\frac{3}{10^3}\right)+\sqrt[38]{3.21615\times 10^8 \exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} = \frac{24}{10^3}+\sqrt[38]{3.21615\exp(1.79175946920000\,i)\,10^8\,\zeta\left(\frac{1}{2}+3\,i,\,1\right)}$$

-

$$\left(\frac{21}{10^3}+\frac{3}{10^3}\right)+\sqrt[38]{3.21615\times 10^8 \exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} = \frac{24}{10^3}+\sqrt[38]{-\frac{3.21615\exp(1.79175946920000\,i)\,\mathrm{Li}_{\frac{1}{2}+3\,i}(-1)\,10^8}{1-2^{1/2-3\,i}}}$$

$\zeta(s,\,a)$ is the Hurwitz zeta function

$\zeta(s,\,a)$ is the generalized Riemann zeta function

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations:

$$\left(\frac{21}{10^3}+\frac{3}{10^3}\right)+\sqrt[38]{3.21615\times 10^8 \exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} = \frac{3}{125}+1.67447\sqrt[38]{-\frac{\exp(1.79175946920000\,i)\sum_{k=1}^{\infty}(-1)^k\,k^{-1/2-3\,i}}{1-2^{1/2-3\,i}}}$$

-

$$\left(\frac{21}{10^3}+\frac{3}{10^3}\right)+\sqrt[38]{3.21615\times 10^8 \exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} = 0.024+1.67447\sqrt[38]{\exp(1.79175946920000\,i)\left(\gamma+\frac{2}{-1+6\,i}+\sum_{k=1}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}+3\,i\right)^k\gamma_k}{k!}\right)}$$

-

$$\left(\frac{21}{10^3}+\frac{3}{10^3}\right)+\sqrt[38]{3.21615\times10^8\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)}=$$

$$1.70529\left(0.0140738+\sqrt[38]{\frac{\exp(1.79175946920000\,i)\sum_{n=0}^{\infty}\frac{\sum_{k=0}^{n}(-1)^k(1+k)^{1/2-3\,i}\binom{n}{k}}{1+n}}{-1+6\,i}}\right)$$

$n!$ is the factorial function

γ_n is the n^{th} Stieltjes constant

γ is the Euler-Mascheroni constant

$\binom{n}{m}$ is the binomial coefficient

Integral representations:

$$\left(\frac{21}{10^3}+\frac{3}{10^3}\right)+\sqrt[38]{3.21615\times10^8\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)}=$$
$$0.024+1.6442\sqrt[38]{-(1+6\,i)\exp(1.79175946920000\,i)\int_0^{\infty}t^{-1/2+3\,i}\,\operatorname{frac}\left(\frac{1}{t}\right)dt}$$

- $$\left(\frac{21}{10^3}+\frac{3}{10^3}\right)+\sqrt[38]{3.21615\times10^8\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)}=$$
$$\frac{3}{125}+1.67447\sqrt[38]{\frac{\exp(1.79175946920000\,i)}{\left(1-2^{1/2-3\,i}\right)\Gamma\left(\frac{1}{2}+3\,i\right)}\int_0^{\infty}\frac{t^{-1/2+3\,i}}{1+e^t}\,dt}$$

- $$\left(\frac{21}{10^3}+\frac{3}{10^3}\right)+\sqrt[38]{3.21615\times10^8\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)}=$$
$$\frac{3}{125}+1.67447\sqrt[38]{\frac{2^{-1/2+3\,i}\exp(1.79175946920000\,i)}{\left(1-2^{1/2-3\,i}\right)\Gamma\left(\frac{3}{2}+3\,i\right)}\int_0^{\infty}t^{1/2+3\,i}\,\operatorname{sech}^2(t)\,dt}$$

$\operatorname{frac}(x)$ is the fractional part function

$\Gamma(x)$ is the gamma function

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

Furthermore, we have also:

-(21/10^3+8/10^3)+(((3.21615* 10^8 * exp(i*1.7917594692) zeta(1/2+3i))))^1/38

Input interpretation:

$$-\left(\frac{21}{10^3}+\frac{8}{10^3}\right)+\sqrt[38]{3.21615\times 10^8 \exp(i\times 1.7917594692)\,\zeta\left(\frac{1}{2}+3\,i\right)}$$

$\zeta(s)$ is the Riemann zeta function

i is the imaginary unit

Result:

1.6168767... +
0.071282024... i

Polar coordinates:

$r = 1.61845$ (radius), $\theta = 2.52432°$ (angle)

1.61845

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

Alternative representations:

$$-\left(\frac{21}{10^3}+\frac{8}{10^3}\right)+\sqrt[38]{3.21615\times 10^8 \exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} = -\frac{29}{10^3}+\sqrt[38]{3.21615 \exp(1.79175946920000\,i)\,\zeta\left(\frac{1}{2}+3\,i,\,1\right)10^8}$$

•

$$-\left(\frac{21}{10^3}+\frac{8}{10^3}\right)+\sqrt[38]{3.21615\times 10^8 \exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} = -\frac{29}{10^3}+\sqrt[38]{3.21615 \exp(1.79175946920000\,i)\,10^8\,\zeta\left(\frac{1}{2}+3\,i,\,1\right)}$$

•

$$-\left(\frac{21}{10^3}+\frac{8}{10^3}\right)+\sqrt[38]{3.21615\times 10^8 \exp(i\, 1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} =$$
$$-\frac{29}{10^3}+\sqrt[38]{-\frac{3.21615\exp(1.79175946920000\, i)\,\mathrm{Li}_{\frac{1}{2}+3\,i}(-1)\,10^8}{1-2^{1/2-3\,i}}}$$

$\zeta(s, a)$ is the Hurwitz zeta function

$\zeta(s, a)$ is the generalized Riemann zeta function

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations:

$$-\left(\frac{21}{10^3}+\frac{8}{10^3}\right)+\sqrt[38]{3.21615\times 10^8 \exp(i\, 1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} =$$
$$-\frac{29}{1000}+1.67447\sqrt[38]{-\frac{\exp(1.79175946920000\, i)\sum_{k=1}^{\infty}(-1)^k\, k^{-1/2-3\,i}}{1-2^{1/2-3\,i}}}$$

- $$-\left(\frac{21}{10^3}+\frac{8}{10^3}\right)+\sqrt[38]{3.21615\times 10^8 \exp(i\, 1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} = -0.029+$$
$$1.67447\sqrt[38]{\exp(1.79175946920000\, i)\left(\gamma+\frac{2}{-1+6\,i}+\sum_{k=1}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}+3\,i\right)^k\gamma_k}{k!}\right)}$$

- $$-\left(\frac{21}{10^3}+\frac{8}{10^3}\right)+\sqrt[38]{3.21615\times 10^8 \exp(i\, 1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} =$$
$$1.70529\left(-0.0170059+\sqrt[38]{\frac{\exp(1.79175946920000\, i)\sum_{n=0}^{\infty}\frac{\sum_{k=0}^{n}(-1)^k(1+k)^{1/2-3\,i}\binom{n}{k}}{1+n}}{-1+6\,i}}\right)$$

$n!$ is the factorial function

γ_n is the n^{th} Stieltjes constant

γ is the Euler-Mascheroni constant

$\binom{n}{m}$ is the binomial coefficient

Integral representations:

$$-\left(\frac{21}{10^3}+\frac{8}{10^3}\right)+\sqrt[38]{3.21615\times10^8\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} =$$
$$-0.029+1.6442\,\sqrt[38]{-(1+6\,i)\exp(1.79175946920000\,i)\int_0^\infty t^{-1/2+3\,i}\,\mathrm{frac}\left(\frac{1}{t}\right)dt}$$

•

$$-\left(\frac{21}{10^3}+\frac{8}{10^3}\right)+\sqrt[38]{3.21615\times10^8\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} =$$
$$-\frac{29}{1000}+1.67447\,\sqrt[38]{\frac{\exp(1.79175946920000\,i)}{\left(1-2^{1/2-3\,i}\right)\Gamma\left(\frac{1}{2}+3\,i\right)}\int_0^\infty\frac{t^{-1/2+3\,i}}{1+e^t}\,dt}$$

•

$$-\left(\frac{21}{10^3}+\frac{8}{10^3}\right)+\sqrt[38]{3.21615\times10^8\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} =$$
$$-\frac{29}{1000}+1.67447\,\sqrt[38]{\frac{2^{-1/2+3\,i}\exp(1.79175946920000\,i)}{\left(1-2^{1/2-3\,i}\right)\Gamma\left(\frac{3}{2}+3\,i\right)}\int_0^\infty t^{1/2+3\,i}\,\mathrm{sech}^2(t)\,dt}$$

$\mathrm{frac}(x)$ is the fractional part function

$\Gamma(x)$ is the gamma function

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

1.072051502779* exp(i*1.7917594692) zeta(1/2+3i)

Input interpretation:

$$1.072051502779\exp(i\times1.7917594692)\,\zeta\left(\frac{1}{2}+3\,i\right)$$

$\zeta(s)$ is the Riemann zeta function

i is the imaginary unit

Result:

$-0.042647619162\ldots +$
$0.57577297081\ldots i$

Polar coordinates:

$r = 0.57735026919$ (radius), $\theta = 94.23617405°$ (angle)

0.57735026919

We note that, the above result is very near to the following value of Ramanujan continued fraction (Rogers-Ramanujan identities): 0,5683...

Alternative representations:

$$1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2}+3\,i\right) = 1.0720515027790000 \exp(1.79175946920000\, i)\, \zeta\left(\frac{1}{2}+3\,i,\, 1\right)$$

•

$$1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2}+3\,i\right) = 1.0720515027790000 \exp(1.79175946920000\, i)\, \zeta\left(\frac{1}{2}+3\,i,\, 1\right)$$

•

$$1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2}+3\,i\right) = 1.0720515027790000 \exp(1.79175946920000\, i)\, S_{-\frac{1}{2}+3\,i,1}(1)$$

$\zeta(s, a)$ is the Hurwitz zeta function

$\zeta(s, a)$ is the generalized Riemann zeta function

$S_{n,p}(x)$ is the Nielsen generalized polylogarithm function

Series representations:

$$1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2}+3\,i\right) = -\frac{1.07205150277900 \times 8^{i} \exp(1.79175946920000\, i) \sum_{k=1}^{\infty} (-1)^{k}\, k^{-1/2-3\,i}}{-1.41421356237310 + 1.00000000000000 \times 8^{i}}$$

•

$$1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right) = \frac{0.357350500926333 \exp(1.79175946920000\, i) \sum_{n=0}^{\infty} \frac{\sum_{k=0}^{n} (-1)^k (1+k)^{1/2-3\, i} \binom{n}{k}}{1+n}}{-0.1666666666666667 + 1.0000000000000000\, i}$$

- $$1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right) = 1.0720515027790000\, \gamma \exp(1.79175946920000\, i) + \frac{2.1441030055580000 \exp(1.79175946920000\, i)}{-1 + 6\, i} + 1.0720515027790000 \exp(1.79175946920000\, i) \sum_{k=1}^{\infty} \frac{(-1)^k \left(-\frac{1}{2} + 3\, i\right)^k \gamma_k}{k!}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

γ_n is the n^{th} Stieltjes constant

γ is the Euler-Mascheroni constant

Integral representations:

$$1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right) = -3.21615450833700\, (0.1666666666666667 + 1.000000000000000\, i) \exp(1.79175946920000\, i) \int_0^{\infty} t^{-1/2+3\, i} \operatorname{frac}\left(\frac{1}{t}\right) dt$$

- $$1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right) = \frac{1.07205150277900 \times 8^i \exp(1.79175946920000\, i)}{\left(-1.41421356237310 + 1.00000000000000 \times 8^i\right) \Gamma\left(\frac{1}{2} + 3\, i\right)} \int_0^{\infty} \frac{t^{-1/2+3\, i}}{1 + e^t}\, dt$$

- $$1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right) = -\frac{0.75805488739625980 \times 64^i \exp(1.79175946920000\, i)}{\left(1.4142135623730950 - 1.0000000000000000 \times 8^i\right) \Gamma\left(\frac{3}{2} + 3\, i\right)} \int_0^{\infty} t^{1/2+3\, i} \operatorname{sech}^2(t)\, dt$$

frac(x) is the fractional part function

$\Gamma(x)$ is the gamma function

sech(x) is the hyperbolic secant function

Note that, from the following ratio, we obtain:

(1.73205 * 10^8) / ((((1.072051502779* exp(i*1.7917594692) zeta(1/2+3i)))))

Input interpretation:

$$\frac{1.73205\times 10^8}{1.072051502779\exp(i\times 1.7917594692)\,\zeta\left(\frac{1}{2}+3\,i\right)}$$

$\zeta(s)$ is the Riemann zeta function

i is the imaginary unit

Result:

$-2.21603\ldots\times 10^7 - 2.99180\ldots\times 10^8\,i$

Polar coordinates:

$r = 3.\times 10^8$ (radius), $\theta = -94.2362°$ (angle)

3×10^8 = speed of light

Alternative representations:

$$\frac{1.73205\times 10^8}{1.0720515027790000\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} = \frac{1.73205\times 10^8}{1.0720515027790000\exp(1.79175946920000\,i)\,\zeta\left(\frac{1}{2}+3\,i,1\right)}$$

-

$$\frac{1.73205\times 10^8}{1.0720515027790000\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} = \frac{1.73205\times 10^8}{1.0720515027790000\exp(1.79175946920000\,i)\,\zeta\left(\frac{1}{2}+3\,i,1\right)}$$

-

$$\frac{1.73205 \times 10^8}{1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)} = \frac{1.73205 \times 10^8}{1.0720515027790000 \exp(1.79175946920000\, i)\, S_{-\frac{1}{2}+3\, i,1}(1)}$$

$\zeta(s, a)$ is the Hurwitz zeta function

$\zeta(s, a)$ is the generalized Riemann zeta function

$S_{n,p}(x)$ is the Nielsen generalized polylogarithm function

Series representations:

$$\frac{1.73205 \times 10^8}{1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)} = -\frac{8^{-i}\left(-2.28486 \times 10^8 + 1.61564 \times 10^8 \times 8^i\right)}{\exp(1.79175946920000\, i) \sum_{k=1}^{\infty} (-1)^k\, k^{-1/2-3\, i}}$$

- $$\frac{1.73205 \times 10^8}{1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)} = \frac{4.84692 \times 10^8\, (-0.166667 + i)}{\exp(1.79175946920000\, i) \sum_{n=0}^{\infty} \frac{\sum_{k=0}^{n} (-1)^k\, (1+k)^{1/2-3\, i} \binom{n}{k}}{1+n}}$$

- $$\frac{1.73205 \times 10^8}{1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)} = \frac{1.61564 \times 10^8}{\exp(1.79175946920000\, i) \left(\gamma + \frac{2}{-1+6\, i} + \sum_{k=1}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}+3\, i\right)^k \gamma_k}{k!}\right)}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

γ_n is the n^{th} Stieltjes constant

γ is the Euler-Mascheroni constant

Integral representations:

$$\frac{1.73205\times10^8}{1.0720515027790000\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} = -\frac{5.38547\times10^7}{(0.166667+i)\exp(1.79175946920000\,i)\int_0^\infty t^{-1/2+3\,i}\,\mathrm{frac}\left(\frac{1}{t}\right)dt}$$

- $$\frac{1.73205\times10^8}{1.0720515027790000\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} = \frac{1.61564\times10^8\left(1-2^{1/2-3\,i}\right)\Gamma\left(\frac{1}{2}+3\,i\right)}{\exp(1.79175946920000\,i)\int_0^\infty \frac{t^{-1/2+3\,i}}{1+e^t}\,dt}$$

- $$\frac{1.73205\times10^8}{1.0720515027790000\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)} = \frac{2.28486\times10^8\times8^{-2\,i}\left(-1.41421+8^i\right)\Gamma\left(\frac{3}{2}+3\,i\right)}{\exp(1.79175946920000\,i)\int_0^\infty t^{1/2+3\,i}\,\mathrm{sech}^2(t)\,dt}$$

$\mathrm{frac}(x)$ is the fractional part function

$\Gamma(x)$ is the gamma function

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

We have also that, from the result 0.57735026919:

0.938272088/((((1.072051502779* exp(i*1.7917594692) zeta(1/2+3i)))))

Where 0.938272088 is the rest mass of proton in GeV

Input interpretation:

$$\frac{0.938272088}{1.072051502779\exp(i\times1.7917594692)\,\zeta\left(\frac{1}{2}+3\,i\right)}$$

$\zeta(s)$ is the Riemann zeta function

i is the imaginary unit

Result:

$-0.120045212\ldots -$
$1.62069512\ldots i$

Polar coordinates:

$r = 1.62513$ (radius), $\theta = -94.2362°$ (angle)

1.62513

Alternative representations:

$$\frac{0.938272}{1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)} = \frac{0.938272}{1.0720515027790000 \exp(1.79175946920000\, i)\, \zeta\left(\frac{1}{2} + 3\, i, 1\right)}$$

-

$$\frac{0.938272}{1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)} = \frac{0.938272}{1.0720515027790000 \exp(1.79175946920000\, i)\, \zeta\left(\frac{1}{2} + 3\, i, 1\right)}$$

-

$$\frac{0.938272}{1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)} = \frac{0.938272}{1.0720515027790000 \exp(1.79175946920000\, i)\, S_{-\frac{1}{2}+3\, i,1}(1)}$$

$\zeta(s, a)$ is the Hurwitz zeta function

$\zeta(s, a)$ is the generalized Riemann zeta function

$S_{n,p}(x)$ is the Nielsen generalized polylogarithm function

Series representations:

$$\frac{0.938272}{1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)} = -\frac{8^{-i} \left(-1.23774 + 0.875212 \times 8^{i}\right)}{\exp(1.79175946920000\, i) \sum_{k=1}^{\infty} (-1)^k\, k^{-1/2-3\, i}}$$

-

$$\frac{0.938272}{1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)} = \frac{2.62564\, (-0.166667 + i)}{\exp(1.79175946920000\, i) \sum_{n=0}^{\infty} \frac{\sum_{k=0}^{n} (-1)^k (1+k)^{1/2-3\, i} \binom{n}{k}}{1+n}}$$

- $$\frac{0.938272}{1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)} = \frac{0.875212}{\exp(1.79175946920000\, i) \left(\gamma + \frac{2}{-1+6\, i} + \sum_{k=1}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}+3\, i\right)^k \gamma_k}{k!}\right)}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

γ_n is the n^{th} Stieltjes constant

γ is the Euler-Mascheroni constant

Integral representations:

$$\frac{0.938272}{1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)} = -\frac{0.291737}{(0.166667 + i) \exp(1.79175946920000\, i) \int_0^{\infty} t^{-1/2+3\, i} \operatorname{frac}\left(\frac{1}{t}\right) dt}$$

- $$\frac{0.938272}{1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)} = \frac{0.875212 \left(1 - 2^{1/2-3\, i}\right) \Gamma\left(\frac{1}{2} + 3\, i\right)}{\exp(1.79175946920000\, i) \int_0^{\infty} \frac{t^{-1/2+3\, i}}{1+e^t}\, dt}$$

- $$\frac{0.938272}{1.0720515027790000 \exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)} = \frac{1.23774 \times 8^{-2\, i} \left(-1.41421 + 8^i\right) \Gamma\left(\frac{3}{2} + 3\, i\right)}{\exp(1.79175946920000\, i) \int_0^{\infty} t^{1/2+3\, i} \operatorname{sech}^2(t)\, dt}$$

frac(x) is the fractional part function

$\Gamma(x)$ is the gamma function

sech(x) is the hyperbolic secant function

We have also:

-(5/10^3i + 2/10^3i) - 0.938272088/((((1.072051502779* exp(i*1.7917594692) zeta(1/2+3i)))))

Input interpretation:

$$-\left(\frac{5}{10^3} i + \frac{2}{10^3} i\right) - \frac{0.938272088}{1.072051502779 \exp(i \times 1.7917594692) \zeta\left(\frac{1}{2} + 3 i\right)}$$

$\zeta(s)$ is the Riemann zeta function

i is the imaginary unit

Result:

0.120045212... +
1.61369512... i

Polar coordinates:

$r = 1.61815$ (radius), $\theta = 85.7455°$ (angle)

1.61815

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

Alternative representations:

$$-\left(\frac{i 5}{10^3} + \frac{i 2}{10^3}\right) - \frac{0.938272}{1.0720515027790000 \exp(i\, 1.79175946920000) \zeta\left(\frac{1}{2} + 3 i\right)} = -\frac{0.938272}{1.0720515027790000 \exp(1.79175946920000\, i) \zeta\left(\frac{1}{2} + 3 i, 1\right)} - \frac{7 i}{10^3}$$

•

$$-\left(\frac{i\,5}{10^3}+\frac{i\,2}{10^3}\right)-\frac{0.938272}{1.0720515027790000\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)}=$$
$$-\frac{7\,i}{10^3}-\frac{0.938272}{1.0720515027790000\exp(1.79175946920000\,i)\,\zeta\left(\frac{1}{2}+3\,i,\,1\right)}$$

-
$$-\left(\frac{i\,5}{10^3}+\frac{i\,2}{10^3}\right)-\frac{0.938272}{1.0720515027790000\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)}=$$
$$-\frac{0.938272}{1.0720515027790000\exp(1.79175946920000\,i)\,S_{-\frac{1}{2}+3\,i,1}(1)}-\frac{7\,i}{10^3}$$

$\zeta(s,\,a)$ is the Hurwitz zeta function

$\zeta(s,\,a)$ is the generalized Riemann zeta function

$S_{n,\,p}(x)$ is the Nielsen generalized polylogarithm function

Series representations:

$$-\left(\frac{i\,5}{10^3}+\frac{i\,2}{10^3}\right)-\frac{0.938272}{1.0720515027790000\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)}=$$
$$-\left(\left(0.007\times 8^{-i}\left(176.819-125.03\times 8^{i}+8^{i}\,i\exp(1.79175946920000\,i)\sum_{k=1}^{\infty}(-1)^k\,k^{-1/2-3\,i}\right)\right)\Big/\left(\exp(1.79175946920000\,i)\sum_{k=1}^{\infty}(-1)^k\,k^{-1/2-3\,i}\right)\right)$$

-
$$-\left(\frac{i\,5}{10^3}+\frac{i\,2}{10^3}\right)-\frac{0.938272}{1.0720515027790000\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)}=$$
$$-\frac{7\,i}{1000}-\frac{0.875212}{\exp(1.79175946920000\,i)\left(\gamma+\frac{1}{-\frac{1}{2}+3\,i}+\sum_{k=1}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}+3\,i\right)^k\gamma_k}{k!}\right)}$$

-
$$-\left(\frac{i\,5}{10^3}+\frac{i\,2}{10^3}\right)-\frac{0.938272}{1.0720515027790000\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3\,i\right)}=$$
$$-\frac{7\,i}{1000}-\frac{0.875212}{\exp(1.79175946920000\,i)\left(\gamma+\frac{2}{-1+6\,i}+\sum_{k=1}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}+3\,i\right)^k\gamma_k}{k!}\right)}$$

$n!$ is the factorial function

γ_n is the n^{th} Stieltjes constant

γ is the Euler-Mascheroni constant

Integral representations:

$$-\left(\frac{i5}{10^3}+\frac{i2}{10^3}\right)-\frac{0.938272}{1.0720515027790000\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3i\right)}=$$
$$-\frac{7i}{1000}+\frac{0.291737}{(0.166667+i)\exp(1.79175946920000\,i)\int_0^{\infty}t^{-1/2+3i}\,\mathrm{frac}\left(\frac{1}{t}\right)dt}$$

- $$-\left(\frac{i5}{10^3}+\frac{i2}{10^3}\right)-\frac{0.938272}{1.0720515027790000\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3i\right)}=$$
$$-\frac{7i}{1000}-\frac{1.23774\times 8^{-2i}\left(-1.41421+8^{i}\right)\Gamma\left(\frac{3}{2}+3i\right)}{\exp(1.79175946920000\,i)\int_0^{\infty}t^{1/2+3i}\,\mathrm{sech}^2(t)\,dt}$$

- $$-\left(\frac{i5}{10^3}+\frac{i2}{10^3}\right)-\frac{0.938272}{1.0720515027790000\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2}+3i\right)}=$$
$$-\frac{7i}{1000}-\frac{0.875212\times 8^{-i}\left(-1.41421+8^{i}\right)\Gamma\left(\frac{1}{2}+3i\right)}{\exp(1.79175946920000\,i)\int_0^{\infty}\frac{t^{-1/2+3i}}{1+e^{t}}\,dt}$$

$\mathrm{frac}(x)$ is the fractional part function

$\Gamma(x)$ is the gamma function

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

And:

(0.8730077+1.962364415)(((1.072051502779* exp(i*1.7917594692) zeta(1/2+3i))))

Where 0.8730077 and 1.962364415 are two Ramanujan mock theta functions

Input interpretation:

$$(0.8730077 + 1.962364415)\left(1.072051502779 \exp(i \times 1.7917594692)\,\zeta\left(\frac{1}{2} + 3\,i\right)\right)$$

$\zeta(s)$ is the Riemann zeta function

i is the imaginary unit

Result:

$-0.12092187\ldots +$
$1.6325306\ldots\, i$

Polar coordinates:

$r = 1.637$ (radius), $\theta = 94.2362°$ (angle)

$1.637 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Alternative representations:

$$(0.873008 + 1.96236)\, 1.0720515027790000\left(\exp(i\, 1.79175946920000)\,\zeta\left(\frac{1}{2} + 3\,i\right)\right) = 3.03966 \exp(1.79175946920000\, i)\,\zeta\left(\frac{1}{2} + 3\,i,\, 1\right)$$

- $$(0.873008 + 1.96236)\, 1.0720515027790000\left(\exp(i\, 1.79175946920000)\,\zeta\left(\frac{1}{2} + 3\,i\right)\right) = 3.03966 \exp(1.79175946920000\, i)\,\zeta\left(\frac{1}{2} + 3\,i,\, 1\right)$$

- $$(0.873008 + 1.96236)\, 1.0720515027790000\left(\exp(i\, 1.79175946920000)\,\zeta\left(\frac{1}{2} + 3\,i\right)\right) = 3.03966 \exp(1.79175946920000\, i)\, S_{-\frac{1}{2}+3\,i,1}(1)$$

$\zeta(s, a)$ is the Hurwitz zeta function

$\zeta(s, a)$ is the generalized Riemann zeta function

$S_{n,p}(x)$ is the Nielsen generalized polylogarithm function

Series representations:

$$(0.873008 + 1.96236)\, 1.0720515027790000 \left(\exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)\right) = -\frac{3.03966 \times 8^i \exp(1.79175946920000\, i) \sum_{k=1}^{\infty} (-1)^k\, k^{-1/2-3\, i}}{-1.41421 + 8^i}$$

•

$$(0.873008 + 1.96236)\, 1.0720515027790000 \left(\exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)\right) = \frac{1.01322 \exp(1.79175946920000\, i) \sum_{n=0}^{\infty} \frac{\sum_{k=0}^{n} (-1)^k\, (1+k)^{1/2-3\, i} \binom{n}{k}}{1+n}}{-0.166667 + i}$$

•

$$(0.873008 + 1.96236)\, 1.0720515027790000 \left(\exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)\right) = 3.03966\, \gamma \exp(1.79175946920000\, i) + \frac{6.07933 \exp(1.79175946920000\, i)}{-1 + 6\, i} + 3.03966 \exp(1.79175946920000\, i) \sum_{k=1}^{\infty} \frac{(-1)^k \left(-\frac{1}{2} + 3\, i\right)^k \gamma_k}{k!}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

γ_n is the n^{th} Stieltjes constant

γ is the Euler-Mascheroni constant

Integral representations:

$$(0.873008 + 1.96236)\, 1.0720515027790000 \left(\exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)\right) = -9.11899\, (0.166667 + i) \exp(1.79175946920000\, i) \int_0^{\infty} t^{-1/2+3\, i} \operatorname{frac}\left(\frac{1}{t}\right) dt$$

•

$$(0.873008 + 1.96236)\, 1.0720515027790000 \left(\exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)\right) = \frac{3.03966 \times 8^i \exp(1.79175946920000\, i)}{\left(-1.41421 + 8^i\right) \Gamma\left(\frac{1}{2} + 3\, i\right)} \int_0^{\infty} \frac{t^{-1/2+3\, i}}{1 + e^t}\, dt$$

•

$$(0.873008 + 1.96236)\, 1.0720515027790000 \left(\exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)\right) = -\frac{2.14937 \times 64^i \exp(1.79175946920000\, i)}{\left(1.41421 - 8^i\right) \Gamma\left(\frac{3}{2} + 3\, i\right)} \int_0^\infty t^{1/2+3\, i}\, \mathrm{sech}^2(t)\, dt$$

frac(x) is the fractional part function

$\Gamma(x)$ is the gamma function

sech(x) is the hyperbolic secant function

(34/10^3i)+(((((((((((0.8730077+1.962364415)(((1.072051502779* exp(i*1.7917594692) zeta(1/2+3i)))))))))))))

Input interpretation:

$$\frac{34}{10^3}\, i + (0.8730077 + 1.962364415) \left(1.072051502779 \exp(i \times 1.7917594692)\, \zeta\left(\frac{1}{2} + 3\, i\right)\right)$$

$\zeta(s)$ is the Riemann zeta function

i is the imaginary unit

Result:

$-0.12092187\ldots + 1.6665306\ldots\, i$

Polar coordinates:

$r = 1.67091$ (radius), $\theta = 94.1501°$ (angle)

1.67091

We note that 1.67091... is a result very near to the value of the formula:

$m_{p'} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

Alternative representations:

$$\frac{i\,34}{10^3} + (0.873008 + 1.96236)\, 1.0720515027790000 \left(\exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)\right) = 3.03966 \exp(1.79175946920000\, i)\, \zeta\left(\frac{1}{2} + 3\, i,\, 1\right) + \frac{34\, i}{10^3}$$

- $$\frac{i\,34}{10^3} + (0.873008 + 1.96236)\, 1.0720515027790000 \left(\exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)\right) = \frac{34\, i}{10^3} + 3.03966 \exp(1.79175946920000\, i)\, \zeta\left(\frac{1}{2} + 3\, i,\, 1\right)$$

- $$\frac{i\,34}{10^3} + (0.873008 + 1.96236)\, 1.0720515027790000 \left(\exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)\right) = -\frac{3.03966 \exp(1.79175946920000\, i)\, \mathrm{Li}_{\frac{1}{2}+3\,i}(-1)}{1 - 2^{1/2-3\,i}} + \frac{34\, i}{10^3}$$

$\zeta(s, a)$ is the Hurwitz zeta function

$\zeta(s, a)$ is the generalized Riemann zeta function

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations:

$$\frac{i\,34}{10^3} + (0.873008 + 1.96236)\, 1.0720515027790000 \left(\exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\, i\right)\right) = \frac{17\, i}{500} - \frac{3.03966 \times 8^i \exp(1.79175946920000\, i) \sum_{k=1}^{\infty} (-1)^k\, k^{-1/2-3\,i}}{-1.41421 + 8^i}$$

-

$$\frac{i\,34}{10^3} + (0.873008 + 1.96236)\; 1.0720515027790000 \left(\exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\,i\right)\right) = \frac{17\,i}{500} + 3.03966\,\gamma \exp(1.79175946920000\,i) + \frac{6.07933 \exp(1.79175946920000\,i)}{-1 + 6\,i} + 3.03966 \exp(1.79175946920000\,i) \sum_{k=1}^{\infty} \frac{(-1)^k \left(-\frac{1}{2} + 3\,i\right)^k \gamma_k}{k!}$$

- $$\frac{i\,34}{10^3} + (0.873008 + 1.96236)\; 1.0720515027790000 \left(\exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\,i\right)\right) = \frac{1}{-0.166667 + i}\, 0.034 \left(-0.166667\,i + i^2 + 29.8006 \exp(1.79175946920000\,i) \sum_{n=0}^{\infty} \frac{\sum_{k=0}^{n} (-1)^k (1+k)^{1/2-3\,i} \binom{n}{k}}{1+n}\right)$$

$n!$ is the factorial function

γ_n is the n^{th} Stieltjes constant

γ is the Euler-Mascheroni constant

$\binom{n}{m}$ is the binomial coefficient

Integral representations:

$$\frac{i\,34}{10^3} + (0.873008 + 1.96236)\; 1.0720515027790000 \left(\exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\,i\right)\right) = \frac{17\,i}{500} + (-1.51983 - 9.11899\,i) \exp(1.79175946920000\,i) \int_0^{\infty} t^{-1/2+3\,i}\, \mathrm{frac}\left(\frac{1}{t}\right) dt$$

- $$\frac{i\,34}{10^3} + (0.873008 + 1.96236)\; 1.0720515027790000 \left(\exp(i\, 1.79175946920000)\, \zeta\left(\frac{1}{2} + 3\,i\right)\right) = \frac{17\,i}{500} + \frac{3.03966 \times 8^i \exp(1.79175946920000\,i)}{\left(-1.41421 + 8^i\right) \Gamma\left(\frac{1}{2} + 3\,i\right)} \int_0^{\infty} \frac{t^{-1/2+3\,i}}{1 + e^t}\, dt$$

•

$$\frac{i\,34}{10^3} + (0.873008 + 1.96236)$$
$$1.0720515027790000 \left(\exp(i\,1.79175946920000)\,\zeta\left(\frac{1}{2} + 3\,i\right)\right) =$$
$$\frac{17\,i}{500} + \frac{2.14937 \times 64^i \exp(1.79175946920000\,i)}{\left(-1.41421 + 8^i\right)\Gamma\left(\frac{3}{2} + 3\,i\right)} \int_0^\infty t^{1/2+3\,i} \operatorname{sech}^2(t)\,dt$$

frac(x) is the fractional part function

$\Gamma(x)$ is the gamma function

sech(x) is the hyperbolic secant function

From:

A. A. Karatsuba, **On zeros of certain Dirichlet series**,
Sovrem. Probl. Mat., 2016, Issue 23, 12–16
DOI: https://doi.org/10.4213/spm57

We have that:

$$\varkappa = \frac{\sqrt{10 - 2\sqrt{5}} - 2}{\sqrt{5} - 1},$$

[sqrt(((10-2sqrt(5))))-2] / ((((sqrt(5))-1)))

Input:

$$\frac{\sqrt{10 - 2\sqrt{5}} - 2}{\sqrt{5} - 1}$$

Decimal approximation:

0.284079043840412296028291832393126169091088088445737582759…

0.28407904384…

We note that, from the algebraic calculation of the below results of Ramanujan continued fractions (Rogers-Ramanujan identities), we obtain:

1 ÷ 0,28407904384 = 3,52014702134; 2,0663656771 + 1,0018674362 + 0,5269391135 = 3,5951722268 result very near to the inverse of value 0.284079..., i.e. 3,52014702134

Alternate forms:

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

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

Minimal polynomial:

$x^4+2x^3-6x^2-2x+1$

We have that

$$L(s,\chi_1)=\sum_{n=1}^{\infty}\chi_1(n)n^{-s}, \qquad \operatorname{Re} s>0.$$

For s = 2 and n = 2

$$\chi_1=\chi_1(n)$$

$$\chi_1(2)=i,\ i^2=-1,$$

$$f(s)=\frac{1-i\varkappa}{2}L(s,\chi_1)+\frac{1+i\varkappa}{2}L(s,\overline{\chi}_1),$$

we obtain:

(1-i*0.28407904384)/2*((((2^-2)*i))) + (1+i*0.28407904384)/2*(((((2^-2)*i))))

Input interpretation:

$$\left(\frac{1}{2}\left(1+i\times(-0.28407904384)\right)\right)\times\frac{i}{2^2}+\left(\frac{1}{2}\left(1+i\times 0.28407904384\right)\right)\times\frac{i}{2^2}$$

i is the imaginary unit

Result:

$0.25\,i$

0.25i = *f(s)*

$$f(s)=\sum_{n=1}^{\infty} r(n)n^{-s},$$

$$r(1)=1, \qquad r(2)=\varkappa, \qquad r(3)=-\varkappa, \qquad r(4)=-1, \qquad r(5)=0$$

$$r(n)=r(n+5).$$

$$g(s)=g(1-s), \qquad g(s)=\left(\frac{\pi}{5}\right)^{-s/2}\Gamma\left(\frac{s+1}{2}\right)f(s).$$

$$g(s)=\left(\frac{\pi}{5}\right)^{-s/2}\Gamma\left(\frac{s+1}{2}\right)f(s).$$

(5/Pi) * gamma(3/2) * 0.25i

Input:

$$\frac{5}{\pi}\,\Gamma\left(\frac{3}{2}\right)\times 0.25\,i$$

$\Gamma(x)$ is the gamma function

i is the imaginary unit

Result:

$0.352618\ldots\,i$

0.352618…i = *g(s)*

Polar coordinates:

$r = 0.352618$ (radius), $\theta = 90°$ (angle)

Alternative representations:

$$\frac{\Gamma\left(\frac{3}{2}\right) 5 \times 0.25\, i}{\pi} = \frac{1.25\, i\, e^{-\log G(3/2)+\log G(5/2)}}{\pi}$$

- $$\frac{\Gamma\left(\frac{3}{2}\right) 5 \times 0.25\, i}{\pi} = \frac{1.25\, i\, \frac{1}{2}!}{\pi}$$

- $$\frac{\Gamma\left(\frac{3}{2}\right) 5 \times 0.25\, i}{\pi} = \frac{1.25\, i\, \Gamma\left(\frac{3}{2}, 0\right)}{\pi}$$

$\log G(z)$ gives the logarithm of the Barnes G-function

$n!$ is the factorial function

$\Gamma(a, x)$ is the incomplete gamma function

Series representations:

$$\frac{\Gamma\left(\frac{3}{2}\right) 5 \times 0.25\, i}{\pi} = \frac{1.25\, i \sum_{k=0}^{\infty} \frac{\left(\frac{3}{2}-z_0\right)^k \Gamma^{(k)}(z_0)}{k!}}{\pi} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

- $$\frac{\Gamma\left(\frac{3}{2}\right) 5 \times 0.25\, i}{\pi} = \frac{1.25\, i}{\sum_{k=0}^{\infty} \left(\frac{3}{2} - z_0\right)^k \sum_{j=0}^{k} \frac{(-1)^j \pi^{-j+k} \sin\left(\frac{1}{2} \pi (-j+k+2 z_0)\right) \Gamma^{(j)}(1-z_0)}{j! (-j+k)!}}$$

$\mathbb{Z}$ is the set of integers

Integral representations:

$$\frac{\Gamma\left(\frac{3}{2}\right) 5 \times 0.25\, i}{\pi} = \frac{1.25\, i}{\pi} \int_0^{\infty} e^{-t} \sqrt{t}\, dt$$

- $$\frac{\Gamma\left(\frac{3}{2}\right) 5 \times 0.25\, i}{\pi} = \frac{1.25\, i}{\pi} \int_0^1 \sqrt{\log\left(\frac{1}{t}\right)}\, dt$$

- $$\frac{\Gamma\left(\frac{3}{2}\right) 5 \times 0.25\, i}{\pi} = \frac{1.25 \exp\left(\int_0^1 \frac{\frac{1}{2} - \frac{3x}{2} + x^{3/2}}{(-1+x) \log(x)}\, dx\right) i}{\pi}$$

$\log(x)$ is the natural logarithm

From *f(s)* + *g(s)*, we obtain:

0.25i + ((((5/Pi) * gamma(3/2) * 0.25i)))

Input:

$$0.25\,i + \frac{5}{\pi}\,\Gamma\left(\frac{3}{2}\right) \times 0.25\,i$$

$\Gamma(x)$ is the gamma function

i is the imaginary unit

Result:

$0.602618\ldots\,i$

0.602618…i

Polar coordinates:

$r = 0.602618$ (radius), $\theta = 90°$ (angle)

Alternative representations:

$$0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right) 5 \times 0.25\,i}{\pi} = 0.25\,i + \frac{1.25\,i\,e^{-\log G(3/2)+\log G(5/2)}}{\pi}$$

- $$0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right) 5 \times 0.25\,i}{\pi} = 0.25\,i + \frac{1.25\,i\,\frac{1}{2}!}{\pi}$$

- $$0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right) 5 \times 0.25\,i}{\pi} = 0.25\,i + \frac{1.25\,i\,\Gamma\left(\frac{3}{2}, 0\right)}{\pi}$$

$\log G(z)$ gives the logarithm of the Barnes G-function

$n!$ is the factorial function

$\Gamma(a, x)$ is the incomplete gamma function

Series representations:

$$0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right) 5 \times 0.25\,i}{\pi} = 0.25\,i + \frac{1.25\,i \sum_{k=0}^{\infty} \frac{\left(\frac{3}{2}-z_0\right)^k \Gamma^{(k)}(z_0)}{k!}}{\pi} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

-

$$0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right) 5 \times 0.25\,i}{\pi} = \frac{0.25\,i \left(5 + \sum_{k=0}^{\infty} \left(\frac{3}{2} - z_0\right)^k \sum_{j=0}^{k} \frac{(-1)^j \pi^{-j+k} \sin\left(\frac{1}{2}\pi(-j+k+2 z_0)\right) \Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)}{\sum_{k=0}^{\infty} \left(\frac{3}{2} - z_0\right)^k \sum_{j=0}^{k} \frac{(-1)^j \pi^{-j+k} \sin\left(\frac{1}{2}\pi(-j+k+2 z_0)\right) \Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}}$$

$\mathbb{Z}$ is the set of integers

Integral representations:

$$0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right) 5 \times 0.25\,i}{\pi} = 0.25\,i + \frac{1.25\,i}{\pi} \int_0^{\infty} e^{-t} \sqrt{t}\, dt$$

- $$0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right) 5 \times 0.25\,i}{\pi} = 0.25\,i + \frac{1.25\,i}{\pi} \int_0^1 \sqrt{\log\left(\frac{1}{t}\right)}\, dt$$

- $$0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right) 5 \times 0.25\,i}{\pi} = 0.25\,i + \frac{1.25 \exp\left(\int_0^1 \frac{\frac{1}{2} - \frac{3x}{2} + x^{3/2}}{(-1+x)\log(x)}\, dx\right) i}{\pi}$$

$\log(x)$ is the natural logarithm

And:

-1/((((((0.25i + ((((5/Pi) * gamma(3/2) * 0.25i)))))))))

Input:

$$-\frac{1}{0.25\,i + \frac{5}{\pi}\,\Gamma\left(\frac{3}{2}\right) \times 0.25\,i}$$

$\Gamma(x)$ is the gamma function

i is the imaginary unit

Result:

1.65942… i

1.65942…i is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3$ = 1164,2696 i.e. 1,65578...

Polar coordinates:

$r = 1.65942$ (radius), $\theta = 90°$ (angle)

Alternative representations:

$$-\frac{1}{0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right)5 \times 0.25\,i}{\pi}} = -\frac{1}{0.25\,i + \frac{1.25\,i\,\frac{1}{2}!}{\pi}}$$

•

$$-\frac{1}{0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right)5 \times 0.25\,i}{\pi}} = -\frac{1}{0.25\,i + \frac{1.25\,i\,e^{-\log G(3/2)+\log G(5/2)}}{\pi}}$$

•

$$-\frac{1}{0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right)5 \times 0.25\,i}{\pi}} = -\frac{1}{0.25\,i + \frac{1.25\,i\,\Gamma\left(\frac{3}{2},0\right)}{\pi}}$$

$n!$ is the factorial function

$\log G(z)$ gives the logarithm of the Barnes G-function

$\Gamma(a, x)$ is the incomplete gamma function

•

Series representations:

$$-\frac{1}{0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right)5 \times 0.25\,i}{\pi}} = -\frac{4\,\pi}{i\,\pi + 5\,i\sum_{k=0}^{\infty}\frac{\left(\frac{3}{2}-z_0\right)^k\Gamma^{(k)}(z_0)}{k!}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

•

$$-\frac{1}{0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right)5 \times 0.25\,i}{\pi}} = -\frac{4\sum_{k=0}^{\infty}\left(\frac{3}{2}-z_0\right)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\,\pi\,(-j+k+2\,z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}}{i\left(5+\sum_{k=0}^{\infty}\left(\frac{3}{2}-z_0\right)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\,\pi\,(-j+k+2\,z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)}$$

$\mathbb{Z}$ is the set of integers

Integral representations:

$$-\frac{1}{0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right)5 \times 0.25\,i}{\pi}} = -\frac{4\,\pi}{5\exp\left(\int_0^1\frac{\frac{1}{2}-\frac{3x}{2}+x^{3/2}}{(-1+x)\log(x)}\,dx\right)i + i\,\pi}$$

•

$$-\frac{1}{0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right)5 \times 0.25\,i}{\pi}} = -\frac{1}{0.25\,i + \frac{2.5\,i\,\mathcal{A}}{\oint_L \frac{e^t}{t^{3/2}}\,dt}}$$

$$-\frac{1}{0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right)5 \times 0.25\,i}{\pi}} = -\frac{1}{0.25\,i + \frac{1.25 \exp\left(-\frac{3\gamma}{2} + \int_0^1 \frac{-1+x^{3/2} - \log\left(x^{3/2}\right)}{(-1+x)\log(x)}\,dx\right) i}{\pi}}$$

(((((((1728)^1/3)))/10^3)))i-1/((((((0.25i + ((((5/Pi) * gamma(3/2) * 0.25i))))))))

Where 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

Input:

$$\frac{\sqrt[3]{1728}}{10^3}\,i - \frac{1}{0.25\,i + \frac{5}{\pi}\,\Gamma\left(\frac{3}{2}\right) \times 0.25\,i}$$

$\Gamma(x)$ is the gamma function

i is the imaginary unit

Result:

$1.67142\ldots\,i$

1.67142…i

We note that 1.67142...i (imaginary unit) is a result practically equal to the value of the formula:

$$m_{p'} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24} \text{ gm}$$

that is the holographic proton mass

Polar coordinates:

$r = 1.67142$ (radius), $\theta = 90°$ (angle)

Alternative representations:

$$\frac{i\sqrt[3]{1728}}{10^3} - \frac{1}{0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right)5\times 0.25\,i}{\pi}} = \frac{i\sqrt[3]{1728}}{10^3} - \frac{1}{0.25\,i + \frac{1.25\,i\,\frac{1}{2}!}{\pi}}$$

•

$$\frac{i\sqrt[3]{1728}}{10^3} - \frac{1}{0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right)5\times 0.25\,i}{\pi}} = \frac{i\sqrt[3]{1728}}{10^3} - \frac{1}{0.25\,i + \frac{1.25\,i\,e^{-\log G(3/2)+\log G(5/2)}}{\pi}}$$

•

$$\frac{i\sqrt[3]{1728}}{10^3} - \frac{1}{0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right)5\times 0.25\,i}{\pi}} = \frac{i\sqrt[3]{1728}}{10^3} - \frac{1}{0.25\,i + \frac{1.25\,i\,\Gamma\left(\frac{3}{2},0\right)}{\pi}}$$

$n!$ is the factorial function

$\log G(z)$ gives the logarithm of the Barnes G-function

$\Gamma(a, x)$ is the incomplete gamma function

Series representations:

$$\frac{i\sqrt[3]{1728}}{10^3} - \frac{1}{0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right)5\times 0.25\,i}{\pi}} = \frac{3\,i}{250} - \frac{4\,\pi}{i\,\pi + 5\,i\sum_{k=0}^{\infty}\frac{\left(\frac{3}{2}-z_0\right)^k\Gamma^{(k)}(z_0)}{k!}}$$

for $(z_0 \notin \mathbb{Z}$ or $z_0 > 0)$

•

$$\frac{i\sqrt[3]{1728}}{10^3} - \frac{1}{0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right)5\times 0.25\,i}{\pi}} =$$

$$\left(0.012\left(5\,i^2 - 333.333\sum_{k=0}^{\infty}\left(\frac{3}{2}-z_0\right)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2\,z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!} + i^2\sum_{k=0}^{\infty}\left(\frac{3}{2}-z_0\right)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2\,z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)\right) \Big/ \left(i\left(5+\sum_{k=0}^{\infty}\left(\frac{3}{2}-z_0\right)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2\,z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)\right)$$

$\mathbb{Z}$ is the set of integers

Integral representations:

$$\frac{i\sqrt[3]{1728}}{10^3} - \frac{1}{0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right)5\times 0.25\,i}{\pi}} = \frac{3\,i}{250} - \frac{4\,\pi}{i\,\pi + 5\,i\int_0^\infty e^{-t}\sqrt{t}\,dt}$$

- $$\frac{i\sqrt[3]{1728}}{10^3} - \frac{1}{0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right)5\times 0.25\,i}{\pi}} = \frac{3\,i}{250} - \frac{4\,\pi}{i\,\pi + 5\,i\int_0^1 \sqrt{\log\left(\frac{1}{t}\right)}\,dt}$$

- $$\frac{i\sqrt[3]{1728}}{10^3} - \frac{1}{0.25\,i + \frac{\Gamma\left(\frac{3}{2}\right)5\times 0.25\,i}{\pi}} = \frac{3\,i}{250} - \frac{1}{0.25\,i + \frac{1.25\exp\left(\int_0^1 \frac{-1-\frac{3}{2}(-1+x)+x^{3/2}}{(-1+x)\log(x)}\,dx\right)i}{\pi}}$$

$\log(x)$ is the natural logarithm

For k = 5 and 0.5 mod 5 = 0.5 = χ

$$a = (\chi(1) - \chi(-1))/2;$$

((((0.5(1)-0.5(-1))))/2

Input:

$$\frac{1}{2}(0.5\times 1 - 0.5\times(-1))$$

Result:

0.5

0.5 = a

((((2^-2)*i))) = *L(s, χ)*

$$\xi(s,\chi) = \left(\frac{\pi}{k}\right)^{-(s+a)/2}\Gamma\left(\frac{s+a}{2}\right)L(s,\chi),$$

(Pi/5)^-1.25 * gamma(((2+0.5)/2))) * ((((2^-2)*i)))

Input:

$$\frac{\Gamma\left(\frac{2+0.5}{2}\right)\times\frac{i}{2^2}}{\left(\frac{\pi}{5}\right)^{1.25}}$$

$\Gamma(x)$ is the gamma function

i is the imaginary unit

Result:

$0.405076\ldots i$

0.405076…i

Polar coordinates:

$r = 0.405076$ (radius), $\theta = 90°$ (angle)

Alternative representations:

$$\frac{\Gamma\left(\frac{2+0.5}{2}\right)i}{\left(\frac{\pi}{5}\right)^{1.25}2^2} = \frac{0.24134\,i}{1.06504\left(\frac{\pi}{5}\right)^{1.25}}$$

- $$\frac{\Gamma\left(\frac{2+0.5}{2}\right)i}{\left(\frac{\pi}{5}\right)^{1.25}2^2} = \frac{i}{4\,e^{0.0982718}\left(\frac{\pi}{5}\right)^{1.25}}$$

- $$\frac{\Gamma\left(\frac{2+0.5}{2}\right)i}{\left(\frac{\pi}{5}\right)^{1.25}2^2} = \frac{i\,0.25!}{4\left(\frac{\pi}{5}\right)^{1.25}}$$

$n!$ is the factorial function

Series representations:

$$\frac{\Gamma\left(\frac{2+0.5}{2}\right)i}{\left(\frac{\pi}{5}\right)^{1.25}2^2} = \frac{1.86919\,i\sum_{k=0}^{\infty}\frac{(1.25-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}{\pi^{1.25}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

- $$\frac{\Gamma\left(\frac{2+0.5}{2}\right)i}{\left(\frac{\pi}{5}\right)^{1.25}2^2} = \frac{1.86919\,i}{\pi^{0.25}\sum_{k=0}^{\infty}(1.25-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!(-j+k)!}}$$

$\mathbb{Z}$ is the set of integers

Integral representations:

$$\frac{\Gamma\left(\frac{2+0.5}{2}\right) i}{\left(\frac{\pi}{5}\right)^{1.25} 2^2} = \frac{1.86919\, i}{\pi^{1.25}} \int_0^\infty e^{-t}\, t^{0.25}\, dt$$

- $$\frac{\Gamma\left(\frac{2+0.5}{2}\right) i}{\left(\frac{\pi}{5}\right)^{1.25} 2^2} = \frac{1.86919\, i}{\pi^{1.25}} \int_0^1 \log^{0.25}\left(\frac{1}{t}\right) dt$$

- $$\frac{\Gamma\left(\frac{2+0.5}{2}\right) i}{\left(\frac{\pi}{5}\right)^{1.25} 2^2} = \frac{1.86919\, e^{\int_0^1 \frac{0.25-1.25\,x+x^{1.25}}{(-1+x)\log(x)} dx}\, i}{\pi^{1.25}}$$

$\log(x)$ is the natural logarithm

And:

4(89+55)/144 (((((Pi/5)^-1.25 * gamma(((2+0.5)/2))) * ((((2^-2)*i))))))

Input:

$$4 \times \frac{89+55}{144}\left(\frac{\Gamma\left(\frac{2+0.5}{2}\right)}{\left(\frac{\pi}{5}\right)^{1.25}} \times \frac{i}{2^2}\right)$$

$\Gamma(x)$ is the gamma function

i is the imaginary unit

Result:

$1.62030\ldots\, i$

1.62030…i

Polar coordinates:

$r = 1.6203$ (radius), $\theta = 90°$ (angle)

Alternative representations:

$$\frac{\left(4\left(\Gamma\left(\frac{2+0.5}{2}\right) i\right)\right)(89+55)}{\left(\left(\frac{\pi}{5}\right)^{1.25} 2^2\right) 144} = \frac{139.012\, i}{1.06504 \times 144 \left(\frac{\pi}{5}\right)^{1.25}}$$

-

$$\frac{\left(4\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(89+55)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144} = \frac{144\,i}{144\,e^{0.0982718}\left(\frac{\pi}{5}\right)^{1.25}}$$

•

$$\frac{\left(4\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(89+55)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144} = \frac{144\,i\,0.25!}{144\left(\frac{\pi}{5}\right)^{1.25}}$$

$n!$ is the factorial function

Series representations:

$$\frac{\left(4\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(89+55)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144} = \frac{7.47674\,i\sum_{k=0}^{\infty}\frac{(1.25-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}{\pi^{1.25}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

•

$$\frac{\left(4\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(89+55)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144} = \frac{7.47674\,i}{\pi^{0.25}\sum_{k=0}^{\infty}(1.25-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}}$$

$\mathbb{Z}$ is the set of integers

Integral representations:

$$\frac{\left(4\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(89+55)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144} = \frac{7.47674\,i}{\pi^{1.25}}\int_0^{\infty}e^{-t}\,t^{0.25}\,dt$$

•

$$\frac{\left(4\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(89+55)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144} = \frac{7.47674\,i}{\pi^{1.25}}\int_0^{1}\log^{0.25}\left(\frac{1}{t}\right)dt$$

•

$$\frac{\left(4\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(89+55)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144} = \frac{7.47674\,e^{\int_0^1\frac{0.25-1.25x+x^{1.25}}{(-1+x)\log(x)}dx}\,i}{\pi^{1.25}}$$

Or:

Pi(8+34+55+89)*1/144 (((((Pi/5)^-1.25 * gamma(((2+0.5)/2))) * ((((2^-2)*i))))))

Input:

$$\pi (8 + 34 + 55 + 89) \times \frac{1}{144} \left(\frac{\Gamma\left(\frac{2+0.5}{2}\right)}{\left(\frac{\pi}{5}\right)^{1.25}} \times \frac{i}{2^2} \right)$$

$\Gamma(x)$ is the gamma function

i is the imaginary unit

Result:

$1.64375\ldots\, i$

$1.64375\ldots i \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

Polar coordinates:

$r = 1.64375$ (radius), $\theta = 90°$ (angle)

Alternative representations:

$$\frac{(\pi (8 + 34 + 55 + 89)) \Gamma\left(\frac{2+0.5}{2}\right) i}{144 \left(\frac{\pi}{5}\right)^{1.25} 2^2} = \frac{44.8892\, i\, \pi}{1.06504 \times 144 \left(\frac{\pi}{5}\right)^{1.25}}$$

-

$$\frac{(\pi (8 + 34 + 55 + 89)) \Gamma\left(\frac{2+0.5}{2}\right) i}{144 \left(\frac{\pi}{5}\right)^{1.25} 2^2} = \frac{93\, i\, \pi}{2 \times 144\, e^{0.0982718} \left(\frac{\pi}{5}\right)^{1.25}}$$

-

$$\frac{(\pi (8 + 34 + 55 + 89)) \Gamma\left(\frac{2+0.5}{2}\right) i}{144 \left(\frac{\pi}{5}\right)^{1.25} 2^2} = \frac{93\, i\, \pi\, 0.25!}{2 \times 144 \left(\frac{\pi}{5}\right)^{1.25}}$$

$n!$ is the factorial function

Series representations:

$$\frac{(\pi (8 + 34 + 55 + 89)) \Gamma\left(\frac{2+0.5}{2}\right) i}{144 \left(\frac{\pi}{5}\right)^{1.25} 2^2} = \frac{2.41437\, i \sum_{k=0}^{\infty} \frac{(1.25 - z_0)^k \Gamma^{(k)}(z_0)}{k!}}{\pi^{0.25}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

-

$$\frac{(\pi (8 + 34 + 55 + 89)) \Gamma\left(\frac{2+0.5}{2}\right) i}{144 \left(\frac{\pi}{5}\right)^{1.25} 2^2} =$$
$$\frac{2.41437\, i\, \pi^{0.75}}{\sum_{k=0}^{\infty} (1.25 - z_0)^k \sum_{j=0}^{k} \frac{(-1)^j \pi^{-j+k} \sin\left(\frac{1}{2} \pi (-j+k+2 z_0)\right) \Gamma^{(j)}(1-z_0)}{j! (-j+k)!}}$$

$\mathbb{Z}$ is the set of integers

Integral representations:

$$\frac{(\pi (8+34+55+89))\,\Gamma\left(\frac{2+0.5}{2}\right) i}{144 \left(\frac{\pi}{5}\right)^{1.25} 2^2} = \frac{2.41437\, i}{\pi^{0.25}} \int_0^{\infty} e^{-t}\, t^{0.25}\, dt$$

- $$\frac{(\pi (8+34+55+89))\,\Gamma\left(\frac{2+0.5}{2}\right) i}{144 \left(\frac{\pi}{5}\right)^{1.25} 2^2} = \frac{2.41437\, i}{\pi^{0.25}} \int_0^{1} \log^{0.25}\left(\frac{1}{t}\right) dt$$

- $$\frac{(\pi (8+34+55+89))\,\Gamma\left(\frac{2+0.5}{2}\right) i}{144 \left(\frac{\pi}{5}\right)^{1.25} 2^2} = \frac{2.41437\, e^{\int_0^1 \frac{0.25-1.25x+x^{1.25}}{(-1+x)\log(x)}\, dx}\, i}{\pi^{0.25}}$$

$\log(x)$ is the natural logarithm

(55/10^3-2/10^3)i-8/10^3i+Pi(1+5+89*2)/144 (((((Pi/5)^-1.25 * gamma(((2+0.5)/2))) * ((((2^-2)*i))))))

Input:

$$\left(\frac{55}{10^3} - \frac{2}{10^3}\right) i - \frac{8}{10^3}\, i + \pi \left(\frac{1}{144}\,(1+5+89\times 2)\right) \left(\frac{\Gamma\left(\frac{2+0.5}{2}\right)}{\left(\frac{\pi}{5}\right)^{1.25}} \times \frac{i}{2^2}\right)$$

$\Gamma(x)$ is the gamma function

i is the imaginary unit

Result:

1.671078323779447077377561675383988106009659813763624116800... i

1.67107832…i

We note that 1.67107832...i is a result practically equal to the value of the formula:

$m_{p'} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

Polar coordinates:

$r = 1.67108$ (radius), $\theta = 90°$ (angle)

Alternative representations:

$$\left(\frac{55}{10^3}-\frac{2}{10^3}\right)i-\frac{i\,8}{10^3}+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=\frac{44.4065\,i\,\pi}{1.06504\times 144\left(\frac{\pi}{5}\right)^{1.25}}+\frac{45\,i}{10^3}$$

- $$\left(\frac{55}{10^3}-\frac{2}{10^3}\right)i-\frac{i\,8}{10^3}+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=\frac{46\,i\,\pi}{144\,e^{0.0982718}\left(\frac{\pi}{5}\right)^{1.25}}+\frac{45\,i}{10^3}$$

- $$\left(\frac{55}{10^3}-\frac{2}{10^3}\right)i-\frac{i\,8}{10^3}+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=\frac{46\,i\,\pi\,0.25!}{144\left(\frac{\pi}{5}\right)^{1.25}}+\frac{45\,i}{10^3}$$

$n!$ is the factorial function

Series representations:

$$\left(\frac{55}{10^3}-\frac{2}{10^3}\right)i-\frac{i\,8}{10^3}+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=$$
$$0.045\,i+\frac{2.3884\,i\sum_{k=0}^{\infty}\frac{(1.25-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}{\pi^{0.25}}\quad\text{for } (z_0\notin\mathbb{Z}\text{ or } z_0>0)$$

- $$\left(\frac{55}{10^3}-\frac{2}{10^3}\right)i-\frac{i\,8}{10^3}+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=$$
$$\frac{2.3884\,i\left(\pi^{0.75}+0.018841\sum_{k=0}^{\infty}(1.25-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!(-j+k)!}\right)}{\sum_{k=0}^{\infty}(1.25-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!(-j+k)!}}$$

$\mathbb{Z}$ is the set of integers

Integral representations:

$$\left(\frac{55}{10^3}-\frac{2}{10^3}\right)i-\frac{i\,8}{10^3}+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=0.045\,i+\frac{2.3884\,i}{\pi^{0.25}}\int_0^{\infty}e^{-t}\,t^{0.25}\,dt$$

-

$$\left(\frac{55}{10^3}-\frac{2}{10^3}\right)i-\frac{i\,8}{10^3}+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=$$
$$0.045\,i+\frac{2.3884\,i}{\pi^{0.25}}\int_0^1\log^{0.25}\left(\frac{1}{t}\right)dt$$

- $$\left(\frac{55}{10^3}-\frac{2}{10^3}\right)i-\frac{i\,8}{10^3}+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=$$
$$0.045\,i+\frac{2.3884\,e^{\int_0^1\frac{0.25-1.25\,x+x^{1.25}}{(-1+x)\log(x)}dx}\,i}{\pi^{0.25}}$$

log(x) is the natural logarithm

-8/10^3i+Pi(1+5+89*2)/144 (((((Pi/5)^-1.25 * gamma(((2+0.5)/2))) * ((((2^-2)*i))))))

Input:

$$-\frac{8}{10^3}\,i+\pi\left(\frac{1}{144}(1+5+89\times 2)\right)\left(\frac{\Gamma\left(\frac{2+0.5}{2}\right)}{\left(\frac{\pi}{5}\right)^{1.25}}\times\frac{i}{2^2}\right)$$

Γ(x) is the gamma function

i is the imaginary unit

Result:

1.618078323779447077377561675383988106009659813763624116800... i

1.61807832…i

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

Polar coordinates:

$r = 1.61808$ (radius), $\theta = 90°$ (angle)

Alternative representations:

$$\frac{i(-8)}{10^3}+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=\frac{44.4065\,i\,\pi}{1.06504\times 144\left(\frac{\pi}{5}\right)^{1.25}}-\frac{8\,i}{10^3}$$

-

$$\frac{i(-8)}{10^3}+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=\frac{46\,i\,\pi}{144\,e^{0.0982718}\left(\frac{\pi}{5}\right)^{1.25}}-\frac{8\,i}{10^3}$$

- $$\frac{i(-8)}{10^3}+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=\frac{46\,i\,\pi\,0.25!}{144\left(\frac{\pi}{5}\right)^{1.25}}-\frac{8\,i}{10^3}$$

$n!$ is the factorial function

Series representations:

$$\frac{i(-8)}{10^3}+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=-0.008\,i+\frac{2.3884\,i\sum_{k=0}^{\infty}\frac{(1.25-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}{\pi^{0.25}}$$

for $(z_0\notin\mathbb{Z}$ or $z_0>0)$

- $$\frac{i(-8)}{10^3}+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=$$
$$\frac{2.3884\,i\left(\pi^{0.75}-0.00334952\sum_{k=0}^{\infty}(1.25-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!(-j+k)!}\right)}{\sum_{k=0}^{\infty}(1.25-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!(-j+k)!}}$$

$\mathbb{Z}$ is the set of integers

Integral representations:

$$\frac{i(-8)}{10^3}+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=-0.008\,i+\frac{2.3884\,i}{\pi^{0.25}}\int_0^{\infty}e^{-t}\,t^{0.25}\,dt$$

- $$\frac{i(-8)}{10^3}+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=-0.008\,i+\frac{2.3884\,i}{\pi^{0.25}}\int_0^{1}\log^{0.25}\left(\frac{1}{t}\right)dt$$

- $$\frac{i(-8)}{10^3}+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=-0.008\,i+\frac{2.3884\,e^{\int_0^1\frac{0.25-1.25x+x^{1.25}}{(-1+x)\log(x)}dx}\,i}{\pi^{0.25}}$$

$\log(x)$ is the natural logarithm

(21/10^3-3/10^3)i+Pi(1+5+89*2)/144 (((((Pi/5)^-1.25 * gamma(((2+0.5)/2))) * ((((2^-2)*i))))))

Input:

$$\left(\frac{21}{10^3}-\frac{3}{10^3}\right)i+\pi\left(\frac{1}{144}(1+5+89\times 2)\right)\left(\frac{\Gamma\left(\frac{2+0.5}{2}\right)}{\left(\frac{\pi}{5}\right)^{1.25}}\times\frac{i}{2^2}\right)$$

$\Gamma(x)$ is the gamma function

i is the imaginary unit

Result:

$1.64408\ldots\, i$

$1.64408\ldots i \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

Polar coordinates:

$r = 1.64408$ (radius), $\theta = 90°$ (angle)

Alternative representations:

$$\left(\frac{21}{10^3}-\frac{3}{10^3}\right)i+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=\frac{44.4065\, i\,\pi}{1.06504\times 144\left(\frac{\pi}{5}\right)^{1.25}}+\frac{18\, i}{10^3}$$

-

$$\left(\frac{21}{10^3}-\frac{3}{10^3}\right)i+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=\frac{46\, i\,\pi}{144\, e^{0.0982718}\left(\frac{\pi}{5}\right)^{1.25}}+\frac{18\, i}{10^3}$$

-

$$\left(\frac{21}{10^3}-\frac{3}{10^3}\right)i+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=\frac{46\, i\,\pi\, 0.25!}{144\left(\frac{\pi}{5}\right)^{1.25}}+\frac{18\, i}{10^3}$$

$n!$ is the factorial function

Series representations:

$$\left(\frac{21}{10^3}-\frac{3}{10^3}\right)i+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=0.018\, i+\frac{2.3884\, i\sum_{k=0}^{\infty}\frac{(1.25-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}{\pi^{0.25}}$$

for ($z_0 \notin \mathbb{Z}$ or $z_0 > 0$)

-

$$\left(\frac{21}{10^3}-\frac{3}{10^3}\right)i+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=$$
$$\frac{2.3884\,i\left(\pi^{0.75}+0.00753641\sum_{k=0}^{\infty}(1.25-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!(-j+k)!}\right)}{\sum_{k=0}^{\infty}(1.25-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!(-j+k)!}}$$

$\mathbb{Z}$ is the set of integers

Integral representations:

$$\left(\frac{21}{10^3}-\frac{3}{10^3}\right)i+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=0.018\,i+\frac{2.3884\,i}{\pi^{0.25}}\int_0^{\infty}e^{-t}\,t^{0.25}\,dt$$

•

$$\left(\frac{21}{10^3}-\frac{3}{10^3}\right)i+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=0.018\,i+\frac{2.3884\,i}{\pi^{0.25}}\int_0^{1}\log^{0.25}\left(\frac{1}{t}\right)dt$$

•

$$\left(\frac{21}{10^3}-\frac{3}{10^3}\right)i+\frac{\left(\pi\left(\Gamma\left(\frac{2+0.5}{2}\right)i\right)\right)(1+5+89\times 2)}{\left(\left(\frac{\pi}{5}\right)^{1.25}2^2\right)144}=0.018\,i+\frac{2.3884\,e^{\int_0^1\frac{0.25-1.25x+x^{1.25}}{(-1+x)\log(x)}dx}\,i}{\pi^{0.25}}$$

$\log(x)$ is the natural logarithm

We have that:

$$f(s)=\sum_{n=1}^{\infty}r(n)n^{-s},$$

$$r(2)=\varkappa,$$

$$\varkappa=\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1},$$

2^-2 * (((((([sqrt(((10-2sqrt(5))))-2] *1/ ((((sqrt(5))-1))))))

Input:

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

Result:

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

Decimal approximation:

0.071019760960103074007072958098281542272772022111434395689...

0.07101976…

We note that, from the algebraic calculation of the below results of Ramanujan continued fractions (Rogers-Ramanujan identities), we obtain:

1 ÷ 0,9568666 = 1,04507775692...; 1,04507775692 * 2 = 2,09015551384;

2.09015551384 + 2,06636567 = 4,1565211838406; 4,1565211838406 / 2 = 2,07826059192; 2,07826059192 - 1,0000007913 – 1.0018674362 = 0,07639236442 result very near to the value 0.07101976...

Alternate forms:

- $$\frac{1}{16}\left(\sqrt{10-2\sqrt{5}}-2\sqrt{5}+\sqrt{5\left(10-2\sqrt{5}\right)}-2\right)$$
- $$\frac{1}{8}\left(-1-\sqrt{5}+\sqrt{2\left(5+\sqrt{5}\right)}\right)$$
- $$\frac{\sqrt{2\left(5-\sqrt{5}\right)}-2}{4\left(\sqrt{5}-1\right)}$$

Minimal polynomial:

$$256x^4+128x^3-96x^2-8x+1$$

And:

sqrt((((((colog((((((2^-2 * (((((([sqrt(((10-2sqrt(5))))-2] *1/ ((((sqrt(5))-1))))))))))))))))))))

Input:

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

log(x) is the natural logarithm

Exact result:

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

Decimal approximation:

1.626283221731029060431182422919583254374345669824004146502...

1.62628322…

Property:

$\sqrt{-\log\left(\frac{-2+\sqrt{10-2\sqrt{5}}}{4\left(-1+\sqrt{5}\right)}\right)}$ is a transcendental number

(34+8+3)/10^3+sqrt((((((colog((((((2^-2 * (((((([sqrt(((10-2sqrt(5))))-2] *1/ ((((sqrt(5))-1))))))))))))))))))))

Input:

$$\frac{34+8+3}{10^3}+\sqrt{-\log\left(\frac{\left(\sqrt{10-2\sqrt{5}}-2\right)\times\frac{1}{\sqrt{5}-1}}{2^2}\right)}$$

log(x) is the natural logarithm

Exact result:

$$\frac{9}{200}+\sqrt{-\log\left(\frac{\sqrt{10-2\sqrt{5}}-2}{4\left(\sqrt{5}-1\right)}\right)}$$

Decimal approximation:

1.671283221731029060431182422919583254374345669824004146502...

1.67128322…

We note that 1.67128322... is a result practically equal to the value of the formula:

$m_{p'} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

Property:

$$\frac{9}{200} + \sqrt{-\log\left(\frac{-2+\sqrt{10-2\sqrt{5}}}{4(-1+\sqrt{5})}\right)} \text{ is a transcendental number}$$

Alternate forms:

$$\frac{9}{200} + \sqrt{-\log\left(\frac{1}{8}\left(-1-\sqrt{5}+\sqrt{2\left(5+\sqrt{5}\right)}\right)\right)}$$

- $$\frac{9}{200} - i\sqrt{\log\left(\sqrt{10-2\sqrt{5}}-2\right) - \log\left(4\left(\sqrt{5}-1\right)\right)}$$

- $$\frac{1}{200}\left(9 + 200\sqrt{-\log\left(\frac{\sqrt{10-2\sqrt{5}}-2}{4(\sqrt{5}-1)}\right)}\right)$$

Alternative representations:

$$\frac{34+8+3}{10^3} + \sqrt{-\log\left(\frac{\sqrt{10-2\sqrt{5}}-2}{2^2(\sqrt{5}-1)}\right)} = \frac{45}{10^3} + \sqrt{-\log_e\left(\frac{-2+\sqrt{10-2\sqrt{5}}}{4(-1+\sqrt{5})}\right)}$$

- $$\frac{34+8+3}{10^3} + \sqrt{-\log\left(\frac{\sqrt{10-2\sqrt{5}}-2}{2^2(\sqrt{5}-1)}\right)} = \frac{45}{10^3} + \sqrt{-\log(a)\log_a\left(\frac{-2+\sqrt{10-2\sqrt{5}}}{4(-1+\sqrt{5})}\right)}$$

- $$\frac{34+8+3}{10^3} + \sqrt{-\log\left(\frac{\sqrt{10-2\sqrt{5}}-2}{2^2(\sqrt{5}-1)}\right)} = \frac{45}{10^3} + \sqrt{\mathrm{Li}_1\left(1-\frac{-2+\sqrt{10-2\sqrt{5}}}{4(-1+\sqrt{5})}\right)}$$

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

$\text{Li}_n(x)$ is the polylogarithm function

Series representations:

$$\frac{34+8+3}{10^3}+\sqrt{-\log\left(\frac{\sqrt{10-2\sqrt{5}}-2}{2^2\left(\sqrt{5}-1\right)}\right)}=\frac{9}{200}+\sqrt{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{-2+\sqrt{10-2\sqrt{5}}}{4\left(-1+\sqrt{5}\right)}\right)^k}{k}}$$

- $$\frac{34+8+3}{10^3}+\sqrt{-\log\left(\frac{\sqrt{10-2\sqrt{5}}-2}{2^2\left(\sqrt{5}-1\right)}\right)}=$$
$$\frac{9}{200}+\sqrt{-2i\pi\left\lfloor\frac{\arg\left(\frac{-2+\sqrt{10-2\sqrt{5}}}{4\left(-1+\sqrt{5}\right)}-x\right)}{2\pi}\right\rfloor-\log(x)+\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{-2+\sqrt{10-2\sqrt{5}}}{4\left(-1+\sqrt{5}\right)}-x\right)^k x^{-k}}{k}}$$
for $x<0$

- $$\frac{34+8+3}{10^3}+\sqrt{-\log\left(\frac{\sqrt{10-2\sqrt{5}}-2}{2^2\left(\sqrt{5}-1\right)}\right)}=$$
$$\frac{9}{200}+\sqrt{-2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor-\log(z_0)+\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{-2+\sqrt{10-2\sqrt{5}}}{4\left(-1+\sqrt{5}\right)}-z_0\right)^k z_0^{-k}}{k}}$$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

Integral representation:

$$\frac{34+8+3}{10^3}+\sqrt{-\log\left(\frac{\sqrt{10-2\sqrt{5}}-2}{2^2\left(\sqrt{5}-1\right)}\right)}=\frac{9}{200}+\sqrt{-\int_1^{\frac{-2+\sqrt{10-2\sqrt{5}}}{4\left(-1+\sqrt{5}\right)}}\frac{1}{t}\,dt}$$

-8/10^3+sqrt((((((colog((((((2^-2 * (((((([sqrt(((10-2sqrt(5))))-2] *1/ ((((sqrt(5))-1)))))))))))))))))))

Input:

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

$\log(x)$ is the natural logarithm

Exact result:

$$\sqrt{-\log\left(\frac{\sqrt{10-2\sqrt{5}}-2}{4\left(\sqrt{5}-1\right)}\right)}-\frac{1}{125}$$

Decimal approximation:

1.618283221731029060431182422919583254374345669824004146502...

1.61828322…

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

Property:

$$-\frac{1}{125}+\sqrt{-\log\left(\frac{-2+\sqrt{10-2\sqrt{5}}}{4\left(-1+\sqrt{5}\right)}\right)}$$ is a transcendental number

Alternate forms:

$$\sqrt{-\log\left(\frac{1}{8}\left(-1-\sqrt{5}+\sqrt{2\left(5+\sqrt{5}\right)}\right)\right)}-\frac{1}{125}$$

- $$-\frac{1}{125}-i\sqrt{\log\left(\sqrt{10-2\sqrt{5}}-2\right)-\log\left(4\left(\sqrt{5}-1\right)\right)}$$

- $$\frac{1}{125}\left(125\sqrt{-\log\left(\frac{\sqrt{10-2\sqrt{5}}-2}{4\left(\sqrt{5}-1\right)}\right)}-1\right)$$

Alternative representations:

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

•

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

•

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

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

$\text{Li}_n(x)$ is the polylogarithm function

Series representations:

$$-\frac{8}{10^3}+\sqrt{-\log\left(\frac{\sqrt{10-2\sqrt{5}}-2}{2^2\left(\sqrt{5}-1\right)}\right)}=-\frac{1}{125}+\sqrt{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{-2+\sqrt{10-2\sqrt{5}}}{4\left(-1+\sqrt{5}\right)}\right)^k}{k}}$$

•

$$-\frac{8}{10^3}+\sqrt{-\log\left(\frac{\sqrt{10-2\sqrt{5}}-2}{2^2\left(\sqrt{5}-1\right)}\right)}=-\frac{1}{125}+$$
$$\sqrt{-2i\pi\left\lfloor\frac{\arg\left(\frac{-2+\sqrt{10-2\sqrt{5}}}{4\left(-1+\sqrt{5}\right)}-x\right)}{2\pi}\right\rfloor-\log(x)+\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{-2+\sqrt{10-2\sqrt{5}}}{4\left(-1+\sqrt{5}\right)}-x\right)^k x^{-k}}{k}} \quad \text{for } x<0$$

•

$$-\frac{8}{10^3}+\sqrt{-\log\left(\frac{\sqrt{10-2\sqrt{5}}-2}{2^2\left(\sqrt{5}-1\right)}\right)} = -\frac{1}{125}+\sqrt{-2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor-\log(z_0)+\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{-2+\sqrt{10-2\sqrt{5}}}{4\left(-1+\sqrt{5}\right)}-z_0\right)^k z_0^{-k}}{k}}$$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

Integral representation:

$$-\frac{8}{10^3}+\sqrt{-\log\left(\frac{\sqrt{10-2\sqrt{5}}-2}{2^2\left(\sqrt{5}-1\right)}\right)} = -\frac{1}{125}+\sqrt{-\int_1^{\frac{-2+\sqrt{10-2\sqrt{5}}}{4\left(-1+\sqrt{5}\right)}}\frac{1}{t}\,dt}$$

Thence:

$$Z(t) = e^{i\theta(t)}\zeta\left(\frac{1}{2}+it\right).$$

Z(t) = exp(i*1.7917594692) zeta(1/2+3i)

Input interpretation:

$$\exp(i\times 1.7917594692)\,\zeta\left(\frac{1}{2}+3\,i\right)$$

$\zeta(s)$ is the Riemann zeta function

i is the imaginary unit

Result:

$-0.039781315591\ldots+$
$0.53707584880\ldots\,i$

Polar coordinates:
$r = 0.53854713854$ (radius), $\theta = 94.23617405°$ (angle)

0.538547…

We note that, the above result is very near to the following value of Ramanujan continued fractions (Rogers-Ramanujan identities): 0,5269391135

And:

Result:
$0.25\,i$

0.25i = *f(s)*

We have that:

A. A. Karatsuba, **On zeros of certain Dirichlet series**,
Sovrem. Probl. Mat., 2016, Issue 23, 12–16
DOI: https://doi.org/10.4213/spm57

From:

$$I_1 = \int_t^{t+h} |Z(u)|\, du, \qquad I_2 = \left| \int_t^{t+h} Z(u)\, du \right|.$$

$$F(u) = Z(u)|f(u)|^2,$$

Where: $r = 0.53854713854$ (radius), $\theta = 94.23617405°$ (angle)

0.53854713854 * (0.25i)^2

Input interpretation:
$0.53854713854\,(0.25\,i)^2$

i is the imaginary unit

Result:
-0.03365919615875

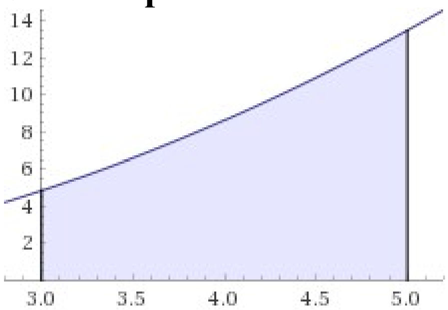
-0.03365919615875

integrate [0.53854713854]x x,[3, 5]

$$\int_3^5 0.53854713854\, x\, x\, dx = 17.592539859$$

17.592539859

Visual representation of the integral:



((((integrate [0.53854713854]x x,[3, 5]))))^1/6

Input interpretation:

$$\sqrt[6]{\int_3^5 0.53854713854\, x\, x\, dx}$$

Result:

1.61270434959

1.61270434959

Computation result:

$$\sqrt[6]{\int_3^5 0.53854713854\, x\, x\, dx} = 1.6127$$

((((integrate [0.53854713854]x x,[3, 5]))))^1/(24^2/10^2)

Input interpretation:

$$\sqrt[\frac{24^2}{10^2}]{\int_3^5 0.53854713854\, x\, x\, dx}$$

Result:

1.64514003871

1.64514003871 ≈ ζ(2) = $\frac{\pi^2}{6} = 1.644934$ ...

Computation result:

$$\sqrt[\frac{10^2}{24^2}]{\int_3^5 0.53854713854\, x\, x\, dx} = 1.64514$$

sqrt(((((1/(2Pi) ((((integrate [0.53854713854]x x,[3, 5])))))))))

Input interpretation:

$$\sqrt{\frac{1}{2\pi}\int_3^5 0.53854713854\, x\, x\, dx}$$

Result:

1.67330202895

1.67330202895 result very near to the proton mass

Computation result:

$$\sqrt{\frac{1}{2\pi}\int_3^5 0.53854713854\, x\, x\, dx} = 1.6733$$

-2/10^3+(((((sqrt(((((1/(2Pi) ((((integrate [0.53854713854]x x,[3, 5])))))))))))))))

Input interpretation:

$$-\frac{2}{10^3} + \sqrt{\frac{1}{2\pi}\int_3^5 0.53854713854\, x\, x\, dx}$$

Result:

1.67130202895

1.67130202895

We note that 1.67130202895... is a result practically equal to the value of the formula:

$m_{p'} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

Computation result:

$$-\frac{2}{10^3}+\sqrt{\frac{1}{2\pi}\int_3^5 0.53854713854\, x\, x\, dx} = 1.6713$$

-55/10^3+(((((sqrt(((((1/(2Pi) ((((integrate [0.53854713854]x x,[3, 5])))))))))))))

Input interpretation:

$$-\frac{55}{10^3}+\sqrt{\frac{1}{2\pi}\int_3^5 0.53854713854\, x\, x\, dx}$$

Result:

1.61830202895

1.61830202895

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

Computation result:

$$-\frac{55}{10^3}+\sqrt{\frac{1}{2\pi}\int_3^5 0.53854713854\, x\, x\, dx} = 1.6183$$

-1/(((0.53854713854 * (0.25i)^2)))

Input interpretation:

$$-\frac{1}{0.53854713854\,(0.25\,i)^2}$$

i is the imaginary unit

Result:

29.709562738325862426742734429978390132697482329473190036 86...

29.7095627…

((((integrate (((0.53854713854 * (0.25i)^2)))x, [3, 13]))))^1/2

Input interpretation:

$$\sqrt{\int_3^{13} \left(0.53854713854\,(0.25\,i)^2\right) x\,dx}$$

i is the imaginary unit

Result:

$1.00476 \times 10^{-16} + 1.64096\,i$

Computation result:

$$\sqrt{\int_3^{13} \left(0.53854713854\,(0.25\,i)^2\right) x\,dx} = 1.00476 \times 10^{-16} + 1.64096\,i$$

Alternate form:

$1.64096\,i$

$1.64096i \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

(34/10^3-3/10^3)i+((((integate (((0.53854713854 * (0.25i)^2)))x, [3, 13]))))^1/2

Input interpretation:

$$\left(\frac{34}{10^3} - \frac{3}{10^3}\right) i + \sqrt{\int_3^{13} \left(0.53854713854\,(0.25\,i)^2\right) x\,dx}$$

i is the imaginary unit

Result:

$1.00476 \times 10^{-16} + 1.67196\,i$

Computation result:

$$\left(\frac{34}{10^3} - \frac{3}{10^3}\right) i + \sqrt{\int_3^{13} \left(0.53854713854\,(0.25\,i)^2\right) x\,dx} = 1.00476 \times 10^{-16} + 1.67196\,i$$

Alternate form:

$1.67196\,i$

1.67196i

We note that 1.67196i is a result practically equal to the value of the formula:

$m_{p'} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

(-55/10^3-2/10^3+34/10^3)i+((((integate (((0.53854713854 * (0.25i)^2)))x, [3, 13]))))^1/2

Input interpretation:

$$\left(-\frac{55}{10^3} - \frac{2}{10^3} + \frac{34}{10^3}\right) i + \sqrt{\int_3^{13} \left(0.53854713854 \, (0.25 \, i)^2\right) x \, dx}$$

i is the imaginary unit

Result:

$1.00476 \times 10^{-16} + 1.61796 \, i$

Computation result:

$$\left(-\frac{55}{10^3} - \frac{2}{10^3} + \frac{34}{10^3}\right) i + \sqrt{\int_3^{13} \left(0.53854713854 \, (0.25 \, i)^2\right) x \, dx} = 1.00476 \times 10^{-16} + 1.61796 \, i$$

Alternate form:

$1.61796 \, i$

1.61796i

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

Now, from the sum of I_1 and I_2, we obtain:

2* integrate [0.53854713854]x x,[3, 5]

Definite integral:

$$2 \int_3^5 0.53854713854 \, x^2 \, dx = 35.1851$$

35.1851

And:

((((((2* integrate [0.53854713854]x x,[3, 5]))))))^1/7

Input interpretation:

$$\sqrt[7]{2\int_3^5 0.53854713854\, x\, x\, dx}$$

Result:

1.66306170311

1.66306170311 is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3$ = 1164,2696 i.e. 1,65578...

Computation result:

$$\sqrt[7]{2\int_3^5 0.53854713854\, x\, x\, dx} = 1.66306$$

8/10^3+((((((2* integrate [0.53854713854]x x,[3, 5]))))))^1/7

Input interpretation:

$$\frac{8}{10^3} + \sqrt[7]{2\int_3^5 0.53854713854\, x\, x\, dx}$$

Result:

1.67106170311

1.67106170311

We note that 1.67106170311 is a result practically equal to the value of the formula:

$m_{p'} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

Computation result:

$$\frac{8}{10^3} + \sqrt[7]{2\int_3^5 0.53854713854\, x\, x\, dx} = 1.67106$$

-(21/10^3-3/10^3)+((((((2* integrate [0.53854713854]x x,[3, 5]))))))^1/7

Input interpretation:

$$-\left(\frac{21}{10^3}-\frac{3}{10^3}\right)+\sqrt[7]{2\times\int_3^5 0.53854713854\,x\,x\,dx}$$

Result:

1.64506170311

1.64506170311 ≈ ζ(2) = $\frac{\pi^2}{6} = 1.644934$ ...

Computation result:

$$-\left(\frac{21}{10^3}-\frac{3}{10^3}\right)+\sqrt[7]{2\times\int_3^5 0.53854713854\,x\,x\,dx} = 1.64506$$

-(34/10^3+8/10^3+3/10^3)+((((((2* integrate [0.53854713854]x x,[3, 5]))))))^1/7

Input interpretation:

$$-\left(\frac{34}{10^3}+\frac{8}{10^3}+\frac{3}{10^3}\right)+\sqrt[7]{2\int_3^5 0.53854713854\,x\,x\,dx}$$

Result:

1.61806170311

1.61806170311

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

Computation result:

$$-\left(\frac{34}{10^3}+\frac{8}{10^3}+\frac{3}{10^3}\right)+\sqrt[7]{2\int_3^5 0.53854713854\,x\,x\,dx} = 1.61806$$

D-BRANES (Dirichlet boundary conditions)

From:

STRING THEORY VOLUME II - Superstring Theory and Beyond

JOSEPH POLCHINSKI
Institute for Theoretical Physics - University of California at Santa Barbara

We have that:

The scattering amplitudes of closed strings from the D-brane are invariant only under these 16 supersymmetries.

To see the significance of this, consider first the conservation of momentum. There is a nonzero amplitude for a closed string to reflect backwards from the D-brane, which clearly does not conserve momentum in the direction orthogonal to the D-brane. This occurs because the Dirichlet boundary conditions explicitly break translational invariance. However,

from the spacetime point of view the breaking is spontaneous: we are expanding around a D-brane in some definite location, but there are degenerate states with the D-brane translated by any amount.[1] For a spontaneously broken symmetry the consequences are more subtle than for an unbroken symmetry: the apparent violation of the conservation law is related to the amplitude to emit a long-wavelength Goldstone boson. For the D-brane, as for any extended object, the Goldstone bosons are the collective coordinates for its motion. In fact, the nonconservation of momentum is measured by the integral of the corresponding current over the world-sheet boundary,

$$\frac{1}{2\pi\alpha'}\int_{\partial M} ds\, \partial_n X'^9 \ , \tag{13.2.3}$$

which up to normalization is just the (0 picture) vertex operator for the collective coordinate, with zero momentum in the Neumann directions.

We conclude by analogy that the D-brane also spontaneously breaks 16 of the 32 spacetime supersymmetries, the ones that are explicitly broken by the open string boundary conditions. The integrals

$$\int_{\partial M} ds\, \mathscr{V}'_\alpha = -\int_{\partial M} ds\, (\beta^9 \tilde{\mathscr{V}}')_\alpha \ , \tag{13.2.4}$$

which measure the breaking of supersymmetry, are just the vertex operators for the fermionic open string state (13.2.1). Thus this state is a *goldstino*, the Goldstone state associated with spontaneously broken supersymmetry.

We observe the following possible mathematical connection, between the following integrals concerning the Dirichlet series and the integrals of the eq. (13.2.4):

$$I_1 = \int_t^{t+h} |Z(u)|\, du, \qquad I_2 = \left| \int_t^{t+h} Z(u)\, du \right|.$$

$$\int_{\partial M} ds\, \mathcal{V}'_\alpha = - \int_{\partial M} ds\, (\beta^9 \tilde{\mathcal{V}}')_\alpha \ ,$$

From the sum of I_1 and I_2, we obtain:

$$\int_t^{t+h} |Z(u)| du + \int_t^{t+h} |Z(u)| du = 35.1851$$

Thence:

$$\int_t^{t+h} |Z(u)| du = 35.1851 - \int_t^{t+h} |Z(u)| du$$

But:

$$\int_t^{t+h} |Z(u)| du = 17.592539859$$

Thence:

$$\int_t^{t+h} |Z(u)| du = 35.1851 - 17.592539859 = 17.592560141$$

This is a possible solution to the eq. (13.2.4). Dividing by 48, i.e. 32 + 16, that are the spacetime supersymmetries, we obtain:

sqrt(((((((48/((((((-17.592539859+[((((((2* integrate [0.53854713854]x x,[3, 5]))))))])))))))))))))

Input interpretation:

$$\sqrt{\frac{48}{-17.592539859 + 2 \times \int_3^5 0.53854713854\, x\, x\, dx}}$$

Result:

1.6517957595

1.6517957595 is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3$ = 1164,2696 i.e. 1,65578...

Computation result:

$$\sqrt{\frac{48}{-17.592539859 + 2 \int_3^5 0.53854713854\, x\, x\, dx}} = 1.6518$$

and:

2sqrt((((((((6*sqrt((((((((48/((((((-17.592539859+[((((((2* integrate [0.53854713854]x x,[3, 5]))))))])))))))))))))))))))))))

Input interpretation:

$$2\sqrt{6\sqrt{\frac{48}{-17.592539859 + 2 \int_3^5 0.53854713854\, x\, x\, dx}}}$$

Result:

6.2962765368

Computation result:

$$2\sqrt{6\sqrt{\frac{48}{-17.592539859 + 2 \times \int_3^5 0.53854713854\, x\, x\, dx}}} = 6.29628$$

6.2962765368 ≈ $2\pi r$, where r :

Input interpretation:

$$2\sqrt{6\sqrt{\frac{48}{-17.592539859+2\times\int_3^5 0.53854713854\,x\,x\,dx}}\times\frac{1}{2\pi}}$$

Result:

1.00208353390

1.00208353390

Possible closed form:

$$\sqrt{\frac{1}{13}(-162+5e+60\pi-13\log(8))}\approx 1.00208353389882$$

We have that:

1/1.00208353390

Input interpretation:

$$\frac{1}{1.00208353390}$$

Result:

0.997920798187461365689645327082047964983530800635182455820...

0.99792079818…

Note that, this result is an excellent approximation to the result of the following wonderful Ramanujan formula, that link π, e and ϕ:

$$\frac{1}{1+\frac{e^{-2\pi}}{1+\frac{e^{-4\pi}}{1+\frac{e^{-6\pi}}{1+\frac{e^{-8\pi}}{1+\frac{e^{-10\pi}}{\ddots}}}}}}=\left(\sqrt{\frac{5+\sqrt{5}}{2}}-\frac{1+\sqrt{5}}{2}\right)e^{2\pi/5}$$

0.9981360445985093321500244590470747353113829947630439821 85... =

0.9981360445985093321500244590470747353113829947630439821 85... ≈

$\approx 0.99792079818746136568964532708204796498353080063518245582 0\ldots$

In conclusion, we obtain:

$$\int_{\partial M} ds\, \mathscr{V}'_{\alpha} = -\int_{\partial M} ds\, (\beta^9 \tilde{\mathscr{V}}')_{\alpha} \,, \qquad \Rightarrow$$

$$\Rightarrow \int_t^{t+h} |Z(u)|du = 35.1851 - \int_t^{t+h} |Z(u)|du$$

$$\int_t^{t+h} |Z(u)|du = 35.1851 - 17.592539859 = 17.592560141$$

From the result, dividing by 48 and computing the square root, we obtain:

$$\sqrt{48/\int_t^{t+h} |Z(u)|du = 48/\left(35.1851 - \int_t^{t+h} |Z(u)|du\right)} = 1.6517957595 \Rightarrow$$

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

We note that, the result 1,65179... is practically equal to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164{,}2696$ i.e. 1,65578...

We also obtain:

21/10^3+sqrt((((((((48/((((((-17.592539859+[((((((2* integrate [0.53854713854]x x,[3, 5]))))))])))))))))))))

Input interpretation:

$$\frac{21}{10^3} + \sqrt{\frac{48}{-17.592539859 + 2 \times \int_3^5 0.53854713854\, x\, x\, dx}}$$

Result:

1.6727957595

1.6727957595 result very near to the proton mass

Computation result:

$$\frac{21}{10^3} + \sqrt{\frac{48}{-17.592539859 + 2 \times \int_3^5 0.53854713854\, x\, x\, dx}} = 1.6728$$

and:

[(((-34-8-5-2))/10^3)]+sqrt((((((((48/((((((-17.592539859+[((((((2* integrate [0.53854713854]x x,[3, 5]))))))])))))))))))))

Input interpretation:

$$\frac{-34 - 8 - 5 - 2}{10^3} + \sqrt{\frac{48}{-17.592539859 + 2 \times \int_3^5 0.53854713854\, x\, x\, dx}}$$

Result:

1.6027957595

1.6027957595 result very near to the value of elementary charge (positron)

Computation result:

$$\frac{-34 - 8 - 5 - 2}{10^3} + \sqrt{\frac{48}{-17.592539859 + 2 \times \int_3^5 0.53854713854\, x\, x\, dx}} = 1.6028$$

Conclusion

We can conclude by saying that there is a strong connection between the equations concerning the Dirichlet boundary conditions of the D-branes and the equations inherent to the Dirichlet series of the A. A. Karatsuba's paper. Furthermore, we obtain: a) class invariant solutions, b) a circumference of radius 1.00208353390, whose reciprocal provides a value very close to that of the wonderful Ramanujan formula, that link π, e and ϕ, c) the values without exponent of the proton mass and of the elementary charge. We note that both the elementary charge and the class invariant type solution and the proton mass belong to the golden ratio range. It is possible to hypothesize, at least from the mathematical point of view, that the D-branes are circles of almost unitary radius, as they are subject to vibrations that slightly alter their shape, and are of the fermionic type

From:

A. A. Karatsuba, **Euler and Number Theory**, Sovrem.
Probl. Mat., 2008, Issue 11, 19–37
DOI: https://doi.org/10.4213/spm21

$N = 21$, $p_1 = 3$ $p_2 = 5$ $p_3 = 13$

$\alpha = 1 - 0.00003$ (Хохайзель, 1930 г.) $\alpha = 1 - 0.004$ (Хейльбронн, 1933 г.) $\alpha = 1 - 0.25$ (Чудаков, 1936 г.) $\alpha = 1 - \frac{3}{8}$ (Ингам, 1937 г.) $\alpha = 1 - \frac{2}{5}$ (Монтгомери, 1969 г.) $\alpha = 1 - \frac{5}{12}$ (Хаксли, 1972 г.).

$$p_1 + p_2 + p_3 = N. \qquad (15)$$

$$\sigma(N) > 1,$$

$$I(N) \sim \frac{N^2}{2(\ln N)^3}\,\sigma(N),$$

$$I(N) = \int_0^1 T^3(\alpha)\,e^{-2\pi i\alpha N}\,d\alpha,$$
$$T(\alpha) = \sum_{p\leqslant N} e^{2\pi i\alpha p}.$$

((((21^2*2))) / ((((2(ln21)^3))))

Input:

$$\frac{21^2 \times 2}{2 \log^3(21)}$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{441}{\log^3(21)}$$

Decimal approximation:

15.62719574714896294408343576998644036034904541127061744027...

15.6271957…

Property:

$\frac{441}{\log^3(21)}$ is a transcendental number

- **Alternate form:**

$$\frac{441}{(\log(3) + \log(7))^3}$$

Alternative representations:

$$\frac{21^2 \times 2}{2 \log^3(21)} = \frac{2 \times 21^2}{2 \log_e^3(21)}$$

- $$\frac{21^2 \times 2}{2 \log^3(21)} = \frac{2 \times 21^2}{2 (\log(a) \log_a(21))^3}$$

- $$\frac{21^2 \times 2}{2 \log^3(21)} = \frac{2 \times 21^2}{2 (-\text{Li}_1(-20))^3}$$

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

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations:

$$\frac{21^2 \times 2}{2 \log^3(21)} = \frac{441}{\left(\log(20) - \sum_{k=1}^{\infty} \frac{\left(-\frac{1}{20}\right)^k}{k}\right)^3}$$

- $$\frac{21^2 \times 2}{2 \log^3(21)} = \frac{441}{\left(2 i \pi \left\lfloor \frac{\arg(21-x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (21-x)^k x^{-k}}{k}\right)^3} \quad \text{for } x < 0$$

- $$\frac{21^2 \times 2}{2 \log^3(21)} = \frac{441}{\left(\log(z_0) + \left\lfloor \frac{\arg(21-z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k (21-z_0)^k z_0^{-k}}{k}\right)^3}$$

$\arg(z)$ is the complex argument

$\lfloor x \rfloor$ is the floor function

Integral representations:

$$\frac{21^2 \times 2}{2 \log^3(21)} = \frac{441}{\left(\int_1^{21} \frac{1}{t} \, dt\right)^3}$$

- $$\frac{21^2 \times 2}{2 \log^3(21)} = -\frac{3528 i \pi^3}{\left(\int_{-i \infty+\gamma}^{i \infty+\gamma} \frac{20^{-s} \Gamma(-s)^2 \Gamma(1+s)}{\Gamma(1-s)} \, ds\right)^3} \quad \text{for } -1 < \gamma < 0$$

$\Gamma(x)$ is the gamma function

1/(3Pi) ((((21^2*2))) / ((((2(ln21)^3))))

Input:

$$\frac{1}{3\pi} \times \frac{21^2 \times 2}{2 \log^3(21)}$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{147}{\pi \log^3(21)}$$

Decimal approximation:

1.658096966548934673456691819261555085659590816762242191423...

1.65809696…. is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3$ = 1164,2696 i.e. 1,65578...

Alternate form:

$$\frac{147}{\pi (\log(3) + \log(7))^3}$$

Alternative representations:

$$\frac{21^2 \times 2}{(2 \log^3(21))(3 \pi)} = \frac{2 \times 21^2}{(3 \pi)(2 \log_e^3(21))}$$

- $$\frac{21^2 \times 2}{(2 \log^3(21))(3 \pi)} = \frac{2 \times 21^2}{(3 \pi)(2 (\log(a) \log_a(21))^3)}$$

- $$\frac{21^2 \times 2}{(2 \log^3(21))(3 \pi)} = \frac{2 \times 21^2}{(3 \pi)(2 (-\mathrm{Li}_1(-20))^3)}$$

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

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations:

$$\frac{21^2 \times 2}{(2 \log^3(21))(3 \pi)} = \frac{147}{\pi \left(\log(20) - \sum_{k=1}^{\infty} \frac{\left(-\frac{1}{20}\right)^k}{k}\right)^3}$$

- $$\frac{21^2 \times 2}{(2\log^3(21))(3\pi)} = \frac{147}{\pi\left(2 i \pi \left\lfloor \frac{\arg(21-x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (21-x)^k x^{-k}}{k}\right)^3} \quad \text{for } x < 0$$

- $$\frac{21^2 \times 2}{(2\log^3(21))(3\pi)} = \frac{147}{\pi\left(\log(z_0) + \left\lfloor \frac{\arg(21-z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k (21-z_0)^k z_0^{-k}}{k}\right)^3}$$

$\arg(z)$ is the complex argument

$\lfloor x \rfloor$ is the floor function

Integral representations:

$$\frac{21^2 \times 2}{(2\log^3(21))(3\pi)} = \frac{147}{\pi\left(\int_1^{21} \frac{1}{t}\, dt\right)^3}$$

- $$\frac{21^2 \times 2}{(2\log^3(21))(3\pi)} = -\frac{1176\, i\, \pi^2}{\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{20^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\, ds\right)^3} \quad \text{for } -1 < \gamma < 0$$

$\Gamma(x)$ is the gamma function

13/10^3+1/(3Pi) ((((21^2*2))) / ((((2(ln21)^3))))

Input:

$$\frac{13}{10^3} + \frac{1}{3\pi} \times \frac{21^2 \times 2}{2\log^3(21)}$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{13}{1000} + \frac{147}{\pi \log^3(21)}$$

Decimal approximation:

1.6710969665489346734566918192615550856595908167622421914 23...

1.67109696…

We note that 1.67109696... is a result practically equal to the value of the formula:

$m_{p'} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

Alternate forms:

$$\frac{147000 + 13\pi \log^3(21)}{1000\pi \log^3(21)}$$

- $$\frac{147000 + 13\pi (\log(3) + \log(7))^3}{1000\pi (\log(3) + \log(7))^3}$$

$$\frac{13}{1000} + \frac{147}{\pi (\log(3) + \log(7))^3}$$

Alternative representations:

$$\frac{13}{10^3} + \frac{21^2 \times 2}{(2\log^3(21))(3\pi)} = \frac{13}{10^3} + \frac{2 \times 21^2}{(3\pi)(2\log_e^3(21))}$$

- $$\frac{13}{10^3} + \frac{21^2 \times 2}{(2\log^3(21))(3\pi)} = \frac{13}{10^3} + \frac{2 \times 21^2}{(3\pi)(2(\log(a)\log_a(21))^3)}$$

- $$\frac{13}{10^3} + \frac{21^2 \times 2}{(2\log^3(21))(3\pi)} = \frac{13}{10^3} + \frac{2 \times 21^2}{(3\pi)(2(-\text{Li}_1(-20))^3)}$$

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

$\text{Li}_n(x)$ is the polylogarithm function

Series representations:

$$\frac{13}{10^3}+\frac{21^2\times 2}{(2\log^3(21))(3\pi)}=\frac{13}{1000}+\frac{147}{\pi\left(\log(20)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{20}\right)^k}{k}\right)^3}$$

- $$\frac{13}{10^3}+\frac{21^2\times 2}{(2\log^3(21))(3\pi)}=\frac{13}{1000}+\frac{147}{\pi\left(2\,i\,\pi\left\lfloor\frac{\arg(21-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(21-x)^k x^{-k}}{k}\right)^3}\quad\text{for } x<0$$

- $$\frac{13}{10^3}+\frac{21^2\times 2}{(2\log^3(21))(3\pi)}=\frac{13}{1000}+\frac{147}{\pi\left(\log(z_0)+\left\lfloor\frac{\arg(21-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(21-z_0)^k z_0^{-k}}{k}\right)^3}$$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

Integral representations:

$$\frac{13}{10^3}+\frac{21^2\times 2}{(2\log^3(21))(3\pi)}=\frac{13}{1000}+\frac{147}{\pi\left(\int_1^{21}\frac{1}{t}\,dt\right)^3}$$

- $$\frac{13}{10^3}+\frac{21^2\times 2}{(2\log^3(21))(3\pi)}=\frac{13}{1000}-\frac{1176\,i\,\pi^2}{\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{20^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^3}\quad\text{for } -1<\gamma<0$$

$\Gamma(x)$ is the gamma function

-(13/10^3+1/10^3)+ 1/(3Pi) ((((21^2*2))) / ((((2(ln21)^3))))

Input:

$$-\left(\frac{13}{10^3}+\frac{1}{10^3}\right)+\frac{1}{3\pi}\times\frac{21^2\times 2}{2\log^3(21)}$$

log(x) is the natural logarithm

Exact result:

$$\frac{147}{\pi\log^3(21)}-\frac{7}{500}$$

Decimal approximation:

1.644096966548934673456691819261555085659590816762242191423...

$1.64409696 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

Alternate forms:

$$-\frac{7\left(\pi\log^3(21)-10\,500\right)}{500\,\pi\log^3(21)}$$

- $$\frac{7\left(10\,500-\pi\left(\log(3)+\log(7)\right)^3\right)}{500\,\pi\left(\log(3)+\log(7)\right)^3}$$

$$\frac{147}{\pi\left(\log(3)+\log(7)\right)^3}-\frac{7}{500}$$

Alternative representations:

$$-\left(\frac{13}{10^3}+\frac{1}{10^3}\right)+\frac{21^2\times 2}{\left(2\log^3(21)\right)(3\pi)}=-\frac{14}{10^3}+\frac{2\times 21^2}{(3\pi)\left(2\log_e^3(21)\right)}$$

- $$-\left(\frac{13}{10^3}+\frac{1}{10^3}\right)+\frac{21^2\times 2}{\left(2\log^3(21)\right)(3\pi)}=-\frac{14}{10^3}+\frac{2\times 21^2}{(3\pi)\left(2\left(\log(a)\log_a(21)\right)^3\right)}$$

- $$-\left(\frac{13}{10^3}+\frac{1}{10^3}\right)+\frac{21^2\times 2}{\left(2\log^3(21)\right)(3\pi)}=-\frac{14}{10^3}+\frac{2\times 21^2}{(3\pi)\left(2\left(-\text{Li}_1(-20)\right)^3\right)}$$

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

$\text{Li}_n(x)$ is the polylogarithm function

Series representations:

$$-\left(\frac{13}{10^3}+\frac{1}{10^3}\right)+\frac{21^2\times 2}{(2\log^3(21))(3\pi)}=-\frac{7}{500}+\frac{147}{\pi\left(\log(20)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{20}\right)^k}{k}\right)^3}$$

- $$-\left(\frac{13}{10^3}+\frac{1}{10^3}\right)+\frac{21^2\times 2}{(2\log^3(21))(3\pi)}=-\frac{7}{500}+\frac{147}{\pi\left(2i\pi\left\lfloor\frac{\arg(21-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(21-x)^k x^{-k}}{k}\right)^3}\quad\text{for } x<0$$

- $$-\left(\frac{13}{10^3}+\frac{1}{10^3}\right)+\frac{21^2\times 2}{(2\log^3(21))(3\pi)}=-\frac{7}{500}+\frac{147}{\pi\left(\log(z_0)+\left\lfloor\frac{\arg(21-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(21-z_0)^k z_0^{-k}}{k}\right)^3}$$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

Integral representations:

$$-\left(\frac{13}{10^3}+\frac{1}{10^3}\right)+\frac{21^2\times 2}{(2\log^3(21))(3\pi)}=-\frac{7}{500}+\frac{147}{\pi\left(\int_1^{21}\frac{1}{t}\,dt\right)^3}$$

- $$-\left(\frac{13}{10^3}+\frac{1}{10^3}\right)+\frac{21^2\times 2}{(2\log^3(21))(3\pi)}=-\frac{7}{500}-\frac{1176\,i\pi^2}{\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{20^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^3}\quad\text{for } -1<\gamma<0$$

$\Gamma(x)$ is the gamma function

-(34/10^3+5/10^3+1/10^3)+ 1/(3Pi) ((((21^2*2))) / ((((2(ln21)^3))))

Input:

$$-\left(\frac{34}{10^3}+\frac{5}{10^3}+\frac{1}{10^3}\right)+\frac{1}{3\pi}\times\frac{21^2\times 2}{2\log^3(21)}$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{147}{\pi\log^3(21)}-\frac{1}{25}$$

Decimal approximation:

1.618096966548934673456691819261555085659590816762242191423...

1.61809696…

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

Alternate forms:

$$-\frac{\pi\log^3(21)-3675}{25\pi\log^3(21)}$$

- $$\frac{3675-\pi(\log(3)+\log(7))^3}{25\pi(\log(3)+\log(7))^3}$$

$$\frac{147}{\pi(\log(3)+\log(7))^3}-\frac{1}{25}$$

Alternative representations:

$$-\left(\frac{34}{10^3}+\frac{5}{10^3}+\frac{1}{10^3}\right)+\frac{21^2\times 2}{(2\log^3(21))(3\pi)}=-\frac{40}{10^3}+\frac{2\times 21^2}{(3\pi)(2\log_e^3(21))}$$

- $$-\left(\frac{34}{10^3}+\frac{5}{10^3}+\frac{1}{10^3}\right)+\frac{21^2\times 2}{(2\log^3(21))(3\pi)}=-\frac{40}{10^3}+\frac{2\times 21^2}{(3\pi)(2(\log(a)\log_a(21))^3)}$$

- $$-\left(\frac{34}{10^3}+\frac{5}{10^3}+\frac{1}{10^3}\right)+\frac{21^2\times 2}{(2\log^3(21))(3\pi)}=-\frac{40}{10^3}+\frac{2\times 21^2}{(3\pi)(2(-\text{Li}_1(-20))^3)}$$

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

$\text{Li}_n(x)$ is the polylogarithm function

Series representations:

$$-\left(\frac{34}{10^3}+\frac{5}{10^3}+\frac{1}{10^3}\right)+\frac{21^2\times 2}{(2\log^3(21))(3\pi)} = -\frac{1}{25}+\frac{147}{\pi\left(\log(20)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{20}\right)^k}{k}\right)^3}$$

•

$$-\left(\frac{34}{10^3}+\frac{5}{10^3}+\frac{1}{10^3}\right)+\frac{21^2\times 2}{(2\log^3(21))(3\pi)} = -\frac{1}{25}+\frac{147}{\pi\left(2i\pi\left\lfloor\frac{\arg(21-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(21-x)^k x^{-k}}{k}\right)^3} \quad \text{for } x<0$$

•

$$-\left(\frac{34}{10^3}+\frac{5}{10^3}+\frac{1}{10^3}\right)+\frac{21^2\times 2}{(2\log^3(21))(3\pi)} = -\frac{1}{25}+\frac{147}{\pi\left(\log(z_0)+\left\lfloor\frac{\arg(21-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(21-z_0)^k z_0^{-k}}{k}\right)^3}$$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

Integral representations:

$$-\left(\frac{34}{10^3}+\frac{5}{10^3}+\frac{1}{10^3}\right)+\frac{21^2\times 2}{(2\log^3(21))(3\pi)} = -\frac{1}{25}+\frac{147}{\pi\left(\int_1^{21}\frac{1}{t}\,dt\right)^3}$$

•

$$-\left(\frac{34}{10^3}+\frac{5}{10^3}+\frac{1}{10^3}\right)+\frac{21^2\times 2}{(2\log^3(21))(3\pi)} = -\frac{1}{25}-\frac{1176\,i\,\pi^2}{\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{20^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^3}$$

for $-1<\gamma<0$

$\Gamma(x)$ is the gamma function

As:

$$I(N) \sim \frac{N^2}{2(\ln N)^3}\,\sigma(N),$$ =

= 15.627195747148962944083435769986440360349045411270617440 27...

$$I(N) = \int_0^1 T^3(\alpha)\, e^{-2\pi i\alpha N}\, d\alpha,$$

$$T(\alpha) = \sum_{p\leqslant N} e^{2\pi i\alpha p}.$$

we have also that:

$$I(N) - \frac{1}{2\pi i}\int_{|z|=R<1} \frac{F(z)}{z^{N+1}}\, dz. \qquad (13)$$

Using special transformations, which later served to create the "circular method", Hardy and Ramanujan found the asymptotic behavior of the integral (13) corresponding to f (x) and, thus, found the asymptotic formula for p(n):

$$p(n) = \frac{e^{k\,\lambda_n}}{4\sqrt{3}\,\lambda_n^2}\left(1 + O\left(\frac{1}{\lambda_n}\right)\right),$$

$$k = \pi\sqrt{\frac{2}{3}}, \quad \lambda_n = \sqrt{n - \frac{1}{24}}, \quad n \geqslant 1.$$

With $O = (\pi^2 / 6)^4$ and $n = 1$, we obtain:

e^((((Pi*(2/3)^(1/2)*(1-1/24)^(1/2))))) / ((4sqrt(3) * (1-1/24))) * (1+(Pi^2/(6))^4(1/(1-1/24)^(1/2)))

Input:

$$\frac{e^{\pi\sqrt{2/3}\,\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}\left(1 + \left(\frac{\pi^2}{6}\right)^4 \times \frac{1}{\sqrt{1-\frac{1}{24}}}\right)$$

Exact result:

$$\frac{2}{23}\sqrt{3}\,e^{(\sqrt{23}\,\pi)/6}\left(1+\frac{\pi^8}{108\sqrt{138}}\right)$$

Decimal approximation:

15.730904179584451320769566032042711055541630174251886 29945...

15.7309041795… a result very near to the previous 15.6271957...

We note that 15,627195 + 15,730904 = 31,358099 and 31,358099 ÷ 2 = 15,6790495 that is an excellent approximation to the black hole entropy value 15.6730.
Furthermore, 15.7309041798... is very near to the black hole entropy value 15.8174.
The mean between the two entropies is 15.7452

Alternate forms:

$$\frac{e^{(\sqrt{23}\,\pi)/6}\left(108\sqrt{138}+\pi^8\right)}{1242\sqrt{46}}$$

$$\frac{e^{(\sqrt{23}\,\pi)/6}\left(14\,904+\sqrt{138}\,\pi^8\right)}{57\,132\sqrt{3}}$$

- $$e^{(\sqrt{23}\,\pi)/6}\left(\frac{2\sqrt{3}}{23}+\frac{\pi^8}{1242\sqrt{46}}\right)$$

Series representations:

$$\frac{\left(1+\frac{\left(\frac{\pi^2}{6}\right)^4}{\sqrt{1-\frac{1}{24}}}\right)e^{\pi\sqrt{2/3}\,\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}=\frac{6\,e^{(\sqrt{23}\,\pi)/6}\left(1+\frac{\pi^8}{108\sqrt{138}}\right)}{23\sqrt{2}\,\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}$$

- $$\frac{\left(1+\frac{\left(\frac{\pi^2}{6}\right)^4}{\sqrt{1-\frac{1}{24}}}\right)e^{\pi\sqrt{2/3}\,\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}=\frac{6\,e^{(\sqrt{23}\,\pi)/6}\left(1+\frac{\pi^8}{108\sqrt{138}}\right)}{23\sqrt{2}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}$$

•

$$\frac{\left(1+\frac{\left(\frac{\pi^2}{6}\right)^4}{\sqrt{1-\frac{1}{24}}}\right)e^{\pi\sqrt{2/3}\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)} = \frac{e^{\left(\sqrt{23}\,\pi\right)/6}\left(14\,904+\sqrt{138}\,\pi^8\right)\sqrt{\pi}}{28\,566\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

Now, we have also that:

-288+3+e^((((Pi*(2/3)^(1/2)*(1-1/24)^(1/2))))) / ((4sqrt(3) * (1-1/24))) * (1+(Pi^2/(6))^14(1/(1-1/24)^(1/2)))

Input:

$$-288+3+\frac{e^{\pi\sqrt{2/3}\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}\left(1+\left(\frac{\pi^2}{6}\right)^{14}\times\frac{1}{\sqrt{1-\frac{1}{24}}}\right)$$

Exact result:

$$\frac{2}{23}\sqrt{3}\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6\,530\,347\,008\,\sqrt{138}}\right)-285$$

Decimal approximation:

1729.358638618564572637680114413329991669316638384459714974...

1729.3586386…

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

Alternate forms:

$$-285+\frac{2}{23}\sqrt{3}\, e^{\left(\sqrt{23}\,\pi\right)/6}+\frac{e^{\left(\sqrt{23}\,\pi\right)/6}\,\pi^{28}}{75\,098\,990\,592\,\sqrt{46}}$$

- $$\frac{-984\,547\,766\,661\,120+300\,395\,962\,368\sqrt{3}\, e^{\left(\sqrt{23}\,\pi\right)/6}+\sqrt{46}\, e^{\left(\sqrt{23}\,\pi\right)/6}\,\pi^{28}}{3\,454\,553\,567\,232}$$

- $$\frac{\sqrt{3}\, e^{\left(\sqrt{23}\,\pi\right)/6}\left(6\,530\,347\,008\sqrt{138}+\pi^{28}\right)-21\,403\,212\,318\,720\sqrt{138}}{75\,098\,990\,592\sqrt{138}}$$

Series representations:

$$-288+3+\frac{\left(1+\frac{\left(\frac{\pi^2}{6}\right)^{14}}{\sqrt{1-\frac{1}{24}}}\right)e^{\pi\sqrt{2/3}\,\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}=-285+\frac{6\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6530\,347008\sqrt{138}}\right)}{23\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}$$

- $$-288+3+\frac{\left(1+\frac{\left(\frac{\pi^2}{6}\right)^{14}}{\sqrt{1-\frac{1}{24}}}\right)e^{\pi\sqrt{2/3}\,\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}=-285+\frac{6\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6530\,347008\sqrt{138}}\right)}{23\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}$$

-

$$-288+3+\frac{\left(1+\frac{\left(\frac{\pi^2}{6}\right)^{14}}{\sqrt{1-\frac{1}{24}}}\right)e^{\pi\sqrt{2/3}\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)} =$$

$$-285+\frac{12\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6530347008\sqrt{138}}\right)\sqrt{\pi}}{23\sum_{j=0}^{\infty}\mathrm{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\mathrm{Res}_{z=z_0} f$ is a complex residue

((((((-288+3+e^((((Pi*(2/3)^(1/2)*(1-1/24)^(1/2))))) / ((4sqrt(3) * (1-1/24))) * (1+(Pi^2/(6))^14(1/(1-1/24)^(1/2)))))))))^1/15

Input:

$$\sqrt[15]{-288+3+\frac{e^{\pi\sqrt{2/3}\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}\left(1+\left(\frac{\pi^2}{6}\right)^{14}\times\frac{1}{\sqrt{1-\frac{1}{24}}}\right)}$$

Exact result:

$$\sqrt[15]{\frac{2}{23}\sqrt{3}\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6530347008\sqrt{138}}\right)-285}$$

Decimal approximation:

1.643837957823887142232218981647618542436598049609781269445...

1.6438379578…. ≈ ζ(2) = $\frac{\pi^2}{6} = 1.644934 \ldots$

Alternate forms:

$$\sqrt[15]{e^{\left(\sqrt{23}\,\pi\right)/6}\left(\frac{2\sqrt{3}}{23}+\frac{\pi^{28}}{75\,098\,990\,592\,\sqrt{46}}\right)-285}$$

- $$\frac{\sqrt[15]{\sqrt{3}\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(6\,530\,347\,008\,\sqrt{138}+\pi^{28}\right)-21\,403\,212\,318\,720\,\sqrt{138}}}{2^{23/30}\times 3^{9/10}\,\sqrt[10]{23}}$$

$$\frac{\sqrt[15]{-984\,547\,766\,661\,120+300\,395\,962\,368\,\sqrt{3}\,e^{\left(\sqrt{23}\,\pi\right)/6}+\sqrt{46}\,e^{\left(\sqrt{23}\,\pi\right)/6}\,\pi^{28}}}{2^{4/5}\times 3^{13/15}\times 23^{2/15}}$$

All 15th roots of 2/23 sqrt(3) e^((sqrt(23) π)/6) (1 + π^28/(6530347008 sqrt(138))) - 285:

- Polar form
$$\sqrt[15]{\frac{2}{23}\sqrt{3}\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6\,530\,347\,008\,\sqrt{138}}\right)-285}\;e^{0}\approx 1.6438$$ (real, principal root)

- $$\sqrt[15]{\frac{2}{23}\sqrt{3}\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6\,530\,347\,008\,\sqrt{138}}\right)-285}\;e^{(2 i \pi)/15}\approx 1.5017+0.6686\,i$$

- $$\sqrt[15]{\frac{2}{23}\sqrt{3}\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6\,530\,347\,008\,\sqrt{138}}\right)-285}\;e^{(4 i \pi)/15}\approx 1.0999+1.2216\,i$$

- $$\sqrt[15]{\frac{2}{23}\sqrt{3}\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6\,530\,347\,008\,\sqrt{138}}\right)-285}\;e^{(2 i \pi)/5}\approx 0.5080+1.5634\,i$$

- $$\sqrt[15]{\frac{2}{23}\sqrt{3}\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6\,530\,347\,008\,\sqrt{138}}\right)-285}\;e^{(8 i \pi)/15}\approx -0.1718+1.6348\,i$$

Series representations:

$$\sqrt[15]{-288+3+\frac{\left(1+\frac{\left(\frac{\pi^2}{6}\right)^{14}}{\sqrt{1-\frac{1}{24}}}\right)e^{\pi\sqrt{2/3}\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}} = \sqrt[15]{-285+\frac{6\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6530347008\sqrt{138}}\right)}{23\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}}$$

- $$\sqrt[15]{-288+3+\frac{\left(1+\frac{\left(\frac{\pi^2}{6}\right)^{14}}{\sqrt{1-\frac{1}{24}}}\right)e^{\pi\sqrt{2/3}\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}} = \sqrt[15]{-285+\frac{6\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6530347008\sqrt{138}}\right)}{23\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}}$$

- $$\sqrt[15]{-288+3+\frac{\left(1+\frac{\left(\frac{\pi^2}{6}\right)^{14}}{\sqrt{1-\frac{1}{24}}}\right)e^{\pi\sqrt{2/3}\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}} = \sqrt[15]{-285+\frac{12\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6530347008\sqrt{138}}\right)\sqrt{\pi}}{23\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

Integral representation:

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,ds}{(2\,\pi\,i)\,\Gamma(-a)} \quad \text{for } (0 < \gamma < -\text{Re}(a) \text{ and } |\arg(z)| < \pi)$$

$\text{Re}(z)$ is the real part of z

$\arg(z)$ is the complex argument

$|z|$ is the absolute value of z

i is the imaginary unit

(((21+5+2)/10^3))+((((((-288+3+e^((((Pi*(2/3)^(1/2)*(1-1/24)^(1/2))))) / ((4sqrt(3) * (1-1/24))) * (1+(Pi^2/(6))^14(1/(1-1/24)^(1/2)))))))))^1/15

Input:

$$\frac{21+5+2}{10^3} + \sqrt[15]{-288+3+\frac{e^{\pi\sqrt{2/3}\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}\left(1+\left(\frac{\pi^2}{6}\right)^{14}\times\frac{1}{\sqrt{1-\frac{1}{24}}}\right)}$$

Exact result:

$$\frac{7}{250}+\sqrt[15]{\frac{2}{23}\sqrt{3}\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6\,530\,347\,008\,\sqrt{138}}\right)-285}$$

Decimal approximation:

1.671837957823887142232218981647618542436598049609781269445...

1.6718379578…

We note that 1.6718379578... is a result practically equal to the value of the formula:

$m_{p\prime} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

Alternate forms:

$$\frac{7}{250}+\sqrt[15]{e^{\left(\sqrt{23}\,\pi\right)/6}\left(\frac{2\sqrt{3}}{23}+\frac{\pi^{28}}{75\,098\,990\,592\sqrt{46}}\right)-285}$$

- $$\frac{7}{250}+\frac{\sqrt[15]{\sqrt{3}\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(6\,530\,347\,008\sqrt{138}+\pi^{28}\right)-21\,403\,212\,318\,720\sqrt{138}}}{2^{23/30}\times 3^{9/10}\sqrt[10]{23}}$$

$$\frac{1}{17\,250}\left(483+125\sqrt[5]{2}\;3^{2/15}\times 23^{13/15}\sqrt[15]{-984\,547\,766\,661\,120+300\,395\,962\,368\sqrt{3}\,e^{\left(\sqrt{23}\,\pi\right)/6}+\sqrt{46}\,e^{\left(\sqrt{23}\,\pi\right)/6}\,\pi^{28}}\right)$$

Series representations:

$$\frac{21+5+2}{10^3}+\sqrt[15]{-288+3+\frac{\left(1+\frac{\left(\frac{\pi^2}{6}\right)^{14}}{\sqrt{1-\frac{1}{24}}}\right)e^{\pi\sqrt{2/3}\,\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}}=\frac{7}{250}+\sqrt[15]{-285+\frac{6\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6530\,347008\sqrt{138}}\right)}{23\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}}$$

- $$\frac{21+5+2}{10^3}+\sqrt[15]{-288+3+\frac{\left(1+\frac{\left(\frac{\pi^2}{6}\right)^{14}}{\sqrt{1-\frac{1}{24}}}\right)e^{\pi\sqrt{2/3}\,\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}}=\frac{7}{250}+\sqrt[15]{-285+\frac{6\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6530\,347008\sqrt{138}}\right)}{23\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}}$$

-

$$\frac{21+5+2}{10^3}+\sqrt[15]{-288+3+\frac{\left(1+\frac{\left(\frac{\pi^2}{6}\right)^{14}}{\sqrt{1-\frac{1}{24}}}\right)e^{\pi\sqrt{2/3}\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}} =$$

$$\frac{7}{250}+\sqrt[15]{-285+\frac{12\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6530347008\sqrt{138}}\right)\sqrt{\pi}}{23\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

And, in conclusion:

(((-21-4)/10^3))+((((((-288+3+e^((((Pi*(2/3)^(1/2)*(1-1/24)^(1/2))))) / ((4sqrt(3) * (1-1/24))) * (1+(Pi^2/(6))^14(1/(1-1/24)^(1/2)))))))))^1/15

Input:

$$\frac{-21-4}{10^3}+\sqrt[15]{-288+3+\frac{e^{\pi\sqrt{2/3}\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}\left(1+\left(\frac{\pi^2}{6}\right)^{14}\times\frac{1}{\sqrt{1-\frac{1}{24}}}\right)}$$

Exact result:

$$\sqrt[15]{\frac{2}{23}\sqrt{3}\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6530347008\sqrt{138}}\right)-285}-\frac{1}{40}$$

Decimal approximation:

1.618837957823887142232218981647618542436598049609781269445...

1.6188379578….

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

Alternate forms:

$$\sqrt[15]{e^{\left(\sqrt{23}\,\pi\right)/6}\left(\frac{2\sqrt{3}}{23}+\frac{\pi^{28}}{75\,098\,990\,592\sqrt{46}}\right)-285}-\frac{1}{40}$$

-

$$\frac{\sqrt[15]{\sqrt{3}\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(6\,530\,347\,008\sqrt{138}+\pi^{28}\right)-21\,403\,212\,318\,720\sqrt{138}}}{2^{23/30}\times 3^{9/10}\sqrt[10]{23}}-\frac{1}{40}$$

$$\frac{1}{2760}\left(20\sqrt[5]{2}\;3^{2/15}\times 23^{13/15}\sqrt[15]{-984\,547\,766\,661\,120+300\,395\,962\,368\sqrt{3}\,e^{\left(\sqrt{23}\,\pi\right)/6}+\sqrt{46}\,e^{\left(\sqrt{23}\,\pi\right)/6}\pi^{28}}-69\right)$$

Series representations:

$$\frac{-21-4}{10^3}+\sqrt[15]{-288+3+\frac{\left(1+\frac{\left(\frac{\pi^2}{6}\right)^{14}}{\sqrt{1-\frac{1}{24}}}\right)e^{\pi\sqrt{2/3}\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}}=-\frac{1}{40}+\sqrt[15]{-285+\frac{6\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6530\,347008\sqrt{138}}\right)}{23\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}}$$

$$\frac{-21-4}{10^3}+\sqrt[15]{-288+3+\frac{\left(1+\frac{\left(\frac{\pi^2}{6}\right)^{14}}{\sqrt{1-\frac{1}{24}}}\right)e^{\pi\sqrt{2/3}\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}} = -\frac{1}{40}+\sqrt[15]{-285+\frac{6\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6530\,347008\,\sqrt{138}}\right)}{23\sqrt{2}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}}$$

- $$\frac{-21-4}{10^3}+\sqrt[15]{-288+3+\frac{\left(1+\frac{\left(\frac{\pi^2}{6}\right)^{14}}{\sqrt{1-\frac{1}{24}}}\right)e^{\pi\sqrt{2/3}\sqrt{1-1/24}}}{4\sqrt{3}\left(1-\frac{1}{24}\right)}} = -\frac{1}{40}+\sqrt[15]{-285+\frac{12\,e^{\left(\sqrt{23}\,\pi\right)/6}\left(1+\frac{\pi^{28}}{6530\,347008\,\sqrt{138}}\right)\sqrt{\pi}}{23\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

Inserting the value of the entropy 15.7309041795 in the Hawking radiation calculator, we obtain the mass, the radius and the temperature:

Mass = 3.695563e-8

Radius = 5.487362e-35

Temperature = 3.320748e+30

From the Ramanujan-Nardelli mock formula, we obtain:

sqrt[[[[1/(((((((4*1.962364415e+19)/(5*0.0864055^2)))*1/(3.695563e-8)* sqrt[[-((((3.320748e+30 * 4*Pi*(5.487362e-35)^3-(5.487362e-35)^2))))) / ((6.67*10^-11))]]]]]

Input interpretation:

$$\sqrt{\left(1/\left(\frac{4\times 1.962364415\times 10^{19}}{5\times 0.0864055^2}\times\frac{1}{3.695563\times 10^{-8}}\sqrt{-\frac{3.320748\times 10^{30}\times 4\,\pi\,(5.487362\times 10^{-35})^3-(5.487362\times 10^{-35})^2}{6.67\times 10^{-11}}}\right)\right)}$$

Result:

1.618249292694184034104092724032297083348105028254480058182...

1.618249292….

$$\frac{1}{1+\frac{e^{-2\pi}}{1+\frac{e^{-4\pi}}{1+\frac{e^{-6\pi}}{1+\ddots}}}}=\left(\sqrt{\frac{5+\sqrt{5}}{2}}-\frac{\sqrt{5}+1}{2}\right)e^{\frac{2\pi}{5}}$$

https://twitter.com/pickover/status/1038963785984294913

$$R(e^{-2\pi\sqrt{5}})=\frac{\sqrt{5}}{1+\sqrt[5]{5^{3/4}\left(\frac{\sqrt{5}-1}{2}\right)^{5/2}-1}}-\frac{\sqrt{5}+1}{2},$$

http://www.bitman.name/math/article/102/109/

$$\frac{e^{-\frac{2\pi}{5}}}{\sqrt{\varphi\sqrt{5}-\varphi}}=1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-4\pi}}{1+\cfrac{e^{-6\pi}}{1+\cfrac{e^{-8\pi}}{1+\dots}}}}\approx 1.0018674362$$

ζ(9.1035) = 1.001867109 ≈ 1.0018674362…

$$\frac{e^{-\frac{2\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{(\varphi-1)^5\sqrt[4]{5^3}}-1}}-\varphi}=1+\cfrac{e^{-2\pi\sqrt{5}}}{1+\cfrac{e^{-4\pi\sqrt{5}}}{1+\cfrac{e^{-6\pi\sqrt{5}}}{1+\cfrac{e^{-8\pi\sqrt{5}}}{1+\dots}}}}\approx 1.0000007913$$

(b)

1/1.0000007913 = 0,9999992087006… ≈ $\Gamma\left(-\frac{5}{2.0345}\right)$ = 0.99912062559…

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

(a)

1/0.9568666373 = 1,04507771618… ≈ ζ(4.745) = 1.04505062…

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

1/0.9991104684 = 1,00089032357 ≈ ζ(10.158) = 1.00089035…

$$\frac{1}{1+}\,\frac{e^{-2\pi}}{1+}\,\frac{e^{-4\pi}}{1+\dots} = \left\{\sqrt{\left(\frac{5+\sqrt{5}}{2}\right)} - \frac{\sqrt{5}+1}{2}\right\} e^{\frac{2}{5}\pi}.$$

$$\frac{1}{1+}\,\frac{e^{-2\pi\sqrt{5}}}{1+}\,\frac{e^{-4\pi\sqrt{5}}}{1+\dots} = \left[\frac{\sqrt{5}}{1+\sqrt[5]{\left\{5^{3/4}\left(\frac{\sqrt{5}-1}{2}\right)^{5/2}-1\right\}}} - \frac{\sqrt{5}+1}{2}\right] e^{2\pi/\sqrt{5}}$$

The Meaning of Ramanujan and His Lost Notebook
21 Jan 2014 - https://www.youtube.com/watch?v=y_0NuOBNobk

we have also that:

zeta((((((((((34^2-(34+3)))^1/14)))^6)))) = zeta((((((1156-34-3))^(3/7)))))

where 1156 = 34^2

$$\zeta\left(\sqrt[14]{34^2-(34+3)}^{\,6}\right) = \zeta\left((1156-34-3)^{3/7}\right)$$

$\zeta(s)$ is the Riemann zeta function

True

Or:

zeta((((((1156-34-3))^(3/7))))) = zeta (((((1019+89+11)^(3/7)))))

where 1019 is the rest mass of Phi meson, while 89 is a Fibonacci number and 11 is a Lucas number

$$\zeta\left((1156-34-3)^{3/7}\right) = \zeta\left((1019+89+11)^{3/7}\right)$$

$\zeta(s)$ is the Riemann zeta function

True

Thence:

zeta((((((((((34^2-(34+3)))^1/14)))^6))))

Input:

$$\zeta\left(\sqrt[14]{34^2-(34+3)}^{\,6}\right)$$

$\zeta(s)$ is the Riemann zeta function

Exact result:

$$\zeta\left(1119^{3/7}\right)$$

Decimal approximation:

1.000000796565920419381918949895917141397906291596829765502...

1.00000079656…

Alternative representations:

$$\zeta\left(\sqrt[14]{34^2-(34+3)}^{\,6}\right)=\zeta\left(\sqrt[14]{-37+34^2}^{\,6},1\right)$$

- $$\zeta\left(\sqrt[14]{34^2-(34+3)}^{\,6}\right)=\zeta\left(\sqrt[14]{-37+34^2}^{\,6},1\right)$$

- $$\zeta\left(\sqrt[14]{34^2-(34+3)}^{\,6}\right)=S_{-1+\sqrt[14]{-37+34^2}^{\,6},1}(1)$$

$\zeta(s, a)$ is the Hurwitz zeta function

$\zeta(s, a)$ is the generalized Riemann zeta function

$S_{n,p}(x)$ is the Nielsen generalized polylogarithm function

Series representations:

$$\zeta\left(\sqrt[14]{34^2-(34+3)}^{\,6}\right)=\sum_{k=1}^{\infty}k^{-1119^{3/7}}$$

- $$\zeta\left(\sqrt[14]{34^2-(34+3)}^{\,6}\right)=\frac{\sum_{k=0}^{\infty}(1+2k)^{-1119^{3/7}}}{1-2^{-1119^{3/7}}}$$

-

$$\zeta\left(\sqrt[14]{34^2-(34+3)}^6\right)=-\frac{\sum_{k=1}^{\infty}(-1)^k k^{-1119^{3/7}}}{1-2^{1-1119^{3/7}}}$$

Integral representations:

$$\zeta\left(\sqrt[14]{34^2-(34+3)}^6\right)=\frac{1}{\Gamma(1119^{3/7})}\int_0^\infty \frac{t^{-1+1119^{3/7}}}{-1+e^t}\,dt$$

- $$\zeta\left(\sqrt[14]{34^2-(34+3)}^6\right)=\frac{2^{-1+1119^{3/7}}}{\Gamma(1+1119^{3/7})}\int_0^\infty t^{1119^{3/7}}\operatorname{csch}^2(t)\,dt$$

- $$\zeta\left(\sqrt[14]{34^2-(34+3)}^6\right)=\frac{2^{-1+1119^{3/7}}}{\Gamma(1119^{3/7})}\int_0^\infty e^{-t}\,t^{-1+1119^{3/7}}\operatorname{csch}(t)\,dt$$

$\Gamma(x)$ is the gamma function

$\operatorname{csch}(x)$ is the hyperbolic cosecant function

And:

zeta (((((1019+89+11)^(3/7)))))

Input:

$\zeta\left((1019+89+11)^{3/7}\right)$

$\zeta(s)$ is the Riemann zeta function

Exact result:

$\zeta\left(1119^{3/7}\right)$

Decimal approximation:

1.000000796565920419381918949895917141397906291596829765502...

1.00000079656…

Alternative representations:

$$\zeta\left((1019+89+11)^{3/7}\right)=\zeta\left(1119^{3/7},\,1\right)$$

-

$$\zeta\left((1019+89+11)^{3/7}\right)=\zeta\left(1119^{3/7},\,1\right)$$

-

$$\zeta\left((1019+89+11)^{3/7}\right)=S_{-1+1119^{3/7},1}(1)$$

$\zeta(s, a)$ is the Hurwitz zeta function

$\zeta(s, a)$ is the generalized Riemann zeta function

$S_{n,p}(x)$ is the Nielsen generalized polylogarithm function

Series representations:

$$\zeta\left((1019+89+11)^{3/7}\right)=\sum_{k=1}^{\infty}k^{-1119^{3/7}}$$

-

$$\zeta\left((1019+89+11)^{3/7}\right)=\frac{\sum_{k=0}^{\infty}(1+2k)^{-1119^{3/7}}}{1-2^{-1119^{3/7}}}$$

-

$$\zeta\left((1019+89+11)^{3/7}\right)=-\frac{\sum_{k=1}^{\infty}(-1)^k\,k^{-1119^{3/7}}}{1-2^{1-1119^{3/7}}}$$

Integral representations:

$$\zeta\left((1019+89+11)^{3/7}\right)=\frac{1}{\Gamma\left(1119^{3/7}\right)}\int_0^{\infty}\frac{t^{-1+1119^{3/7}}}{-1+e^t}\,dt$$

-

$$\zeta\left((1019+89+11)^{3/7}\right)=\frac{2^{-1+1119^{3/7}}}{\Gamma\left(1+1119^{3/7}\right)}\int_0^{\infty}t^{1119^{3/7}}\,\operatorname{csch}^2(t)\,dt$$

-

$$\zeta\left((1019+89+11)^{3/7}\right) = \frac{2^{-1+1119^{3/7}}}{\Gamma(1119^{3/7})} \int_0^\infty e^{-t}\, t^{-1+1119^{3/7}} \operatorname{csch}(t)\, dt$$

$\Gamma(x)$ is the gamma function

$\operatorname{csch}(x)$ is the hyperbolic cosecant function

1/ ((((((((((((sqrt(5)/((((1+(((5^0.75*(1/golden ratio)^2.5-1)))^1/5))))) - golden ratio)))) * exp((((2Pi)/sqrt(5))))))))))

Input:

$$\frac{1}{\left(\frac{\sqrt{5}}{1+\sqrt[5]{5^{0.75}\left(\frac{1}{\phi}\right)^{2.5}-1}} - \phi\right)\exp\left(\frac{2\pi}{\sqrt{5}}\right)}$$

ϕ is the golden ratio

Result:

1.0000007912677253109902298067320769665875856884382740465 27...

1.000000791267725…

Series representations:

$$\frac{1}{\left(\frac{\sqrt{5}}{1+\sqrt[5]{5^{0.75}\left(\frac{1}{\phi}\right)^{2.5}-1}} - \phi\right)\exp\left(\frac{2\pi}{\sqrt{5}}\right)} = -\frac{1+\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}}{\exp\left(\frac{2\pi}{\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}}\right)\left(\phi+\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}\,\phi-\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)}$$

•

$$\frac{1}{\left(\frac{\sqrt{5}}{1+\sqrt[5]{5^{0.75}\left(\frac{1}{\phi}\right)^{2.5}-1}}-\phi\right)\exp\left(\frac{2\pi}{\sqrt{5}}\right)} = -\frac{1+\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}}{\exp\left(\frac{2\pi}{\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)\left(\phi+\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}\ \phi-\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)}$$

- $$\frac{1}{\left(\frac{\sqrt{5}}{1+\sqrt[5]{5^{0.75}\left(\frac{1}{\phi}\right)^{2.5}-1}}-\phi\right)\exp\left(\frac{2\pi}{\sqrt{5}}\right)} = -\left(\left(2\left(1+\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}\right)\sqrt{\pi}\right)\Big/\left(\exp\left(\frac{4\pi\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)\left(2\phi\sqrt{\pi}+2\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}\ \phi\sqrt{\pi}-\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)\right)\right)$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

e^-((((2Pi)/sqrt(5)))))))))) / ((((((((((sqrt(5)/((((1+(((5^0.75*(1/golden ratio)^2.5-1)))^1/5))))) - golden ratio))))

Input:

$$\frac{e^{-(2\pi)/\sqrt{5}}}{\frac{\sqrt{5}}{1+\sqrt[5]{5^{0.75}\left(\frac{1}{\phi}\right)^{2.5}-1}}-\phi}$$

ϕ is the golden ratio

Result:

1.000000791267725310990229806732076966587585688438274046527...

1.000000791267725…

Series representations:

$$\frac{e^{-(2\pi)/\sqrt{5}}}{\frac{\sqrt{5}}{1+\sqrt[5]{5^{0.75}\left(\frac{1}{\phi}\right)^{2.5}-1}}-\phi}=-\frac{e^{-(2\pi)/\left(\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)}\left(1+\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}\right)}{\phi+\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}\,\phi-\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}}$$

- $$\frac{e^{-(2\pi)/\sqrt{5}}}{\frac{\sqrt{5}}{1+\sqrt[5]{5^{0.75}\left(\frac{1}{\phi}\right)^{2.5}-1}}-\phi}=-\frac{\exp\left(-\frac{2\pi}{\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)\left(1+\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}\right)}{\phi+\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}\,\phi-\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}$$

- $$\frac{e^{-(2\pi)/\sqrt{5}}}{\frac{\sqrt{5}}{1+\sqrt[5]{5^{0.75}\left(\frac{1}{\phi}\right)^{2.5}-1}}-\phi}=$$
$$-\frac{2\exp\left(-\frac{4\pi\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)\left(1+\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}\right)\sqrt{\pi}}{2\phi\sqrt{\pi}+2\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}\,\phi\sqrt{\pi}-\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\underset{z=z_0}{\text{Res}} f$ is a complex residue

Note that:

((((((((((sqrt(5)/((((1+(((5^0.75*(1/golden ratio)^2.5-1)))^1/5))))) - golden ratio)))) * exp((((2Pi)/sqrt(5))))))))))

Input:

$$\left(\frac{\sqrt{5}}{1+\sqrt[5]{5^{0.75}\left(\frac{1}{\phi}\right)^{2.5}-1}}-\phi\right)\exp\left(\frac{2\pi}{\sqrt{5}}\right)$$

ϕ is the golden ratio

Result:

0.999999208732900793127473040933715786515159415005409478944...

0.9999992087329…

Series representations:

$$\left(\frac{\sqrt{5}}{1+\sqrt[5]{5^{0.75}\left(\frac{1}{\phi}\right)^{2.5}-1}}-\phi\right)\exp\left(\frac{2\pi}{\sqrt{5}}\right)=$$

$$-\frac{\exp\left(\frac{2\pi}{\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}}\right)\left(\phi+\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}\ \phi-\sqrt{4}\ \sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)}{1+\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}}$$

•

$$\left(\frac{\sqrt{5}}{1+\sqrt[5]{5^{0.75}\left(\frac{1}{\phi}\right)^{2.5}-1}}-\phi\right)\exp\left(\frac{2\pi}{\sqrt{5}}\right)=$$
$$-\frac{\exp\left(\frac{2\pi}{\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)\left(\phi+\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}\ \phi-\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)}{1+\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}}$$

•

$$\left(\frac{\sqrt{5}}{1+\sqrt[5]{5^{0.75}\left(\frac{1}{\phi}\right)^{2.5}-1}}-\phi\right)\exp\left(\frac{2\pi}{\sqrt{5}}\right)=-\left(\left(\exp\left(\frac{2\pi}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}}\right)\left(\phi+\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}\ \phi-\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right)\Big/\left(1+\sqrt[5]{-1+3.3437\left(\frac{1}{\phi}\right)^{2.5}}\right)\right)\quad \text{for not } ((z_0\in\mathbb{R} \text{ and } -\infty<z_0\le 0))$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

And:

1/0.9999992087329007931274730409337157865151594150054094 = 1.000000791267725310990229806732076966587585688438274125472

Thence, 0.9999992087329... is the reciprocal of 1.000000791267725...

Now, we have the following mathematical connection:

$$\frac{e^{-\frac{2\pi}{\sqrt{5}}}}{\dfrac{\sqrt{5}}{1+\sqrt[5]{\sqrt{(\varphi-1)^5 \sqrt[4]{5^3}}-1}}-\varphi} = 1+\cfrac{e^{-2\pi\sqrt{5}}}{1+\cfrac{e^{-4\pi\sqrt{5}}}{1+\cfrac{e^{-6\pi\sqrt{5}}}{1+\cfrac{e^{-8\pi\sqrt{5}}}{1+\dots}}}} \approx 1.0000007913$$

$\Rightarrow$

$$R(e^{-2\pi\sqrt{5}}) = \frac{\sqrt{5}}{1+\sqrt[5]{5^{3/4}\left(\frac{\sqrt{5}-1}{2}\right)^{5/2}-1}} - \frac{\sqrt{5}+1}{2},$$

$\Rightarrow$ $\Rightarrow$

$$\Rightarrow \frac{1}{\left(\dfrac{\sqrt{5}}{1+\sqrt[5]{5^{0.75}\left(\frac{1}{\phi}\right)^{2.5}-1}}-\phi\right)\exp\left(\frac{2\pi}{\sqrt{5}}\right)} =$$

$= 1.0000007912677253109902298067320769665875856884382740465 27\dots \Rightarrow$

$$\Rightarrow \zeta\left(\sqrt[14]{34^2-(34+3)}^{\,6}\right) = \zeta\left(1119^{3/7}\right) =$$

$= 1.000000796565920419381918949895917141397906291596829765502\dots$

1.00000079126772531… ≅ 1.00000079656592…

Now, we have that:

$$\sqrt{\frac{e\pi}{2}} = \sum_{n=0}^{\infty}\frac{1}{(2n+1)!!}+\cfrac{1}{1+\cfrac{1}{1+\cfrac{2}{1+\cfrac{3}{1+\cfrac{4}{1+\dots}}}}} \approx 2.0663656771$$

sqrt((e*Pi)/2)

Input:

$$\sqrt{\frac{e\,\pi}{2}}$$

Decimal approximation:

2.066365677061246469234695942149926324722760958495654225778...

2.06636567706...

All 2nd roots of (e π)/2:

$$\sqrt{\frac{e\,\pi}{2}}\;e^{0} \approx 2.0664 \quad \text{(real, principal root)}$$

•

$$\sqrt{\frac{e\,\pi}{2}}\;e^{i\,\pi} \approx -2.0664 \quad \text{(real root)}$$

Series representations:

$$\sqrt{\frac{e\,\pi}{2}} = \sqrt{-1+\frac{e\,\pi}{2}}\,\sum_{k=0}^{\infty}\left(-1+\frac{e\,\pi}{2}\right)^{-k}\binom{\frac{1}{2}}{k}$$

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

•

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

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

And:

$$\sqrt{\frac{e\pi}{2}}\, erfc\left(\frac{\sqrt{2}}{2}\right) \approx 0.6556795424$$

sqrt((e*Pi)/2)erfc(sqrt(2)/2)

Input:

$$\sqrt{\frac{e\,\pi}{2}}\ \operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)$$

erfc(x) is the complementary error function

Exact result:

$$\sqrt{\frac{e\,\pi}{2}}\ \operatorname{erfc}\left(\frac{1}{\sqrt{2}}\right)$$

Decimal approximation:

0.655679542418798471543871230730811283399282332870462028053...

0.6556795424…

Alternate form:

$$\sqrt{\frac{e\,\pi}{2}}\ \left(1 - \operatorname{erf}\left(\frac{1}{\sqrt{2}}\right)\right)$$

erf(x) is the error function

- **Alternative representations:**

$$\sqrt{\frac{e\,\pi}{2}}\ \operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right) = \left(1 - \operatorname{erf}\left(\frac{\sqrt{2}}{2}\right)\right)\sqrt{\frac{e\,\pi}{2}}$$

- $$\sqrt{\frac{e\,\pi}{2}}\ \operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right) = \left(1 + i \operatorname{erfi}\left(\frac{i\sqrt{2}}{2}\right)\right)\sqrt{\frac{e\,\pi}{2}}$$

- $$\sqrt{\frac{e\,\pi}{2}}\ \mathrm{erfc}\left(\frac{\sqrt{2}}{2}\right) = \mathrm{erf}\left(\frac{\sqrt{2}}{2}, \infty\right)\sqrt{\frac{e\,\pi}{2}}$$

$\mathrm{erfi}(x)$ is the imaginary error function

i is the imaginary unit

$\mathrm{erf}(x_0, x_1)$ is the generalized error function

- **Series representations:**

$$\sqrt{\frac{e\,\pi}{2}}\ \mathrm{erfc}\left(\frac{\sqrt{2}}{2}\right) = \sqrt{\frac{e\,\pi}{2}} - \sqrt{2\,e}\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{-1/2-k}}{(1+2\,k)\,k!}$$

- $$\sqrt{\frac{e\,\pi}{2}}\ \mathrm{erfc}\left(\frac{\sqrt{2}}{2}\right) = \sqrt{\frac{e\,\pi}{2}} - \sqrt{\frac{e}{2}}\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{-1/2-3\,k}\,H_{1+2\,k}\left(\frac{1}{\sqrt{2}}\right)}{(1+2\,k)\,k!}$$

- $$\sqrt{\frac{e\,\pi}{2}}\ \mathrm{erfc}\left(\frac{\sqrt{2}}{2}\right) = \sqrt{\frac{e\,\pi}{2}} - \sqrt{\frac{e\,\pi}{2}}\sum_{k=1}^{\infty}\frac{{}_2\tilde{F}_2\left(\frac{1}{2}, 1;\ 1-\frac{k}{2}, \frac{3-k}{2};\ -z_0^2\right)\left(\sqrt{2}-2\,z_0\right)^k z_0^{1-k}}{k!}$$

$n!$ is the factorial function

$H_n(x)$ is the n^{th} Hermite polynomial in x

${}_p\tilde{F}_q(a_1, \ldots, a_p;\ b_1, \ldots, b_q;\ z)$
is the regularized generalized hypergeometric function

- **Integral representations:**

$$\sqrt{\frac{e\,\pi}{2}}\ \mathrm{erfc}\left(\frac{\sqrt{2}}{2}\right) = \sqrt{2\,e}\int_{\frac{1}{\sqrt{2}}}^{\infty} e^{-t^2}\,dt$$

-

$$\sqrt{\frac{e\pi}{2}}\ \mathrm{erfc}\left(\frac{\sqrt{2}}{2}\right) = \sqrt{\frac{e\pi}{2}} - \sqrt{\frac{2e}{\pi}} \int_0^\infty \frac{e^{-t^2}\sin\left(\sqrt{2}\ t\right)}{t}\,dt$$

•

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

•

$$\sqrt{\frac{e\pi}{2}}\ \mathrm{erfc}\left(\frac{\sqrt{2}}{2}\right) = \sqrt{\frac{e\pi}{2}} + \frac{i\sqrt{\frac{e}{2}}}{2\pi} \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{2^s\,\Gamma(-s)\,\Gamma\left(\frac{1}{2}+s\right)}{\Gamma(1-s)}\,ds \quad \text{for } \gamma > -\frac{1}{2}$$

$\Gamma(x)$ is the gamma function

1+sqrt((e*Pi)/2)erfc(sqrt(2)/2)

Input:

$$1+\sqrt{\frac{e\pi}{2}}\ \mathrm{erfc}\left(\frac{\sqrt{2}}{2}\right)$$

$\mathrm{erfc}(x)$ is the complementary error function

Exact result:

$$\sqrt{\frac{e\pi}{2}}\ \mathrm{erfc}\left(\frac{1}{\sqrt{2}}\right)+1$$

Decimal approximation:

1.655679542418798471543871230730811283399282332870462028053...

1.6556795424…. is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3$ = 1164,2696 i.e. 1,65578...

Alternate forms:

$$\frac{1}{2}\left(\sqrt{2e\pi}\ \mathrm{erfc}\left(\frac{1}{\sqrt{2}}\right)+2\right)$$

•

$$\sqrt{\frac{e\,\pi}{2}}\left(1-\operatorname{erf}\left(\frac{1}{\sqrt{2}}\right)\right)+1$$

- $$\frac{\sqrt{e\,\pi}\,\operatorname{erfc}\left(\frac{1}{\sqrt{2}}\right)+\sqrt{2}}{\sqrt{2}}$$

$\operatorname{erf}(x)$ is the error function

- **Alternative representations:**

$$1+\sqrt{\frac{e\,\pi}{2}}\,\operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=1+\left(1-\operatorname{erf}\left(\frac{\sqrt{2}}{2}\right)\right)\sqrt{\frac{e\,\pi}{2}}$$

- $$1+\sqrt{\frac{e\,\pi}{2}}\,\operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=1+\left(1+i\,\operatorname{erfi}\left(\frac{i\sqrt{2}}{2}\right)\right)\sqrt{\frac{e\,\pi}{2}}$$

- $$1+\sqrt{\frac{e\,\pi}{2}}\,\operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=1+\operatorname{erf}\left(\frac{\sqrt{2}}{2},\infty\right)\sqrt{\frac{e\,\pi}{2}}$$

$\operatorname{erfi}(x)$ is the imaginary error function

i is the imaginary unit

$\operatorname{erf}(x_0, x_1)$ is the generalized error function

- **Series representations:**

$$1+\sqrt{\frac{e\,\pi}{2}}\,\operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=1+\sqrt{\frac{e\,\pi}{2}}-\sqrt{2\,e}\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{-1/2-k}}{(1+2\,k)\,k!}$$

- $$1+\sqrt{\frac{e\,\pi}{2}}\,\operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=1+\sqrt{\frac{e\,\pi}{2}}-\sqrt{\frac{e}{2}}\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{-1/2-3\,k}\,H_{1+2\,k}\left(\frac{1}{\sqrt{2}}\right)}{(1+2\,k)\,k!}$$

-

$$1+\sqrt{\frac{e\,\pi}{2}}\ \operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=$$
$$1+\sqrt{\frac{e\,\pi}{2}}-\sqrt{\frac{e\,\pi}{2}}\sum_{k=1}^{\infty}\frac{{}_2\tilde{F}_2\left(\frac{1}{2},1;\,1-\frac{k}{2},\frac{3-k}{2};\,-z_0^2\right)\left(\sqrt{2}-2\,z_0\right)^k z_0^{1-k}}{k!}$$

$n!$ is the factorial function

$H_n(x)$ is the n^{th} Hermite polynomial in x

${}_p\tilde{F}_q(a_1,\ldots,a_p;\,b_1,\ldots,b_q;\,z)$ is the regularized generalized hypergeometric function

- **Integral representations:**

$$1+\sqrt{\frac{e\,\pi}{2}}\ \operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=1+\sqrt{2\,e}\int_{\frac{1}{\sqrt{2}}}^{\infty}e^{-t^2}\,dt$$

- $$1+\sqrt{\frac{e\,\pi}{2}}\ \operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=1+\sqrt{\frac{e\,\pi}{2}}-\sqrt{\frac{2\,e}{\pi}}\int_0^{\infty}\frac{e^{-t^2}\sin\left(\sqrt{2}\,t\right)}{t}\,dt$$

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

- $$1+\sqrt{\frac{e\,\pi}{2}}\ \operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=1+\sqrt{\frac{e\,\pi}{2}}+\frac{i\sqrt{\frac{e}{2}}}{2\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{2^s\,\Gamma(-s)\,\Gamma\left(\frac{1}{2}+s\right)}{\Gamma(1-s)}\,ds\quad\text{for } \gamma>-\frac{1}{2}$$

$\Gamma(x)$ is the gamma function

-11/10^3+1+sqrt((e*Pi)/2)erfc(sqrt(2)/2)

Where 11 is a Lucas number:

Input:

$$-\frac{11}{10^3}+1+\sqrt{\frac{e\pi}{2}}\ \mathrm{erfc}\left(\frac{\sqrt{2}}{2}\right)$$

erfc(x) is the complementary error function

Exact result:

$$\sqrt{\frac{e\pi}{2}}\ \mathrm{erfc}\left(\frac{1}{\sqrt{2}}\right)+\frac{989}{1000}$$

Decimal approximation:

1.644679542418798471543871230730811283399282332870462028053...

$1.6446795424.... \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934$ ...

Alternate forms:

$$\sqrt{\frac{e\pi}{2}}\left(1-\mathrm{erf}\left(\frac{1}{\sqrt{2}}\right)\right)+\frac{989}{1000}$$

- $$\frac{1000\sqrt{e\pi}\ \mathrm{erfc}\left(\frac{1}{\sqrt{2}}\right)+989\sqrt{2}}{1000\sqrt{2}}$$

erf(x) is the error function

-

Alternative representations:

$$-\frac{11}{10^3}+1+\sqrt{\frac{e\pi}{2}}\ \mathrm{erfc}\left(\frac{\sqrt{2}}{2}\right)=1-\frac{11}{10^3}+\left(1-\mathrm{erf}\left(\frac{\sqrt{2}}{2}\right)\right)\sqrt{\frac{e\pi}{2}}$$

- $$-\frac{11}{10^3}+1+\sqrt{\frac{e\pi}{2}}\ \mathrm{erfc}\left(\frac{\sqrt{2}}{2}\right)=1-\frac{11}{10^3}+\left(1+i\,\mathrm{erfi}\left(\frac{i\sqrt{2}}{2}\right)\right)\sqrt{\frac{e\pi}{2}}$$

- $$-\frac{11}{10^3}+1+\sqrt{\frac{e\pi}{2}}\ \mathrm{erfc}\left(\frac{\sqrt{2}}{2}\right)=1-\frac{11}{10^3}+\mathrm{erf}\left(\frac{\sqrt{2}}{2},\infty\right)\sqrt{\frac{e\pi}{2}}$$

$\operatorname{erfi}(x)$ is the imaginary error function

i is the imaginary unit

$\operatorname{erf}(x_0, x_1)$ is the generalized error function

-

Series representations:

$$-\frac{11}{10^3}+1+\sqrt{\frac{e\,\pi}{2}}\operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=\frac{989}{1000}+\sqrt{\frac{e\,\pi}{2}}-\sqrt{2\,e}\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{-1/2-k}}{(1+2\,k)\,k!}$$

-

$$-\frac{11}{10^3}+1+\sqrt{\frac{e\,\pi}{2}}\operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=\frac{989}{1000}+\sqrt{\frac{e\,\pi}{2}}-\sqrt{\frac{e}{2}}\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{-1/2-3\,k}\,H_{1+2\,k}\left(\frac{1}{\sqrt{2}}\right)}{(1+2\,k)\,k!}$$

-

$$-\frac{11}{10^3}+1+\sqrt{\frac{e\,\pi}{2}}\operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=$$
$$\frac{989}{1000}+\sqrt{\frac{e\,\pi}{2}}-\sqrt{\frac{e\,\pi}{2}}\sum_{k=1}^{\infty}\frac{{}_2\tilde{F}_2\left(\frac{1}{2},\,1;\,1-\frac{k}{2},\,\frac{3-k}{2};\,-z_0^2\right)\left(\sqrt{2}-2\,z_0\right)^k\,z_0^{1-k}}{k!}$$

$n!$ is the factorial function

$H_n(x)$ is the n^{th} Hermite polynomial in x

${}_p\tilde{F}_q(a_1,\,\ldots,\,a_p;\,b_1,\,\ldots,\,b_q;\,z)$
is the regularized generalized hypergeometric function

-

Integral representations:

$$-\frac{11}{10^3}+1+\sqrt{\frac{e\,\pi}{2}}\operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=\frac{989}{1000}+\sqrt{2\,e}\int_{\frac{1}{\sqrt{2}}}^{\infty}e^{-t^2}\,dt$$

-

$$-\frac{11}{10^3}+1+\sqrt{\frac{e\,\pi}{2}}\operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=\frac{989}{1000}+\sqrt{\frac{e\,\pi}{2}}-\sqrt{\frac{2\,e}{\pi}}\int_0^{\infty}\frac{e^{-t^2}\sin\left(\sqrt{2}\,t\right)}{t}\,dt$$

-

$$-\frac{11}{10^3}+1+\sqrt{\frac{e\pi}{2}}\operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=\frac{989}{1000}-\frac{i\sqrt{\frac{e}{2}}}{2\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{2^s\,\Gamma(s)\,\Gamma\left(\frac{1}{2}+s\right)}{\Gamma(1+s)}\,ds \quad \text{for } 0<\gamma$$

- $$-\frac{11}{10^3}+1+\sqrt{\frac{e\pi}{2}}\operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)= \frac{989}{1000}+\sqrt{\frac{e\pi}{2}}+\frac{i\sqrt{\frac{e}{2}}}{2\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{2^s\,\Gamma(-s)\,\Gamma\left(\frac{1}{2}+s\right)}{\Gamma(1-s)}\,ds \quad \text{for } \gamma>-\frac{1}{2}$$

$\Gamma(x)$ is the gamma function

(-29/10^3+3/10^3-11/10^3)+1+sqrt((e*Pi)/2)erfc(sqrt(2)/2)

Where 3, 29 and 11 are Lucas numbers:

Input:

$$\left(-\frac{29}{10^3}+\frac{3}{10^3}-\frac{11}{10^3}\right)+1+\sqrt{\frac{e\pi}{2}}\operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)$$

erfc(x) is the complementary error function

Exact result:

$$\sqrt{\frac{e\pi}{2}}\operatorname{erfc}\left(\frac{1}{\sqrt{2}}\right)+\frac{963}{1000}$$

Decimal approximation:

1.618679542418798471543871230730811283399282332870462028053...

1.6186795424…

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

Alternate forms:

$$\sqrt{\frac{e\,\pi}{2}}\left(1-\operatorname{erf}\left(\frac{1}{\sqrt{2}}\right)\right)+\frac{963}{1000}$$

- $$\frac{1000\sqrt{e\,\pi}\,\operatorname{erfc}\left(\frac{1}{\sqrt{2}}\right)+963\sqrt{2}}{1000\sqrt{2}}$$

erf(x) is the error function

- **Alternative representations:**

$$\left(-\frac{29}{10^3}+\frac{3}{10^3}-\frac{11}{10^3}\right)+1+\sqrt{\frac{e\,\pi}{2}}\operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=1-\frac{37}{10^3}+\left(1-\operatorname{erf}\left(\frac{\sqrt{2}}{2}\right)\right)\sqrt{\frac{e\,\pi}{2}}$$

- $$\left(-\frac{29}{10^3}+\frac{3}{10^3}-\frac{11}{10^3}\right)+1+\sqrt{\frac{e\,\pi}{2}}\operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=1-\frac{37}{10^3}+\left(1+i\operatorname{erfi}\left(\frac{i\sqrt{2}}{2}\right)\right)\sqrt{\frac{e\,\pi}{2}}$$

- $$\left(-\frac{29}{10^3}+\frac{3}{10^3}-\frac{11}{10^3}\right)+1+\sqrt{\frac{e\,\pi}{2}}\operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=1-\frac{37}{10^3}+\operatorname{erf}\left(\frac{\sqrt{2}}{2},\infty\right)\sqrt{\frac{e\,\pi}{2}}$$

erfi(x) is the imaginary error function

i is the imaginary unit

erf(x_0, x_1) is the generalized error function

- **Series representations:**

$$\left(-\frac{29}{10^3}+\frac{3}{10^3}-\frac{11}{10^3}\right)+1+\sqrt{\frac{e\,\pi}{2}}\operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=\frac{963}{1000}+\sqrt{\frac{e\,\pi}{2}}-\sqrt{2\,e}\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{-1/2-k}}{(1+2\,k)\,k!}$$

-

$$\left(-\frac{29}{10^3}+\frac{3}{10^3}-\frac{11}{10^3}\right)+1+\sqrt{\frac{e\,\pi}{2}}\ \mathrm{erfc}\left(\frac{\sqrt{2}}{2}\right)=$$
$$\frac{963}{1000}+\sqrt{\frac{e\,\pi}{2}}-\sqrt{\frac{e}{2}}\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{-1/2-3k}\,H_{1+2k}\left(\frac{1}{\sqrt{2}}\right)}{(1+2k)\,k!}$$

-

$$\left(-\frac{29}{10^3}+\frac{3}{10^3}-\frac{11}{10^3}\right)+1+\sqrt{\frac{e\,\pi}{2}}\ \mathrm{erfc}\left(\frac{\sqrt{2}}{2}\right)=$$
$$\frac{963}{1000}+\sqrt{\frac{e\,\pi}{2}}-\sqrt{\frac{e\,\pi}{2}}\sum_{k=1}^{\infty}\frac{{}_2\tilde{F}_2\left(\frac{1}{2},1;1-\frac{k}{2},\frac{3-k}{2};-z_0^2\right)\left(\sqrt{2}-2z_0\right)^k z_0^{1-k}}{k!}$$

$n!$ is the factorial function

$H_n(x)$ is the n^{th} Hermite polynomial in x

${}_p\tilde{F}_q(a_1,\ldots,a_p;b_1,\ldots,b_q;z)$
is the regularized generalized hypergeometric function

-

Integral representations:

$$\left(-\frac{29}{10^3}+\frac{3}{10^3}-\frac{11}{10^3}\right)+1+\sqrt{\frac{e\,\pi}{2}}\ \mathrm{erfc}\left(\frac{\sqrt{2}}{2}\right)=\frac{963}{1000}+\sqrt{2e}\int_{\frac{1}{\sqrt{2}}}^{\infty}e^{-t^2}\,dt$$

$$\left(-\frac{29}{10^3}+\frac{3}{10^3}-\frac{11}{10^3}\right)+1+\sqrt{\frac{e\,\pi}{2}}\ \mathrm{erfc}\left(\frac{\sqrt{2}}{2}\right)=$$
$$\frac{963}{1000}+\sqrt{\frac{e\,\pi}{2}}-\sqrt{\frac{2e}{\pi}}\int_0^{\infty}\frac{e^{-t^2}\sin\left(\sqrt{2}\,t\right)}{t}\,dt$$

-

$$\left(-\frac{29}{10^3}+\frac{3}{10^3}-\frac{11}{10^3}\right)+1+\sqrt{\frac{e\,\pi}{2}}\ \mathrm{erfc}\left(\frac{\sqrt{2}}{2}\right)=$$
$$\frac{963}{1000}-\frac{i\sqrt{\frac{e}{2}}}{2\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{2^s\,\Gamma(s)\,\Gamma\left(\frac{1}{2}+s\right)}{\Gamma(1+s)}\,ds\quad\text{for }0<\gamma$$

-

$$\left(-\frac{29}{10^3}+\frac{3}{10^3}-\frac{11}{10^3}\right)+1+\sqrt{\frac{e\pi}{2}}\ \operatorname{erfc}\left(\frac{\sqrt{2}}{2}\right)=$$

$$\frac{963}{1000}+\sqrt{\frac{e\pi}{2}}+\frac{i\sqrt{\frac{e}{2}}}{2\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{2^s\,\Gamma(-s)\,\Gamma\left(\frac{1}{2}+s\right)}{\Gamma(1-s)}\,ds \quad \text{for } \gamma>-\frac{1}{2}$$

$\Gamma(x)$ is the gamma function

Now, we have that:

from:

TASI LECTURES ON D-BRANES
JOSEPH POLCHINSKI
Institute for Theoretical Physics
University of California, Santa Barbara, CA 93106-4030
arXiv:hep-th/9611050v2 23 Apr 1997

One can reason out what is happening as follows. The string in the interior of the open string is the same 'stuff' as the closed string is made of, and so should still be vibrating in D dimensions. What distinguishes the open string is its endpoints, and these are restricted to a $D-1$ dimensional hyperplane. Indeed, this follows from the duality transformation (28). The Neumann condition $\partial_n X^{25}$ for the original coordinate becomes $\partial_t X'^{25}$ for the dual coordinate.[1–8] This is the Dirichlet condition: the X^{25} coordinate of the endpoint is fixed, so the endpoint is constrained to lie on a hyperplane.

In fact, all endpoints are constrained to lie on the same hyperplane. To see this, integrate

$$\begin{aligned} X'^{25}(\pi)-X'^{25}(0) &= \int_0^\pi d\sigma\partial_\sigma X'^{25} = i\int_0^\pi d\sigma\partial_\tau X^{25} \\ &= 2\pi\alpha' p^{25} = \frac{2\pi\alpha' n}{R} = 2\pi n R'. \end{aligned} \tag{31}$$

We observe the possible mathematical connection between eq. (31) and the equations concerning the Dirichlet series:

$$Z(t)=e^{i\theta(t)}\zeta\left(\frac{1}{2}+it\right).$$

$$e^{i\,\theta(3)}\,\zeta\left(\frac{1}{2}+3\,i\right)$$

$$e^{i}\,\zeta\left(\frac{1}{2}+3\,i\right)\approx 0.354228+0.405654\,i$$

$0.354228 + 0.405654\,i$

$0.354228\ldots +$
$0.405654\ldots\,i$

$r = 0.538547$ (radius), $\theta = 48.8717°$ (angle)

Or:

$$\exp(i\log(6))\,\zeta\left(\frac{1}{2}+3\,i\right) = 6^{i}\,\zeta\left(\frac{1}{2}+3\,i\right) = 0.538547138541707203 94$$

(We note that, the above result is very near to the following value of Ramanujan continued fraction (Rogers-Ramanujan identities): 0,5269391135)

$$2\sqrt{6\sqrt{\frac{48}{-17.592539859+2\int_3^5 0.53854713854\,x\,x\,dx}}}$$

$= 6.2962765368 = 6.2962765368 \approx 2\pi r$, where r :

$$2\sqrt{6\sqrt{\frac{48}{-17.592539859+2\times\int_3^5 0.53854713854\,x\,x\,dx}}}\times\frac{1}{2\,\pi}$$

1.00208353390
1.00208353390

(We note that, the above result is very near to the following value of Ramanujan continued fraction (Rogers-Ramanujan identities): 1.0018674362)

Indeed, we have:

$$\exp(i \log(6))\, \zeta\left(\frac{1}{2}+3\,i\right) = 6^{i}\, \zeta\left(\frac{1}{2}+3\,i\right) = 0.53854713854170720394$$

$$2\sqrt{6\sqrt{\frac{48}{-17.592539859+2\int_3^5 0.53854713854\, x\, x\, dx}}}$$

$= 6.2962765368 = 6.2962765368 \approx 2\pi r \Rightarrow$

$$\begin{aligned} X'^{25}(\pi) - X'^{25}(0) &= \int_0^\pi d\sigma \partial_\sigma X'^{25} = i\int_0^\pi d\sigma \partial_\tau X^{25} \\ &= 2\pi\alpha' p^{25} = \frac{2\pi\alpha' n}{R} = 2\pi n R'. \end{aligned}$$

$\Rightarrow$

In conclusion, the result 6.2962765368, that is a length of a circle with radius 1.00208353390, can be interpreted as the shape of the bosonic string, thus a closed string of circular form.

We have that:

$$\begin{aligned} \mathcal{A}_{\rm M} &= \pm V_{p+1}\int_0^\infty \frac{dt}{2t}(8\pi^2\alpha' t)^{-\frac{(p+1)}{2}} e^{-2X\cdot Xt/\pi\alpha'} \\ &\qquad \left[q^{-2}\prod_{k=1}^\infty (1+q^{4k-2})^{-24}(1-q^{4k})^{-24}\right] \end{aligned} \tag{63}$$

The factor in braces [ ] is

$$\begin{aligned} f_3(q^2)^{-24} f_1(q^2)^{-24} &= (2t)^{12} f_3(e^{-\pi/2t})^{-24} f_1(e^{-\pi/2t})^{-24} \\ &= (2t)^{12}\left(e^{\pi/2t} - 24 + \ldots\right) . \end{aligned} \tag{64}$$

One thus finds a pole

$$\mp 2^{p-12} V_{p+1}\frac{3\pi}{2^5}(4\pi^2\alpha')^{11-p} G_{25-p}(X^2) . \tag{65}$$

From (64), we obtain:

Input:

$$6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)$$

Exact result:

$$2\,176\,782\,336\left(e^{\pi/6}-24\right)$$

Decimal approximation:

$$-4.8568167663174811002550607379155427003722721317208 18\ldots \times 10^{10}$$

-4.856816766… * 10^{10}

We note that, from the sum of the below results of Ramanujan continued fractions (Rogers-Ramanujan identities), we obtain:

2,06636567 + 1,0018674362 + 0,9991104684 + 0,6556795 = 4,7230230746

Property:

$2\,176\,782\,336\left(-24+e^{\pi/6}\right)$ is a transcendental number

Alternate form:

$$2\,176\,782\,336\,e^{\pi/6}-52\,242\,776\,064$$

Series representations:

$$6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)=-52\,242\,776\,064+2\,176\,782\,336\,e^{2/3\sum_{k=0}^{\infty}(-1)^k/(1+2k)}$$

- $$6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)=-52\,242\,776\,064+2\,176\,782\,336\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{\pi/6}$$

- $$6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)=-52\,242\,776\,064+2\,176\,782\,336\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{\pi/6}$$

$n!$ is the factorial function

Integral representations:

$$6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)=-52\,242\,776\,064+2\,176\,782\,336\,e^{2/3\int_0^1\sqrt{1-t^2}\,dt}$$

-

$$6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right) = -52\,242\,776\,064 + 2\,176\,782\,336\, e^{1/3 \int_0^1 1/\sqrt{1-t^2}\, dt}$$

- $$6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right) = -52\,242\,776\,064 + 2\,176\,782\,336\, e^{1/3 \int_0^\infty 1/(1+t^2)\, dt}$$

((((-(6)^12 ((exp(Pi/6)-24))))))^1/5

Input:

$$\sqrt[5]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)}$$

Exact result:

$$36 \times 6^{2/5} \sqrt[5]{24 - e^{\pi/6}}$$

Decimal approximation:

137.1735391537262519798755266991164858343698568216774993777...

137.17353915… result very near to the value of the inverse of fine-structure constant 137.035

Property:

$36 \times 6^{2/5} \sqrt[5]{24 - e^{\pi/6}}$ is a transcendental number

All 5th roots of -2176782336 (e^(π/6) - 24):

- Polar form

  $36 \times 6^{2/5} \sqrt[5]{24 - e^{\pi/6}}\; e^0 \approx 137.17$ (real, principal root)

- $36 \times 6^{2/5} \sqrt[5]{24 - e^{\pi/6}}\; e^{(2 i \pi)/5} \approx 42.39 + 130.46\, i$

- $36 \times 6^{2/5} \sqrt[5]{24 - e^{\pi/6}}\; e^{(4 i \pi)/5} \approx -110.98 + 80.63\, i$

- $36 \times 6^{2/5} \sqrt[5]{24 - e^{\pi/6}}\; e^{-(4 i \pi)/5} \approx -110.98 - 80.63\, i$

-

$$36 \times 6^{2/5} \sqrt[5]{24 - e^{\pi/6}}\ e^{-(2 i \pi)/5} \approx 42.39 - 130.46\, i$$

Series representations:

$$\sqrt[5]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right) - 24\right)} = 36 \times 6^{2/5} \sqrt[5]{24 - e^{2/3 \sum_{k=0}^{\infty} (-1)^k/(1+2k)}}$$

-

$$\sqrt[5]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right) - 24\right)} = 36 \times 6^{2/5} \sqrt[5]{24 - \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{\pi/6}}$$

-

$$\sqrt[5]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right) - 24\right)} = 36 \times 6^{2/5} \sqrt[5]{24 - \left(\frac{1}{\sum_{k=0}^{\infty} \frac{(-1)^k}{k!}}\right)^{\pi/6}}$$

$n!$ is the factorial function

Integral representations:

$$\sqrt[5]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right) - 24\right)} = 36 \times 6^{2/5} \sqrt[5]{24 - e^{2/3 \int_0^1 \sqrt{1-t^2}\, dt}}$$

-

$$\sqrt[5]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right) - 24\right)} = 36 \times 6^{2/5} \sqrt[5]{24 - e^{1/3 \int_0^{\infty} 1/(1+t^2)\, dt}}$$

-

$$\sqrt[5]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right) - 24\right)} = 36 \times 6^{2/5} \sqrt[5]{24 - e^{1/3 \int_0^1 1/\sqrt{1-t^2}\, dt}}$$

((((-(6)^12 ((exp(Pi/6)-24))))))^1/48

Input:

$$\sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right) - 24\right)}$$

Exact result:
$\sqrt[4]{6}\ \sqrt[48]{24-e^{\pi/6}}$

Decimal approximation:
1.669676472263331213252626998144160831849926309757227892263...

1.669676472263…

Property:
$\sqrt[4]{6}\ \sqrt[48]{24-e^{\pi/6}}$ is a transcendental number

All 48th roots of -2176782336 (e^(π/6) - 24):

- Polar form
  $\sqrt[4]{6}\ \sqrt[48]{24-e^{\pi/6}}\ e^{0} \approx 1.66968$ (real, principal root)
- $\sqrt[4]{6}\ \sqrt[48]{24-e^{\pi/6}}\ e^{(i\pi)/24} \approx 1.65539 + 0.21794\, i$
- $\sqrt[4]{6}\ \sqrt[48]{24-e^{\pi/6}}\ e^{(i\pi)/12} \approx 1.61278 + 0.43214\, i$
- $\sqrt[4]{6}\ \sqrt[48]{24-e^{\pi/6}}\ e^{(i\pi)/8} \approx 1.54258 + 0.6390\, i$
- $\sqrt[4]{6}\ \sqrt[48]{24-e^{\pi/6}}\ e^{(i\pi)/6} \approx 1.4460 + 0.83484\, i$

Series representations:

$$\sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)} = \sqrt[4]{6}\ \sqrt[48]{24-e^{2/3\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

- $$\sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)} = \sqrt[4]{6}\ \sqrt[48]{24-\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{\pi/6}}$$

-

$$\sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)} = \sqrt[4]{6}\ \sqrt[48]{24-\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{\pi/6}}$$

$n!$ is the factorial function

Integral representations:

$$\sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)} = \sqrt[4]{6}\ \sqrt[48]{24-e^{2/3\int_0^1\sqrt{1-t^2}\,dt}}$$

•

$$\sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)} = \sqrt[4]{6}\ \sqrt[48]{24-e^{1/3\int_0^\infty 1/(1+t^2)\,dt}}$$

•

$$\sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)} = \sqrt[4]{6}\ \sqrt[48]{24-e^{1/3\int_0^1 1/\sqrt{1-t^2}\,dt}}$$

2/10^3+((((-(6)^12 ((exp(Pi/6)-24))))))^1/48

Input:

$$\frac{2}{10^3}+\sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)}$$

Exact result:

$$\frac{1}{500}+\sqrt[4]{6}\ \sqrt[48]{24-e^{\pi/6}}$$

Decimal approximation:

1.671676472263312132526269981441608318499263097572278922263...

1.671676472263…

We note that 1.67167647... is a result practically equal to the value of the formula:

$m_{p'} = 2\times\frac{\eta}{R}m_P = 1.6714213\times 10^{-24}$ gm

that is the holographic proton mass

Property:

$$\frac{1}{500}+\sqrt[4]{6}\ \sqrt[48]{24-e^{\pi/6}}\ \text{is a transcendental number}$$

Alternate form:

$$\frac{1}{500}\left(1+500\sqrt[4]{6}\ \sqrt[48]{24-e^{\pi/6}}\right)$$

Series representations:

$$\frac{2}{10^3}+\sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)}=\frac{1}{500}+\sqrt[4]{6}\ \sqrt[48]{24-e^{2/3\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

-

$$\frac{2}{10^3}+\sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)}=\frac{1}{500}+\sqrt[4]{6}\ \sqrt[48]{24-\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{\pi/6}}$$

-

$$\frac{2}{10^3}+\sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)}=\frac{1}{500}+\sqrt[4]{6}\ \sqrt[48]{24-\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{\pi/6}}$$

$n!$ is the factorial function

Integral representations:

$$\frac{2}{10^3}+\sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)}=\frac{1}{500}+\sqrt[4]{6}\ \sqrt[48]{24-e^{2/3\int_0^1\sqrt{1-t^2}\,dt}}$$

-

$$\frac{2}{10^3}+\sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)}=\frac{1}{500}+\sqrt[4]{6}\ \sqrt[48]{24-e^{1/3\int_0^{\infty}1/(1+t^2)\,dt}}$$

-

$$\frac{2}{10^3} + \sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right) - 24\right)} = \frac{1}{500} + \sqrt[4]{6}\ \sqrt[48]{24 - e^{1/3 \int_0^1 1/\sqrt{1-t^2}\,dt}}$$

-(47/10^3+4/10^3)+((((-(6)^12 ((exp(Pi/6)-24))))))^1/48

Input:

$$-\left(\frac{47}{10^3} + \frac{4}{10^3}\right) + \sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right) - 24\right)}$$

Exact result:

$$\sqrt[4]{6}\ \sqrt[48]{24 - e^{\pi/6}} - \frac{51}{1000}$$

Decimal approximation:

1.618676472263331213252626998144160831849926309757227892263...

1.618676472263…

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

Property:

$$-\frac{51}{1000} + \sqrt[4]{6}\ \sqrt[48]{24 - e^{\pi/6}} \text{ is a transcendental number}$$

-

Alternate form:

$$\frac{1000\sqrt[4]{6}\ \sqrt[48]{24 - e^{\pi/6}} - 51}{1000}$$

Series representations:

$$-\left(\frac{47}{10^3} + \frac{4}{10^3}\right) + \sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right) - 24\right)} = -\frac{51}{1000} + \sqrt[4]{6}\ \sqrt[48]{24 - e^{2/3 \sum_{k=0}^{\infty} (-1)^k/(1+2k)}}$$

-

$$-\left(\frac{47}{10^3} + \frac{4}{10^3}\right) + \sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right) - 24\right)} = -\frac{51}{1000} + \sqrt[4]{6}\ \sqrt[48]{24 - \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{\pi/6}}$$

-

$$-\left(\frac{47}{10^3}+\frac{4}{10^3}\right)+\sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)} = -\frac{51}{1000}+\sqrt[4]{6}\sqrt[48]{24-\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{\pi/6}}$$

$n!$ is the factorial function

Integral representations:

$$-\left(\frac{47}{10^3}+\frac{4}{10^3}\right)+\sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)} = -\frac{51}{1000}+\sqrt[4]{6}\sqrt[48]{24-e^{2/3\int_0^1\sqrt{1-t^2}\,dt}}$$

- $$-\left(\frac{47}{10^3}+\frac{4}{10^3}\right)+\sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)} = -\frac{51}{1000}+\sqrt[4]{6}\sqrt[48]{24-e^{1/3\int_0^\infty 1/(1+t^2)\,dt}}$$

- $$-\left(\frac{47}{10^3}+\frac{4}{10^3}\right)+\sqrt[48]{-6^{12}\left(\exp\left(\frac{\pi}{6}\right)-24\right)} = -\frac{51}{1000}+\sqrt[4]{6}\sqrt[48]{24-e^{1/3\int_0^1 1/\sqrt{1-t^2}\,dt}}$$

We have that:

3.5 The D-Brane Action and Charge

We have concluded that the D-brane must couple to a $(p+1)$-form potential. The spacetime plus D-brane action then includes

$$S = \frac{1}{2}\int G_{(p+2)}{}^{*}G_{(p+2)} + i\mu_p \int_{p-\text{brane}} C_{(p+1)}, \qquad (86)$$

where the $(p+1)$-form charge of the D p-brane is denoted μ_p.[g] As discussed earlier, the dilaton does not appear in the action. However, there are additional terms involving the D-brane gauge field, similar to the Born-Infeld terms. Again these can be determined from T-duality. Consider, as an example, a 1-brane in the 1-2 plane. The action is

$$\int dx^1 \ (C_1 + \partial_1 X^2 C_2) \ . \qquad (87)$$

Under a T-duality in the 2-direction this becomes

$$\int dx^1 \ (C_{12} + 2\pi\alpha' F_{12} C) \ . \qquad (88)$$

$$\begin{aligned} \mathcal{A}_{\rm NS} \ = \ -\mathcal{A}_{\rm R} \ &\sim \ \frac{1}{2}V_{p+1}\int \frac{dt}{t}(2\pi t)^{-(p+1)/2}(t/2\pi\alpha')^4 e^{-t\frac{Y^2}{8\pi^2\alpha'^2}} \\ &= \ V_{p+1}2\pi(4\pi^2\alpha')^{3-p}G_{9-p}(Y^2). \end{aligned} \qquad (91)$$

Comparing with field theory calculations gives[2]

$$\mu_p^2 = 2\kappa^2\tau_p^2 = 2\pi(4\pi^2\alpha')^{3-p}. \qquad (92)$$

For α’ = 1/2 and p = -1, we obtain, from (92):

2Pi*(4Pi^2*1/2)^4

Input:

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

Result:

$32\pi^9$

Decimal approximation:

953891.1786702787733283008768396689716437778487772369061334...

953891.17867…

Property:

$32\,\pi^9$ is a transcendental number

Alternative representations:

$$2\,\pi\left(\frac{4\,\pi^2}{2}\right)^4 = 360\,°\left(2\,(180\,°)^2\right)^4$$

- $$2\,\pi\left(\frac{4\,\pi^2}{2}\right)^4 = 2\,\pi\,(12\,\zeta(2))^4$$

- $$2\,\pi\left(\frac{4\,\pi^2}{2}\right)^4 = 2\cos^{-1}(-1)\left(2\cos^{-1}(-1)^2\right)^4$$

$\zeta(s)$ is the Riemann zeta function

$\cos^{-1}(x)$ is the inverse cosine function

Series representations:

$$2\,\pi\left(\frac{4\,\pi^2}{2}\right)^4 = 8\,388\,608\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2\,k}\right)^9$$

- $$2\,\pi\left(\frac{4\,\pi^2}{2}\right)^4 = 32\left(\sum_{k=0}^{\infty}-\frac{4\,(-1)^k\,1195^{-1-2\,k}\left(5^{1+2\,k}-4\times 239^{1+2\,k}\right)}{1+2\,k}\right)^9$$

- $$2\,\pi\left(\frac{4\,\pi^2}{2}\right)^4 = 32\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2\,k}+\frac{2}{1+4\,k}+\frac{1}{3+4\,k}\right)\right)^9$$

Integral representations:

$$2\,\pi\left(\frac{4\,\pi^2}{2}\right)^4 = 8\,388\,608\left(\int_0^1\sqrt{1-t^2}\,dt\right)^9$$

-

$$2\pi\left(\frac{4\pi^2}{2}\right)^4 = 16384\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^9$$

- $$2\pi\left(\frac{4\pi^2}{2}\right)^4 = 16384\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt\right)^9$$

We know that the (p + 1)-form charge of the D p-brane is denoted μ_p. From the above result, we obtain:

sqrt((((2Pi*(4Pi^2*1/2)^4))))

Input:

$$\sqrt{2\pi\left(4\pi^2\times\frac{1}{2}\right)^4}$$

Exact result:

$4\sqrt{2}\,\pi^{9/2}$

Decimal approximation:

976.6735271677423597763612658953162911346259056239132770245...

976.67352716…

Property:

$4\sqrt{2}\,\pi^{9/2}$ is a transcendental number

All 2nd roots of 32 π^9:

- Polar form
  $4\sqrt{2}\,\pi^{9/2}\,e^0 \approx 976.7$ (real, principal root)
- $4\sqrt{2}\,\pi^{9/2}\,e^{i\pi} \approx -976.7$ (real root)

Series representations:

$$\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4} = \sqrt{-1+32\pi^9}\sum_{k=0}^{\infty}\left(-1+32\pi^9\right)^{-k}\binom{\frac{1}{2}}{k}$$

- $$\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4} = \sqrt{-1+32\pi^9}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+32\pi^9\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

- $$\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4} = \sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(32\pi^9-z_0\right)^k z_0^{-k}}{k!}$$

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

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

((((sqrt((((2Pi*(4Pi^2*1/2)^4))))))))^1/14

Input:

$$\sqrt[14]{\sqrt{2\pi\left(4\pi^2\times\frac{1}{2}\right)^4}}$$

Exact result:

$2^{5/28}\,\pi^{9/28}$

Decimal approximation:

- More digits

1.6351346801268644759633203438840095543322325137007511161252...

1.63513468…

Property:

$2^{5/28}\,\pi^{9/28}$ is a transcendental number

All 14th roots of 4 sqrt(2) π^(9/2):

- Polar form
  $2^{5/28}\,\pi^{9/28}\,e^{0} \approx 1.63513$ (real, principal root)
- $2^{5/28}\,\pi^{9/28}\,e^{(i\pi)/7} \approx 1.4732 + 0.7095\,i$
- $2^{5/28}\,\pi^{9/28}\,e^{(2i\pi)/7} \approx 1.0195 + 1.2784\,i$
- $2^{5/28}\,\pi^{9/28}\,e^{(3i\pi)/7} \approx 0.36385 + 1.59414\,i$
- $2^{5/28}\,\pi^{9/28}\,e^{(4i\pi)/7} \approx -0.3639 + 1.59414\,i$

Series representations:

$$\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}} = 2^{23/28}\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^{9/28}$$

- $$\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}} = 2^{23/28}\left(\sum_{k=0}^{\infty}\frac{(-1)^{1+k}\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^{9/28}$$

- $$\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}} = 2^{5/28}\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^{9/28}$$

Integral representations:

$$\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}} = 2^{23/28}\left(\int_0^1\sqrt{1-t^2}\,dt\right)^{9/28}$$

-

$$\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}} = \sqrt{2}\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^{9/28}$$

- $$\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}} = \sqrt{2}\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt\right)^{9/28}$$

(47-11)/10^3 + ((((sqrt((((2Pi*(4Pi^2*1/2)^4))))))))^1/14

Where 11 and 47 are Lucas numbers

Input:

$$\frac{47-11}{10^3} + \sqrt[14]{\sqrt{2\pi\left(4\pi^2 \times \frac{1}{2}\right)^4}}$$

Exact result:

$$\frac{9}{250} + 2^{5/28}\,\pi^{9/28}$$

Decimal approximation:

1.671134680126864475963320343884009554332232513700751161252...

1.67113468012…

We note that 1.6711346... is a result practically equal to the value of the formula:

$m_{p\prime} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

Property:

$\frac{9}{250} + 2^{5/28}\,\pi^{9/28}$ is a transcendental number

- **Alternate form:**

$$\frac{1}{250}\left(9+250\times 2^{5/28}\,\pi^{9/28}\right)$$

Series representations:

$$\frac{47-11}{10^3}+\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}}=\frac{9}{250}+2^{23/28}\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^{9/28}$$

-

$$\frac{47-11}{10^3}+\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}}=$$
$$\frac{9}{250}+2^{23/28}\left(\sum_{k=0}^{\infty}\frac{(-1)^{1+k}\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^{9/28}$$

-

$$\frac{47-11}{10^3}+\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}}=\frac{9}{250}+2^{5/28}\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^{9/28}$$

Integral representations:

$$\frac{47-11}{10^3}+\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}}=\frac{9}{250}+2^{23/28}\left(\int_0^1\sqrt{1-t^2}\,dt\right)^{9/28}$$

-

$$\frac{47-11}{10^3}+\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}}=\frac{9}{250}+\sqrt{2}\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^{9/28}$$

-

$$\frac{47-11}{10^3}+\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}}=\frac{9}{250}+\sqrt{2}\left(\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt\right)^{9/28}$$

-(18-1)/10^3 + ((((sqrt((((2Pi*(4Pi^2*1/2)^4))))))))^1/14

Where 1 and 18 are Lucas numbers

Input:

$$-\frac{18-1}{10^3}+\sqrt[14]{\sqrt{2\pi\left(4\pi^2\times\frac{1}{2}\right)^4}}$$

Exact result:

$$2^{5/28}\,\pi^{9/28}-\frac{17}{1000}$$

Decimal approximation:

- More digits

1.618134680126864475963320343884009554332232513700751161252...

1.61813468012…

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

Property:

$-\frac{17}{1000}+2^{5/28}\,\pi^{9/28}$ is a transcendental number

•

Alternate form:

$$\frac{1000\times 2^{5/28}\,\pi^{9/28}-17}{1000}$$

Series representations:

$$-\frac{18-1}{10^3}+\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}}=-\frac{17}{1000}+2^{23/28}\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^{9/28}$$

•

$$-\frac{18-1}{10^3}+\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}} = -\frac{17}{1000}+2^{23/28}\left(\sum_{k=0}^{\infty}\frac{(-1)^{1+k}\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^{9/28}$$

- $$-\frac{18-1}{10^3}+\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}} = -\frac{17}{1000}+2^{5/28}\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^{9/28}$$

Integral representations:

$$-\frac{18-1}{10^3}+\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}} = -\frac{17}{1000}+2^{23/28}\left(\int_0^1\sqrt{1-t^2}\,dt\right)^{9/28}$$

- $$-\frac{18-1}{10^3}+\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}} = -\frac{17}{1000}+\sqrt{2}\left(\int_0^\infty\frac{1}{1+t^2}\,dt\right)^{9/28}$$

- $$-\frac{18-1}{10^3}+\sqrt[14]{\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}} = -\frac{17}{1000}+\sqrt{2}\left(\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt\right)^{9/28}$$

-248+sqrt((((2Pi*(4Pi^2*1/2)^4))))

Input:

$$-248+\sqrt{2\pi\left(4\pi^2\times\frac{1}{2}\right)^4}$$

Exact result:

$$4\sqrt{2}\,\pi^{9/2} - 248$$

Decimal approximation:

728.6735271677423597763612658953162911346259056239132770245...

728.67352716… result that is very near to the Ramanujan cube $9^3 - 1$

Property:

$-248 + 4\sqrt{2}\,\pi^{9/2}$ is a transcendental number

- **Alternate form:**

$$4\left(\sqrt{2}\,\pi^{9/2} - 62\right)$$

Series representations:

$$-248 + \sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4} = -248 + \sqrt{-1 + 32\pi^9}\,\sum_{k=0}^{\infty}\left(-1 + 32\pi^9\right)^{-k}\binom{\frac{1}{2}}{k}$$

- $$-248 + \sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4} = -248 + \sqrt{-1 + 32\pi^9}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1 + 32\pi^9\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

- $$-248 + \sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4} = -248 + \sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(32\pi^9 - z_0\right)^k z_0^{-k}}{k!}$$

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

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

((((-248+((((sqrt((((2Pi*(4Pi^2*1/2)^4)))))))))))))^1/13

Input:

$$\sqrt[13]{-248+\sqrt{2\pi\left(4\pi^2\times\frac{1}{2}\right)^4}}$$

Exact result:

$$\sqrt[13]{4\sqrt{2}\,\pi^{9/2}-248}$$

Decimal approximation:

1.660331645499079118382809387732735216100168732784581438925...

1.660331645…. is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3$ = 1164,2696 i.e. 1,65578...

Property:

$\sqrt[13]{-248+4\sqrt{2}\,\pi^{9/2}}$ is a transcendental number

- **Alternate form:**

$$2^{2/13}\sqrt[13]{\sqrt{2}\,\pi^{9/2}-62}$$

All 13th roots of 4 sqrt(2) π^(9/2) - 248:

- Polar form

$\sqrt[13]{4\sqrt{2}\,\pi^{9/2}-248}\;e^0 \approx 1.6603$ (real, principal root)

- $\sqrt[13]{4\sqrt{2}\,\pi^{9/2}-248}\;e^{(2i\pi)/13} \approx 1.4702+0.7716\,i$

- $\sqrt[13]{4\sqrt{2}\,\pi^{9/2}-248}\;e^{(4i\pi)/13} \approx 0.9432+1.3664\,i$

- $\sqrt[13]{4\sqrt{2}\,\pi^{9/2}-248}\;e^{(6i\pi)/13} \approx 0.20013+1.6482\,i$

- $$\sqrt[13]{4\sqrt{2}\,\pi^{9/2} - 248}\ e^{(8 i \pi)/13} \approx -0.5888 + 1.5524\, i$$

Series representations:

$$\sqrt[13]{-248 + \sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}} = \sqrt[13]{-248 + \sqrt{-1 + 32\pi^9}\ \sum_{k=0}^{\infty} \left(-1 + 32\pi^9\right)^{-k} \binom{\frac{1}{2}}{k}}$$

- $$\sqrt[13]{-248 + \sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}} = \sqrt[13]{-248 + \sqrt{-1 + 32\pi^9}\ \sum_{k=0}^{\infty} \frac{(-1)^k \left(-1 + 32\pi^9\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}}$$

- $$\sqrt[13]{-248 + \sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}} = \sqrt[13]{-248 + \sqrt{z_0}\ \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(32\pi^9 - z_0\right)^k z_0^{-k}}{k!}}$$

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

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

Integral representation:

$$(1+z)^a = \frac{\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\Gamma(s)\Gamma(-a-s)}{z^s}\, ds}{(2\pi i)\,\Gamma(-a)}$$ for $(0 < \gamma < -\text{Re}(a)$ and $|\arg(z)| < \pi)$

$\Gamma(x)$ is the gamma function

$\text{Re}(z)$ is the real part of z

$\arg(z)$ is the complex argument

$|z|$ is the absolute value of z

i is the imaginary unit

11/10^3+((((-248+((((sqrt((((2Pi*(4Pi^2*1/2)^4))))))))))))^1/13

Where 11 is a Lucas number

Input:

$$\frac{11}{10^3}+\sqrt[13]{-248+\sqrt{2\pi\left(4\pi^2\times\frac{1}{2}\right)^4}}$$

Exact result:

$$\frac{11}{1000}+\sqrt[13]{4\sqrt{2}\,\pi^{9/2}-248}$$

Decimal approximation:

1.671331645499079118382809387732735216100168732784581438925...

1.67133164549…

We note that 1.6713316... is a result practically equal to the value of the formula:

$m_{p\prime} = 2\times\frac{\eta}{R}m_P = 1.6714213\times10^{-24}$ gm

that is the holographic proton mass

Property:

$\frac{11}{1000}+\sqrt[13]{-248+4\sqrt{2}\,\pi^{9/2}}$ is a transcendental number

-

Alternate form:

$$\frac{11+1000\times2^{2/13}\sqrt[13]{\sqrt{2}\,\pi^{9/2}-62}}{1000}$$

Series representations:

$$\frac{11}{10^3}+\sqrt[13]{-248+\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}} =$$

$$\frac{11}{1000}+\sqrt[13]{-248+\sqrt{-1+32\pi^9}\sum_{k=0}^{\infty}(-1+32\pi^9)^{-k}\binom{\frac{1}{2}}{k}}$$

•

$$\frac{11}{10^3}+\sqrt[13]{-248+\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}} =$$

$$\frac{11}{1000}+\sqrt[13]{-248+\sqrt{-1+32\pi^9}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+32\pi^9)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

•

$$\frac{11}{10^3}+\sqrt[13]{-248+\sqrt{2\pi\left(\frac{4\pi^2}{2}\right)^4}} =$$

$$\frac{11}{1000}+\sqrt[13]{-248+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(32\pi^9-z_0)^k z_0^{-k}}{k!}}$$

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

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

We have that:

It is natural to define the dimensionless string coupling $g = e^{\phi}$ to be the ratio of the fundamental (F-)string and D-string tensions in the IIB theory, so that

$$\tau_p = \frac{(2\pi\sqrt{\alpha'})^{1-p}}{2\pi\alpha' g} \ . \tag{105}$$

Comparing this with the string calculation (92) fixes the relation between g and $\kappa = g\kappa_0$ and so determines the normalization κ_0 of the spacetime action (11),[28]

$$\kappa_0 = 8\pi^{7/2}\alpha'^2 \ . \tag{106}$$

$$\kappa = (8\pi G_N)^{1/2} = \frac{(8\pi)^{1/2}}{M_P} = (2.43 \times 10^{18}\ \mathrm{GeV})^{-1} \ .$$

For κ_0 = 109,91438900847863181036715208831 and

κ = 4,1152263374485596707818930041152e-19, we obtain:

g = 3,7440287614491865231459649661364e-21

Thence, eq. (105) provide us:

(2Pi*sqrt(1/2)))^2 / (((2Pi*1/2*3.7440287614491865*10^-21)))

19.7392088021787172376689 / 1.176221325180*10^-20

Input interpretation:

$$19.7392088021787172376689 \times \frac{1}{1.17622132518 \times 10^{-20}}$$

Result:

$1.678188311979293376279007007690307552123104587155 6878... \times 10^{21}$

$1.678188311... * 10^{21}$

We have that:

Consider a parallel D-string and F-string. The total tension

$$\tau_{D1} + \tau_{F1} = \frac{g^{-1} + 1}{2\pi\alpha'} \tag{111}$$

(3,7440287614491865231459649661364e-21 + 1) / (2Pi*1/2)

0,31830988618379067153895928811395

And we have that:

(1 / 0.31830988618379067153895928811395)

Input interpretation:

$$\frac{1}{0.31830988618379067153895928811395}$$

Result:

3.141592653589793238450881170027749180495376796449275340118...

3.14159265…

Possible closed forms:

$\pi \approx 3.141592653589793238462643383279503$

$\log(\mathcal{G}_{Ge}) \approx 3.141592653589793238462643383279503$

$\sqrt{6\zeta(2)} \approx 3.141592653589793238462643383279503$

$\log(x)$ is the natural logarithm

$\mathcal{G}_{Ge}$ is Gelfond's constant

$\zeta(2)$ is zeta of 2

1/6(1 / 0.31830988618379067153895928811395)^2

Input interpretation:

$$\frac{1}{6}\left(\frac{1}{0.31830988618379067153895928811395}\right)^2$$

Result:

1.644934066848226436460097805732136539632196099316910217822...

1.64493406... = ζ(2) = $\frac{\pi^2}{6} = 1.644934$ ...

(29/10^3-2/10^3)+ 1/6(1 / 0.31830988618379067153895928811395)^2

Where 29 and 2 are Lucas numbers

Input interpretation:

$$\left(\frac{29}{10^3}-\frac{2}{10^3}\right)+\frac{1}{6}\left(\frac{1}{0.31830988618379067153895928811395}\right)^2$$

Result:

1.671934066848226436460097805732136539632196099316910217822...

1.67193406…

We note that 1.67193406... is a result practically equal to the value of the formula:

$m_{p\prime} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

-(21/10^3+5/10^3)+ 1/6(1 / 0.31830988618379067153895928811395)^2

Input interpretation:

$$-\left(\frac{21}{10^3}+\frac{5}{10^3}\right)+\frac{1}{6}\left(\frac{1}{0.31830988618379067153895928811395}\right)^2$$

Result:

1.618934066848226436460097805732136539632196099316910217822...

1.61893406…

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

Now, we have:

$$\sum_{n=0}^{\infty} q^n D_n \;=\; 256 \prod_{k=1}^{\infty}\left(\frac{1+q^k}{1-q^k}\right)^8 , \qquad (112)$$

For $q = e^{-\pi t}$

256 * product (((((((1+((e^(-2Pi)))^k)))) / ((((1-((e^(-2Pi)))^k)))))))^8 , k=1..4096

Input interpretation:

$$256\prod_{k=1}^{4096}\left(\frac{1+\left(e^{-2\pi}\right)^k}{1-\left(e^{-2\pi}\right)^k}\right)^8$$

Result:

263.779

263.779

(47+18+2)/10 * 256 * product (((((((1+((e^(-2Pi)))^k)))) / ((((1-((e^(-2Pi)))^k)))))))^8 , k=1..4096

Where 47, 18 and 2 are Lucas numbers

Input interpretation:

$$\left(\frac{1}{10}(47+18+2)\right)\times 256 \prod_{k=1}^{4096}\left(\frac{1+\left(e^{-2\pi}\right)^k}{1-\left(e^{-2\pi}\right)^k}\right)^8$$

Result:

1767.32

1767.32 result in the range of the mass of candidate "glueball" $f_0(1710)$ ("glueball" =1760 ± 15 MeV).

(((((((47+18+2)/10 * 256 * product (((((((1+((e^(-2Pi)))^k)))) / ((((1-((e^(-2Pi)))^k)))))))^8 , k=1..4096))))))^1/15

Input interpretation:

$$\sqrt[15]{\left(\frac{1}{10}(47+18+2)\right)\times 256 \prod_{k=1}^{4096}\left(\frac{1+\left(e^{-2\pi}\right)^k}{1-\left(e^{-2\pi}\right)^k}\right)^8}$$

Result:

1.64622

$1.64622 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

(29-4)/10^3+(((((((47+18+2)/10 * 256 * product (((((((1+((e^(-2Pi)))^k)))) / ((((1-((e^(-2Pi)))^k)))))))^8 , k=1..4096))))))^1/15

Input interpretation:

$$\frac{29-4}{10^3}+\sqrt[15]{\left(\frac{1}{10}(47+18+2)\right)\times 256 \prod_{k=1}^{4096}\left(\frac{1+\left(e^{-2\pi}\right)^k}{1-\left(e^{-2\pi}\right)^k}\right)^8}$$

Result:

1.67122

1.67122

We note that 1.67122 is a result practically equal to the value of the formula:

$m_{p\prime} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

Now we have that:

To relate the coupling to the size of the eleventh dimension we need to compare the respective actions,[38]

$$\frac{1}{2\kappa_0^2 g^2} \int d^{10}x \sqrt{-g_s} R_s = \frac{2\pi R}{2\kappa_{11}^2} \int d^{10}x \sqrt{-g_{11}} R_{11} \ . \tag{116}$$

The string and M theory metrics are equal up to a rescaling,

$$g_{s\mu\nu} = \zeta^2 g_{11\mu\nu} \tag{117}$$

and so $\zeta^8 = 2\pi R \kappa_0^2 g^2 / \kappa_{11}^2$. The respective masses are related $nR^{-1} = m_{11} = \zeta m_s = n\zeta\tau_0$ or $R = \alpha'^{1/2} g/\zeta$. Combining these with the result (106) for κ_0, we obtain

$$\zeta = g^{1/3} \left[2^{7/9} \pi^{8/9} \alpha' \kappa_{11}^{-2/9} \right] \tag{118}$$

and

$$R = g^{2/3} \left[2^{-7/9} \pi^{-8/9} \kappa_{11}^{2/9} \right] \ . \tag{119}$$

From:

$$\kappa_{11}^2 = g^3 \left[2^7 \pi^8 \alpha'^{9/2} \right]$$

For κ_0 = 109.91438900847863181036715208831 and

κ = 4,1152263374485596707818930041152e-19, we obtain:

g = 3.7440287614491865231459649661364e-21

Input interpretation:

$$\sqrt[3]{3.7440287614491865231459649661364 \times 10^{-21}}$$

Result:

$$1.552791191497236378810925256971\ldots \times 10^{-7}$$

1.552791191... * 10^{-7}

2^(7/9) * Pi^(8/9) * 1/2* 109.914389^(-2/9) * 1.552791191 * 10^-7

Input interpretation:

$$\frac{2^{7/9}\,\pi^{8/9} \times \frac{1}{2} \times 109.914389^{-2/9} \times 1.552791191}{10^7}$$

Result:

$$1.29586817\ldots \times 10^{-7}$$

1.29586817… * 10^{-7} = ζ

Alternative representations:

$$\frac{\left(2^{7/9}\,\pi^{8/9}\right) 109.914^{-2/9} \times 1.55279}{2 \times 10^7} = \frac{0.776396 \times 2^{7/9} \times 109.914^{-2/9}\,(180\,°)^{8/9}}{10^7}$$

-

$$\frac{\left(2^{7/9}\,\pi^{8/9}\right) 109.914^{-2/9} \times 1.55279}{2 \times 10^7} = \frac{0.776396 \times 2^{7/9} \times 109.914^{-2/9}\,(-i \log(-1))^{8/9}}{10^7}$$

-

$$\frac{\left(2^{7/9}\,\pi^{8/9}\right) 109.914^{-2/9} \times 1.55279}{2 \times 10^7} = \frac{0.776396 \times 2^{7/9} \times 109.914^{-2/9} \cos^{-1}(-1)^{8/9}}{10^7}$$

$\log(x)$ is the natural logarithm

i is the imaginary unit

$\cos^{-1}(x)$ is the inverse cosine function

Series representations:

$$\frac{(2^{7/9}\,\pi^{8/9})\,109.914^{-2/9}\times 1.55279}{2\times 10^7} = 1.60625\times 10^{-7}\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^{8/9}$$

-

$$\frac{(2^{7/9}\,\pi^{8/9})\,109.914^{-2/9}\times 1.55279}{2\times 10^7} = 8.67425\times 10^{-8}\left(-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)^{8/9}$$

-

$$\frac{(2^{7/9}\,\pi^{8/9})\,109.914^{-2/9}\times 1.55279}{2\times 10^7} = 4.68436\times 10^{-8}\left(\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^{8/9}$$

$\binom{n}{m}$ is the binomial coefficient

Integral representations:

$$\frac{(2^{7/9}\,\pi^{8/9})\,109.914^{-2/9}\times 1.55279}{2\times 10^7} = 8.67425\times 10^{-8}\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^{8/9}$$

-

$$\frac{(2^{7/9}\,\pi^{8/9})\,109.914^{-2/9}\times 1.55279}{2\times 10^7} = 1.60625\times 10^{-7}\left(\int_0^{1}\sqrt{1-t^2}\,dt\right)^{8/9}$$

-

$$\frac{(2^{7/9}\,\pi^{8/9})\,109.914^{-2/9}\times 1.55279}{2\times 10^7} = 8.67425\times 10^{-8}\left(\int_0^{\infty}\frac{\sin(t)}{t}\,dt\right)^{8/9}$$

(3.7440287614491865231459649661364e-21)^(2/3) * (((2^-(7/9) * Pi^-(8/9) *109.914389^(2/9))))

Input interpretation:

$$(3.7440287614491865231459649661364\times 10^{-21})^{2/3}\left(2^{-7/9}\,\pi^{-8/9}\times 109.914389^{2/9}\right)$$

Result:

$$1.444602481\ldots\times 10^{-14}$$

$1.444602481... * 10^{-14} = R$

From the ratio of R and ζ,

(1.29586817* 10^-7) *1/ (1.444602481 * 10^-14)

Input interpretation:

$$\frac{1.29586817}{10^7} \times \frac{1}{\frac{1.444602481}{10^{14}}}$$

Result:

$8.970413570818171673900094873227619771753666259970932 44... \times 10^6$

$8.9704135708... * 10^6$

((((1.29586817* 10^-7) *1/ (1.444602481 * 10^-14))))^1/32

Input interpretation:

$$\sqrt[32]{\frac{1.29586817}{10^7} \times \frac{1}{\frac{1.444602481}{10^{14}}}}$$

Result:

1.649207836...

$1.649207836.... \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 ...$

(11*2)/10^3 + ((((1.29586817* 10^-7) *1/ (1.444602481 * 10^-14))))^1/32

Input interpretation:

$$\frac{11 \times 2}{10^3} + \sqrt[32]{\frac{1.29586817}{10^7} \times \frac{1}{\frac{1.444602481}{10^{14}}}}$$

Result:

1.671207836...

1.671207836…

We note that 1.671207836... is a result practically equal to the value of the formula:

$m_{p'} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

From

$$\kappa_{11}^2 = g^3 \left[2^7 \pi^8 \alpha'^{9/2} \right] \quad (120)$$

we obtain:

(3.7440287614491865231459649661364e-21)^3 * (2^7*Pi^8*0.5^4.5)

Input interpretation:

$(3.7440287614491865231459649661364 \times 10^{-21})^3 (2^7 \pi^8 \times 0.5^{4.5})$

Result:

$2.81703... \times 10^{-57}$

2.81703… * 10^{-57}

Now:

$$\frac{2\pi R}{2\kappa_{11}^2} \int d^{10}x \sqrt{-g_{11}} R_{11}$$

(2Pi*1.444602481e-14)/(2*2.81703e-57)* integrate(-sqrt(3.7440287614491865231459649661364e-21)*(1.444602481e-14)x

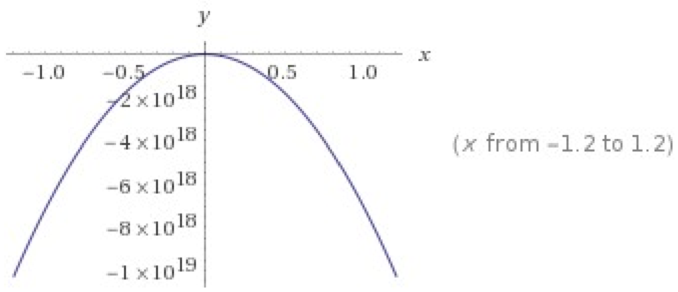
Input interpretation:

$$\frac{2\pi \times 1.444602481 \times 10^{-14}}{2 \times 2.81703 \times 10^{-57}} \int -\sqrt{3.7440287614491865231459649661364 \times 10^{-21}} \times 1.444602481 \times 10^{-14}\, x\, dx$$

Result:

$-7.12024 \times 10^{18}\, x^2$

Plot:



For x = $-1/10^{17} * 5^2$, we obtain:

-7.12024×10^18 * -1/10^17*(5)^2

Input interpretation:

$$-\frac{7.12024\times10^{18}\times(-1)\times5^2}{10^{17}}$$

Result:

1780.06

1780.06 result in the range of the hypothetical mass of Gluino (gluino = 1785.16 GeV).

((((-7.12024×10^18 * -1/10^17*(5)^2))))^1/15

Input interpretation:

$$\sqrt[15]{-\frac{7.12024\times10^{18}\times(-1)\times5^2}{10^{17}}}$$

Result:

1.647007749993275519261255982360566974309026018793145621014...

$1.647007749.... \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 ...$

24/10^3+((((-7.12024×10^18 * -1/10^17*(5)^2))))^1/15

Input interpretation:

$$\frac{24}{10^3}+\sqrt[15]{-\frac{7.12024\times10^{18}\times(-1)\times5^2}{10^{17}}}$$

Result:

1.671007749993275519261255982360566974309026018793145621014...

1.671007749…

We note that 1.671007749... is a result practically equal to the value of the formula:

$m_{p\prime} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

-29/10^3+((((-7.12024×10^18 * -1/10^17*(5)^2))))^1/15

Where 29 is a Lucas number

Input interpretation:

$$-\frac{29}{10^3} + \sqrt[15]{-\frac{7.12024 \times 10^{18} \times (-1) \times 5^2}{10^{17}}}$$

Result:

1.618007749993275519261255982360566974309026018793145621014...

1.618007749...

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

From:

ON APPLICATION OF THE FUNCTIONAL EQUATION OF THE JACOBI THETA FUNCTION TO APPROXIMATION OF ATOMIC INVERSION IN THE JAYNES-CUMMINGS MODEL

Anatolii A. Karatsuba1_***and Ekatherina A. Karatsuba***2†

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We have that:

$$4\pi\left(k\sqrt{m_2}-\sqrt{\left(\frac{m_2}{m_1}+\frac{m_1}{m_2}\frac{\left(k+\frac{1}{2}\right)^2}{\pi^2}\right)\ln m_2}\right)\ \leq\ T$$

$$\leq\ 4\pi\left(k\sqrt{m_2}+\sqrt{\left(\frac{m_2}{m_1}+\frac{m_1}{m_2}\frac{\left(k+\frac{1}{2}\right)^2}{\pi^2}\right)\ln m_2}\right);$$

For $m_1 = 10000$; a = 17424; $m_2 = 27425$ and k = 2, we obtain:

((((((((((4Pi((((((2*sqrt(27425)-sqrt((((27425/10000+10000/27425*((((2+1/2)^2))/((Pi^2)))*ln27425))))))))

Input:

$$4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{10000}{27425}\times\frac{\left(2+\frac{1}{2}\right)^2}{\pi^2}\log(27425)}\right)$$

log(x) is the natural logarithm

Exact result:

$$4\pi\left(10\sqrt{1097}-\sqrt{\frac{1097}{400}+\frac{2500\log(27425)}{1097\pi^2}}\right)$$

Decimal approximation:

4133.721502457329461874837261396284547776848144818760438441...

4133.721502457...

Alternate forms:

$$-\frac{\sqrt{1203409\pi^2+1000000\log(27425)}-219400\pi}{5\sqrt{1097}}$$

- $$40\sqrt{1097}\,\pi-4\pi\sqrt{\frac{1097}{400}+\frac{2500\log(27425)}{1097\pi^2}}$$

- $$40\sqrt{1097}\,\pi-\frac{1}{5}\sqrt{1097\pi^2+\frac{1000000\log(27425)}{1097}}$$

Alternative representations:

$$4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)=$$
$$4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{10000\log_e(27425)\left(\frac{5}{2}\right)^2}{27425\,\pi^2}}\right)$$

•

$$4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)=$$
$$4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{10000\log(a)\log_a(27425)\left(\frac{5}{2}\right)^2}{27425\,\pi^2}}\right)$$

•

$$4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)=$$
$$4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}-\frac{10000\,\mathrm{Li}_1(-27424)\left(\frac{5}{2}\right)^2}{27425\,\pi^2}}\right)$$

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

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations:

$$4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)=$$
$$40\sqrt{1097}\,\pi-4\pi\sqrt{\frac{1097}{400}+\frac{2500\left(\log(27424)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{27424}\right)^k}{k}\right)}{1097\,\pi^2}}$$

•

$$4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)=40\sqrt{1097}\,\pi-4\pi\sqrt{\frac{1097}{400}+\frac{2500\left(2\,i\,\pi\left\lfloor\frac{\arg(27425-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(27425-x)^k x^{-k}}{k}\right)}{1097\,\pi^2}}\quad\text{for } x<0$$

- $$4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)=40\sqrt{1097}\,\pi-4\pi\sqrt{\left(\frac{1097}{400}+\frac{2500\left(\log(z_0)+\left\lfloor\frac{\arg(27425-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(27425-z_0)^k z_0^{-k}}{k}\right)}{1097\,\pi^2}\right)}$$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

Integral representations:

$$4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)=40\sqrt{1097}\,\pi-4\pi\sqrt{\frac{1097}{400}+\frac{2500}{1097\,\pi^2}\int_1^{27425}\frac{1}{t}\,dt}$$

- $$4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)=40\sqrt{1097}\,\pi-4\pi\sqrt{\frac{1097}{400}-\frac{1250\,i}{1097\,\pi^3}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{27424^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}\quad\text{for } -1<\gamma<0$$

$\Gamma(x)$ is the gamma function

And:

-(11+3)/10^3+((((((((((4Pi((((((2*sqrt(27425)-sqrt((((27425/10000+10000/27425*((((2+1/2)^2))/((Pi^2)))*ln27425))))))))))))))))^1/17

Input:

$$-\frac{11+3}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{10000}{27425}\times\frac{\left(2+\frac{1}{2}\right)^2}{\pi^2}\log(27425)}\right)}$$

$\log(x)$ is the natural logarithm

Exact result:

$$2^{2/17}\sqrt[17]{\pi\left(10\sqrt{1097}-\sqrt{\frac{1097}{400}+\frac{2500\log(27425)}{1097\pi^2}}\right)}-\frac{7}{500}$$

Decimal approximation:

1.618021793027539844367307101644938478796913143093121044800...

1.618021793…

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

Alternate forms:

$$\frac{\sqrt[17]{43880\pi-\frac{1}{5}\sqrt{1203409\pi^2+1000000\log(27425)}}}{\sqrt[34]{1097}}-\frac{7}{500}$$

- $$\frac{100\times5^{16/17}\times1097^{33/34}\sqrt[17]{219400\pi-\sqrt{1203409\pi^2+1000000\log(27425)}}-7679}{548500}$$

- $$\frac{100\times5^{16/17}\times1097^{33/34}\sqrt[17]{\pi\left(219400-\frac{\sqrt{1203409\pi^2+1000000\log(27425)}}{\pi}\right)}-7679}{548500}$$

Alternative representations:

$$-\frac{11+3}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)}=$$
$$-\frac{14}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{10000\log_e(27425)\left(\frac{5}{2}\right)^2}{27425\,\pi^2}}\right)}$$

•

$$-\frac{11+3}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)}=$$
$$-\frac{14}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{10000\log(a)\log_a(27425)\left(\frac{5}{2}\right)^2}{27425\,\pi^2}}\right)}$$

•

$$-\frac{11+3}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)}=$$
$$-\frac{14}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}-\frac{10000\,\mathrm{Li}_1(-27424)\left(\frac{5}{2}\right)^2}{27425\,\pi^2}}\right)}$$

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

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations:

$$-\frac{11+3}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)}=-\frac{7}{500}+$$
$$\frac{\sqrt[17]{43880\pi-\frac{1}{5}\sqrt{1203409\pi^2+1000000\log(27424)-1000000\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{27424}\right)^k}{k}}}}{\sqrt[34]{1097}}$$

•

$$-\frac{11+3}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)}=$$

$$-\frac{7}{500}+2^{2/17}\sqrt[17]{\pi}\sqrt[17]{10\sqrt{1097}-\sqrt{\frac{1097}{400}+\frac{2500\left(\log(27424)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{27424}\right)^k}{k}\right)}{1097\pi^2}}}$$

- $$-\frac{11+3}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)}=$$

$$-\frac{7}{500}+2^{2/17}\sqrt[17]{\pi}\left(10\sqrt{1097}-\sqrt{\frac{1097}{400}+\frac{2500\left(2i\pi\left\lfloor\frac{\arg(27425-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(27425-x)^k x^{-k}}{k}\right)}{1097\pi^2}}\right)^{\wedge}$$

$(1/17)$ for $x<0$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

Integral representations:

$$-\frac{11+3}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)}=$$

$$-\frac{7}{500}+2^{2/17}\sqrt[17]{\pi}\sqrt[17]{10\sqrt{1097}-\sqrt{\frac{1097}{400}+\frac{2500}{1097\pi^2}\int_1^{27425}\frac{1}{t}\,dt}}$$

-

$$-\frac{11+3}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}-\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)}=$$

$$-\frac{7}{500}+2^{2/17}\sqrt[17]{\pi}\sqrt[17]{10\sqrt{1097}-\sqrt{\frac{1097}{400}-\frac{1250\,i}{1097\,\pi^3}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{27424^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}}$$

for $-1<\gamma<0$

$\Gamma(x)$ is the gamma function

((((((((((4Pi((((((2*sqrt(27425)+sqrt((((27425/10000+10000/27425*((((2+1/2)^2))/((Pi^2)))*ln27425))))))))

Input:

$$4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{10000}{27425}\times\frac{\left(2+\frac{1}{2}\right)^2}{\pi^2}\log(27425)}\right)$$

$\log(x)$ is the natural logarithm

Exact result:

$$4\pi\left(10\sqrt{1097}+\sqrt{\frac{1097}{400}+\frac{2500\log(27425)}{1097\,\pi^2}}\right)$$

Decimal approximation:

4190.491287901178005531258853534034816548357157278285343683...

4190.4912879…

Alternate forms:

$$\frac{219400\,\pi+\sqrt{1203409\,\pi^2+1000000\log(27425)}}{5\sqrt{1097}}$$

- $$40\sqrt{1097}\,\pi+4\pi\sqrt{\frac{1097}{400}+\frac{2500\log(27425)}{1097\,\pi^2}}$$

- $$\frac{\pi\left(219400+\frac{\sqrt{1203409\,\pi^2+1000000\log(27425)}}{\pi}\right)}{5\sqrt{1097}}$$

Alternative representations:

$$4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)=$$
$$4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{10000\log_e(27425)\left(\frac{5}{2}\right)^2}{27425\,\pi^2}}\right)$$

-

$$4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)=$$
$$4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{10000\log(a)\log_a(27425)\left(\frac{5}{2}\right)^2}{27425\,\pi^2}}\right)$$

-

$$4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)=$$
$$4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}-\frac{10000\,\mathrm{Li}_1(-27424)\left(\frac{5}{2}\right)^2}{27425\,\pi^2}}\right)$$

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

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations:

$$4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)=$$
$$40\sqrt{1097}\,\pi+4\pi\sqrt{\frac{1097}{400}+\frac{2500\left(\log(27424)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{27424}\right)^k}{k}\right)}{1097\,\pi^2}}$$

-

$$4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\, 27425}}\right)=40\sqrt{1097}\,\pi+$$
$$4\pi\sqrt{\frac{1097}{400}+\frac{2500\left(2\,i\,\pi\left\lfloor\frac{\arg(27425-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(27425-x)^k x^{-k}}{k}\right)}{1097\,\pi^2}}\quad\text{for } x<0$$

- $$4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\, 27425}}\right)=$$
$$40\sqrt{1097}\,\pi+4\pi\sqrt{\left(\frac{1097}{400}+\frac{2500\left(\log(z_0)+\left\lfloor\frac{\arg(27425-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(27425-z_0)^k z_0^{-k}}{k}\right)}{1097\,\pi^2}\right)}$$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

Integral representations:

$$4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\, 27425}}\right)=$$
$$40\sqrt{1097}\,\pi+4\pi\sqrt{\frac{1097}{400}+\frac{2500}{1097\,\pi^2}\int_1^{27425}\frac{1}{t}\,dt}$$

- $$4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\, 27425}}\right)=40\sqrt{1097}\,\pi+$$
$$4\pi\sqrt{\frac{1097}{400}-\frac{1250\,i}{1097\,\pi^3}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{27424^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}\quad\text{for } -1<\gamma<0$$

$\Gamma(x)$ is the gamma function

And:

-
(11+4)/10^3+((((((((((4Pi((((((2*sqrt(27425)+sqrt((((27425/10000+10000/27425*((((2+1/2)^2))/((Pi^2)))*ln27425)))))))))))))))))^1/17

Input:

$$-\frac{11+4}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{10000}{27425}\times\frac{\left(2+\frac{1}{2}\right)^2}{\pi^2}\log(27425)}\right)}$$

log(x) is the natural logarithm

Exact result:

$$2^{2/17}\sqrt[17]{\pi\left(10\sqrt{1097}+\sqrt{\frac{1097}{400}+\frac{2500\log(27425)}{1097\pi^2}}\right)}-\frac{3}{200}$$

Decimal approximation:

1.618331765228497683139746460460002282710368601395081708782...

1.6183317652…

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

Alternate forms:

$$\frac{\sqrt[17]{43880\pi+\frac{1}{5}\sqrt{1203409\pi^2+1000000\log(27425)}}}{\sqrt[34]{1097}}-\frac{3}{200}$$

- $$\frac{40\times5^{16/17}\times1097^{33/34}\sqrt[17]{219400\pi+\sqrt{1203409\pi^2+1000000\log(27425)}}-3291}{219400}$$

- $$\frac{40\times5^{16/17}\times1097^{33/34}\sqrt[17]{\pi\left(219400+\frac{\sqrt{1203409\pi^2+1000000\log(27425)}}{\pi}\right)}-3291}{219400}$$

Alternative representations:

$$-\frac{11+4}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)}=$$

$$-\frac{15}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{10000\log_e(27425)\left(\frac{5}{2}\right)^2}{27425\,\pi^2}}\right)}$$

•

$$-\frac{11+4}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)}=$$

$$-\frac{15}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{10000\log(a)\log_a(27425)\left(\frac{5}{2}\right)^2}{27425\,\pi^2}}\right)}$$

•

$$-\frac{11+4}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)}=$$

$$-\frac{15}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}-\frac{10000\,\mathrm{Li}_1(-27424)\left(\frac{5}{2}\right)^2}{27425\,\pi^2}}\right)}$$

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

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations:

$$-\frac{11+4}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)}=$$

$$-\frac{3}{200}+2^{2/17}\sqrt[17]{\pi}\sqrt[17]{10\sqrt{1097}+\sqrt{\frac{1097}{400}+\frac{2500\left(\log(27424)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{27424}\right)^k}{k}\right)}{1097\,\pi^2}}}$$

•

$$-\frac{11+4}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)}=$$

$$-\frac{3}{200}+2^{2/17}\sqrt[17]{\pi}\left(10\sqrt{1097}+\sqrt{\frac{1097}{400}+\frac{2500\left(2\,i\,\pi\left\lfloor\frac{\arg(27425-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(27425-x)^k x^{-k}}{k}\right)}{1097\,\pi^2}}\right)^\wedge(1/17) \quad \text{for } x<0$$

-

$$-\frac{11+4}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)}=$$

$$-\frac{3}{200}+2^{2/17}\sqrt[17]{\pi}\left(10\sqrt{1097}+\sqrt{\left(\frac{1097}{400}+\frac{1}{1097\,\pi^2}2500\left(\log(z_0)+\left\lfloor\frac{\arg(27425-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(27425-z_0)^k z_0^{-k}}{k}\right)\right)}\right)^\wedge(1/17)$$

arg(z) is the complex argument

$\lfloor x\rfloor$ is the floor function

Integral representations:

$$-\frac{11+4}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)}=$$

$$-\frac{3}{200}+\frac{\sqrt[17]{43880\pi+\frac{1}{5}\sqrt{1203409\,\pi^2+1000000\int_1^{27425}\frac{1}{t}\,dt}}}{\sqrt[34]{1097}}$$

-

$$-\frac{11+4}{10^3}+\sqrt[17]{4\pi\left(2\sqrt{27425}+\sqrt{\frac{27425}{10000}+\frac{\left(\left(2+\frac{1}{2}\right)^2\log(27425)\right)10000}{\pi^2\,27425}}\right)}=$$

$$-\frac{3}{200}+2^{2/17}\sqrt[17]{\pi}\sqrt[17]{10\sqrt{1097}+\sqrt{\frac{1097}{400}-\frac{1250\,i}{1097\,\pi^3}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{27424^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}}$$

for $-1<\gamma<0$

$\Gamma(x)$ is the gamma function

Now, we have that

Thus, we finally get the following asymptotic formula for atomic inversion:
for $0 \le T \le (m_1+a+1)^{\frac{5}{6}}$,

$$W(t)=U(T)=\frac{a}{m_1+a+1}+\frac{m_1+1}{m_1+a+1}\left(1+\frac{T^2m_1^2}{16(m_1+a+1)^3}\right)^{-\frac{1}{4}}$$

$$*\exp\left(-2\pi^2m_1\left(1+\frac{T^2m_1^2}{16(m_1+a+1)^3}\right)^{-1}\left(\left\|\frac{T}{4\pi\sqrt{m_1+a+1}}\right\|\right)^2\right)$$

$$*\cos\left(\frac{\pi^2}{2}T\frac{m_1^2}{\sqrt{(m_1+a+1)^3}}\left(1+\frac{T^2m_1^2}{16(m_1+a+1)^3}\right)^{-1}\left(\left\|\frac{T}{4\pi\sqrt{m_1+a+1}}\right\|\right)^2\right.$$

$$\left.-\frac{1}{2}\arctan\frac{Tm_1}{4\sqrt{m_1+a+1}}-T\sqrt{m_1+a+1}\right)$$

$$+\theta\left(\frac{2}{\sqrt{2\pi m_1}}\left(1+\frac{a}{m_1}\right)^{-1}\left(Tm_1^{\frac{3}{2}}(m_1+a+1)^{-\frac{5}{2}}+19\right)\right), \quad (46)$$

where

$$a=\frac{\Delta^2}{4g^2},\quad T=2gt,\quad m_1=|\alpha|^2.$$

$a = 10$, $m_1 = 100$, $m_2 = m_1 + a + 1 = 111$, $T = 50.633251315$, $\theta = 1$

10/111 + 101/111*((((((1+(((50.633251315^2*100^2)))/(((16(111)^3))))))))^(-1/4)

$$\frac{10}{111}+\frac{101}{111}\left(1+\frac{50.633251315^2\times 100^2}{16\times 111^3}\right)^{-1/4}$$

$0.83964419172426202865887709050408621537947215300531354 5299\ldots$

0.83964419172...

$$*\exp\left(-2\pi^2 m_1\left(1+\frac{T^2 m_1^2}{16(m_1+a+1)^3}\right)^{-1}\left(\left\|\frac{T}{4\pi\sqrt{m_1+a+1}}\right\|\right)^2\right)$$

exp(-2Pi^2*100*((((((1+(((50.633251315^2*100^2)))/(((16(111)^3))))))))^(-1) * ((((50.633251315/(4Pi*sqrt(111)))^2

$$\exp\left(-2\pi^2\times 100\times\frac{\left(\frac{50.633251315}{4\pi\sqrt{111}}\right)^2}{1+\frac{50.633251315^2\times 100^2}{16\times 111^3}}\right)$$

$1.8283237\ldots\times 10^{-58}$

1.8283237*10^-58

$$\frac{\pi^2}{2}T\frac{m_1^2}{\sqrt{(m_1+a+1)^3}}$$

(Pi^2)/2 * 50.633251315*100^2*1/((sqrt(111)^3))

$$\frac{\pi^2}{2}\times 50.633251315\times 100^2\times\frac{1}{\sqrt{111}^3}$$

2136.5895365...

2136.5895365...

((((((1+(((50.633251315^2*100^2)))/(((16(111)^3))))))))^(-1) * ((((50.633251315/(4Pi*sqrt(111)))^2

$$\frac{\left(\frac{50.633251315}{4\pi\sqrt{111}}\right)^2}{1+\frac{50.633251315^2\times 100^2}{16\times 111^3}}$$

0.067351501874...

0.067351501874

$$-\frac{1}{2}\arctan\frac{T m_1}{4\sqrt{m_1+a+1}}-T\sqrt{m_1+a+1}$$

-1/2 atan(50.633251315*100)/4*sqrt(111)-50.633251315*sqrt(111)

$$-\frac{1}{2}\tan^{-1}\left(\frac{50.633251315\times 100}{4\sqrt{111}}\right)+\sqrt{111}\times(-50.633251315)$$

-534.23564094...

(result in radians)

-534.23564094…

$$\left(\frac{2}{\sqrt{2\pi m_1}}\left(1+\frac{a}{m_1}\right)^{-1}\left(T m_1^{\frac{3}{2}}(m_1+a+1)^{-\frac{5}{2}}+19\right)\right)$$

2/((sqrt(2*Pi*100)))*(1+10/100)^-1 * (((50.633251315*100^1.5*(111)^(-2.5)+19)))

$$\frac{\frac{2}{\sqrt{2\pi\times 100}}\left(\frac{50.633251315\times 100^{1.5}}{111^{2.5}}+19\right)}{1+\frac{10}{100}}$$

1.40645702936248520009937562023161484090921649774814275055 3...

1.4064570293624852...

0.83964419172*1.8283237*10^-58 * cos(2136.5895365*0.067351501874-534.23564094)+1.4064570293624852

$$0.83964419172\times 1.8283237\times 10^{-58}\cos(2136.5895365\times 0.067351501874-534.23564094)+1.4064570293624852$$

1.40645702936248520000000000000000000000000000000000000000...

1.4064570293624852

We note that, from the difference of the below results of Ramanujan continued fractions (Rogers-Ramanujan identities), we obtain:

2,0663656771 - 0,6556795424 = 1,4106861347

From:

Collected Papers of

SRINIVASA RAMANUJAN

Edited by

G. H. HARDY

P. V. SESHU AIYAR

and

B. M. WILSON

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$$\phi(q)=1+\frac{q}{1+q^2}+\frac{q^4}{(1+q^2)(1+q^4)}+\dots,$$

and $q=e^{-t}\to 1$ by positive values

Mock ϑ-functions

$$\phi(q)=1+\frac{q}{1+q^2}+\frac{q^4}{(1+q^2)(1+q^4)}+\dots$$

For q = e^{-t} = e^(-0.8) = 0.4493289641172 ≈ 0.449329, we obtain :

$\boldsymbol{\phi(q)}$ **= 1.40643658…** =

$$= 1+\frac{0.449329}{1+0.449329^2}+\frac{0.449329^4}{(1+0.449329^2)(1+0.449329^4)} =$$

= 1.4064365895048910484929701419123708525837793421365755717 64...

= 1.4064365895…

Note that, the asymptotic formula for atomic inversion, above analyzed:

$$W(t)=U(T)=\frac{a}{m_1+a+1}+\frac{m_1+1}{m_1+a+1}\left(1+\frac{T^2m_1^2}{16(m_1+a+1)^3}\right)^{-\frac{1}{4}}$$

$$*\exp\left(-2\pi^2m_1\left(1+\frac{T^2m_1^2}{16(m_1+a+1)^3}\right)^{-1}\left(\left\|\frac{T}{4\pi\sqrt{m_1+a+1}}\right\|\right)^2\right)$$

$$*\cos\left(\frac{\pi^2}{2}T\frac{m_1^2}{\sqrt{(m_1+a+1)^3}}\left(1+\frac{T^2m_1^2}{16(m_1+a+1)^3}\right)^{-1}\left(\left\|\frac{T}{4\pi\sqrt{m_1+a+1}}\right\|\right)^2\right.$$

$$\left.-\frac{1}{2}\arctan\frac{Tm_1}{4\sqrt{m_1+a+1}}-T\sqrt{m_1+a+1}\right)$$

$$+\theta\left(\frac{2}{\sqrt{2\pi m_1}}\left(1+\frac{a}{m_1}\right)^{-1}\left(Tm_1^{\frac{3}{2}}(m_1+a+1)^{-\frac{5}{2}}+19\right)\right), \qquad (46)$$

is equal to: 1.4064570293624852. This result is practically equal to the following Ramanujan mock theta function:

$$\phi(q)=1+\frac{q}{1+q^2}+\frac{q^4}{(1+q^2)(1+q^4)}+\ldots$$

that is equal to: 1.4064365895… Thence, we have a new interesting mathematical connection:

$$W(t)=U(T)=\frac{a}{m_1+a+1}+\frac{m_1+1}{m_1+a+1}\left(1+\frac{T^2m_1^2}{16(m_1+a+1)^3}\right)^{-\frac{1}{4}}$$

$$*\exp\left(-2\pi^2m_1\left(1+\frac{T^2m_1^2}{16(m_1+a+1)^3}\right)^{-1}\left(\left\|\frac{T}{4\pi\sqrt{m_1+a+1}}\right\|\right)^2\right)$$

$$*\cos\left(\frac{\pi^2}{2}T\frac{m_1^2}{\sqrt{(m_1+a+1)^3}}\left(1+\frac{T^2m_1^2}{16(m_1+a+1)^3}\right)^{-1}\left(\left\|\frac{T}{4\pi\sqrt{m_1+a+1}}\right\|\right)^2\right.$$

$$\left.-\frac{1}{2}\arctan\frac{Tm_1}{4\sqrt{m_1+a+1}}-T\sqrt{m_1+a+1}\right)$$

$$+\theta\left(\frac{2}{\sqrt{2\pi m_1}}\left(1+\frac{a}{m_1}\right)^{-1}\left(Tm_1^{\frac{3}{2}}(m_1+a+1)^{-\frac{5}{2}}+19\right)\right),$$

⇒

⇒ $$\phi(q)=1+\frac{q}{1+q^2}+\frac{q^4}{(1+q^2)(1+q^4)}+\ldots$$

⇒ 1.4064570293624852 ≈ 1.4064365895…

Note that:

$$\theta\left(\frac{2}{\sqrt{2\pi m_1}}\left(1+\frac{a}{m_1}\right)^{-1}\left(Tm_1^{\frac{3}{2}}(m_1+a+1)^{-\frac{5}{2}}+19\right)\right)$$

2/((sqrt(2*Pi*100)))*(1+10/100)^-1 * (((50.633251315*100^1.5*(111)^(-2.5)+19)))

Input interpretation:

$$\frac{\frac{2}{\sqrt{2\pi\times 100}}\left(\frac{50.633251315\times 100^{1.5}}{111^{2.5}}+19\right)}{1+\frac{10}{100}}$$

Result:

1.4064570293624852000993756202316148409092164977481427505 53...

1.40645702936248520009937562…

Series representations:

$$\frac{\left(\frac{50.6332513150000\times 100^{1.5}}{111^{2.5}}+19\right)2}{\left(1+\frac{10}{100}\right)\sqrt{2\pi\,100}}=\frac{35.2546}{\sqrt{-1+200\pi}\sum_{k=0}^{\infty}(-1+200\pi)^{-k}\binom{\frac{1}{2}}{k}}$$

- $$\frac{\left(\frac{50.6332513150000\times 100^{1.5}}{111^{2.5}}+19\right)2}{\left(1+\frac{10}{100}\right)\sqrt{2\pi\,100}}=\frac{35.2546}{\sqrt{-1+200\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+200\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

- $$\frac{\left(\frac{50.6332513150000\times 100^{1.5}}{111^{2.5}}+19\right)2}{\left(1+\frac{10}{100}\right)\sqrt{2\pi\,100}}=\frac{35.2546}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(200\pi-z_0)^k z_0^{-k}}{k!}}$$

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

We note that the result 1.40645702936248520009937562… is practically the same of the full expression. Thence we can do the following mathematical connection:

$$\theta\left(\frac{2}{\sqrt{2\pi m_1}}\left(1+\frac{a}{m_1}\right)^{-1}\left(Tm_1^{\frac{3}{2}}(m_1+a+1)^{\ \frac{5}{2}}+19\right)\right)\Rightarrow$$

$$\Rightarrow \quad \phi(q) = 1 + \frac{q}{1+q^2} + \frac{q^4}{(1+q^2)(1+q^4)} + \ldots$$

⇒ 1.40645702936248520009937562 ≈ 1.4064365895…

From the result, we have also:

1/((((((1.4064570293624852)))*1/(144+34+11))))

Where 144 and 34 are Fibonacci numbers and 11 is a Lucas number

Input interpretation:

$$\frac{1}{1.4064570293624852 \times \frac{1}{144+34+11}}$$

Result:

134.3802164262845462110986122490064908475752886751142270195...

134.380216426…

1/((((((1.4064570293624852)))/(144+34+18))))

Where 144 and 34 are Fibonacci numbers and 18 is a Lucas number

Input interpretation:

$$\frac{1}{\frac{1.4064570293624852}{144+34+18}}$$

Result:

139.3572614791098997744726349248956201382262252927110502424...

139.3572614…

The above results are very near to the rest masses of two Pion mesons 134.9766 and 139.57

And:

1/((((((1.4064570293624852)))/(144+34+11+4))))

Where 144 and 34 are Fibonacci numbers, while 11 and 4 are Lucas numbers

Input interpretation:

$$\frac{1}{\frac{1.4064570293624852}{144+34+11+4}}$$

Result:

137.2242421707561768187409109209431361565186810280266974326...

137.22424217… result very near to the value of $1/\alpha$ = inverse of fine-structure constant = 137.035...

Now, we have that:

Above we showed that on the interval $0 \leq T \leq (m_1+a+1)^{\frac{5}{6}}$ approximately $\frac{1}{2\pi}(m_1+a+1)^{\frac{1}{3}}$ revivals appear, which are localized on the intervals of the form

$$4\pi\sqrt{m_1+a+1}\left(k-\frac{1}{2}\right) \leq T \leq 4\pi\sqrt{m_1+a+1}\left(k+\frac{1}{2}\right);$$

$k = 0, 1, 2, \ldots, k_1;\ k_1 = \left[\frac{(m_1+a+1)^{\frac{1}{3}}}{4\pi}\right].$

From

$$4\pi\sqrt{m_1+a+1}\left(k-\frac{1}{2}\right) \leq T \leq 4\pi\sqrt{m_1+a+1}\left(k+\frac{1}{2}\right);$$

We obtain:

4*Pi * ((sqrt(27425))) * (2+1/2)

Input:

$$4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)$$

Result:

$$50\sqrt{1097}\,\pi$$

Decimal approximation:

5202.632993974067167128810071831449602703253313810653613828...

5202.63299397…

Property:

$50\sqrt{1097}\,\pi$ is a transcendental number

-

Series representations:

$$4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)=10\pi\sqrt{27424}\sum_{k=0}^{\infty}27424^{-k}\binom{\frac{1}{2}}{k}$$

-

$$4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)=10\pi\sqrt{27424}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{27424}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}$$

-

$$4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)=\frac{5\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}27424^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

4*Pi * ((sqrt(27425))) * (2-1/2)

Input:

$$4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)$$

Result:

$$30\sqrt{1097}\,\pi$$

Decimal approximation:

3121.579796384440300277286043098869761621951988286392168297...

3121.5797963…

Property:

$30\sqrt{1097}\,\pi$ is a transcendental number

-

Series representations:

$$4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)=6\pi\sqrt{27424}\sum_{k=0}^{\infty}27424^{-k}\binom{\frac{1}{2}}{k}$$

-

$$4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)=6\pi\sqrt{27424}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{27424}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}$$

-

$$4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)=\frac{3\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}27424^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

More information »

1/2* (((((((4*Pi*((sqrt(27425)))*(2+1/2)))))+((((4*Pi*((sqrt(27425)))*(2-1/2))))))))

Input:

$$\frac{1}{2}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)$$

Result:

$40\sqrt{1097}\,\pi$

Decimal approximation:

- More digits

4162.106395179253733703048057465159682162602651048522891062...

4162.106395179…

Property:

$40\sqrt{1097}\,\pi$ is a transcendental number

-

Series representations:

$$\frac{1}{2}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)=8\pi\sqrt{27424}\sum_{k=0}^{\infty}27424^{-k}\binom{\frac{1}{2}}{k}$$

-

$$\frac{1}{2}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)=8\pi\sqrt{27424}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{27424}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}$$

-

$$\frac{1}{2}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)=\frac{4\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}27424^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

64+1/5* (((((((4*Pi * ((sqrt(27425))) * (2+1/2))))) + ((((4*Pi * ((sqrt(27425))) * (2-1/2))))))))

Input:

$$64+\frac{1}{5}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)$$

Result:

$$64+16\sqrt{1097}\,\pi$$

Decimal approximation:

1728.842558071701493481219222986063872865041060419409156425...

1728.842558…

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

Property:

$64+16\sqrt{1097}\,\pi$ is a transcendental number

- **Alternate form:**

$$16\left(4+\sqrt{1097}\,\pi\right)$$

- **Series representations:**

$$64+\frac{1}{5}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)=$$
$$64+\frac{16}{5}\pi\sqrt{27424}\sum_{k=0}^{\infty}27424^{-k}\binom{\frac{1}{2}}{k}$$

- $$64+\frac{1}{5}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)=$$
$$64+\frac{16}{5}\pi\sqrt{27424}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{27424}\right)^k\left(-\frac{1}{2}\right)_k}{k!}$$

- $$64+\frac{1}{5}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)=$$
$$64+\frac{8\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}27424^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{5\sqrt{\pi}}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

More information »

[64+1/5* (((((((4*Pi * ((sqrt(27425))) * (2+1/2))))) + ((((4*Pi * ((sqrt(27425))) * (2-1/2)))))))]^1/15

Input:

$$\sqrt[15]{64+\frac{1}{5}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)}$$

Exact result:

$$\sqrt[15]{64+16\sqrt{1097}\,\pi}$$

Decimal approximation:

1.6438052493217830658761646627034114889037360228588489518 46...

$1.643805249\ldots \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

Property:

$\sqrt[15]{64 + 16\sqrt{1097}\,\pi}$ is a transcendental number

- **Alternate form:**

$2^{4/15}\sqrt[15]{4 + \sqrt{1097}\,\pi}$

- **All 15th roots of 64 + 16 sqrt(1097) π:**

$\sqrt[15]{64 + 16\sqrt{1097}\,\pi}\; e^0 \approx 1.64381$ (real, principal root)

- $\sqrt[15]{64 + 16\sqrt{1097}\,\pi}\; e^{(2 i \pi)/15} \approx 1.50169 + 0.6686\, i$

- $\sqrt[15]{64 + 16\sqrt{1097}\,\pi}\; e^{(4 i \pi)/15} \approx 1.0999 + 1.2216\, i$

- $\sqrt[15]{64 + 16\sqrt{1097}\,\pi}\; e^{(2 i \pi)/5} \approx 0.5080 + 1.5634\, i$

- $\sqrt[15]{64 + 16\sqrt{1097}\,\pi}\; e^{(8 i \pi)/15} \approx -0.17182 + 1.63480\, i$

- **Series representations:**

-

$$\sqrt[15]{64+\frac{1}{5}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)} = \sqrt[15]{64+\frac{16}{5}\pi\sqrt{27424}\sum_{k=0}^{\infty}27424^{-k}\binom{\frac{1}{2}}{k}}$$

- $$\sqrt[15]{64+\frac{1}{5}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)} = \sqrt[15]{64+\frac{16}{5}\pi\sqrt{27424}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{27424}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}$$

- $$\sqrt[15]{64+\frac{1}{5}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)} = \sqrt[15]{64+\frac{8\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}27424^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{5\sqrt{\pi}}}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

Integral representation:

$$(1+z)^a = \frac{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(s)\Gamma(-a-s)}{z^s}\,ds}{(2\pi i)\Gamma(-a)} \quad \text{for } (0<\gamma<-\operatorname{Re}(a) \text{ and } |\arg(z)|<\pi)$$

$\operatorname{Re}(z)$ is the real part of z

$\arg(z)$ is the complex argument

$|z|$ is the absolute value of z

i is the imaginary unit

29/10^3+[64+1/5* (((((((4*Pi * ((sqrt(27425))) * (2+1/2))))) + ((((4*Pi * ((sqrt(27425))) * (2-1/2)))))))))]^1/15

Input:

$$\frac{29}{10^3}+\sqrt[15]{64+\frac{1}{5}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)}$$

Exact result:

$$\frac{29}{1000}+\sqrt[15]{64+16\sqrt{1097}\,\pi}$$

Decimal approximation:

1.672805249321783065876164662703411488903736022858848951846...

1.672805249…. result very near to the proton mass

Property:

$\frac{29}{1000}+\sqrt[15]{64+16\sqrt{1097}\,\pi}$ is a transcendental number

-

Alternate form:

$$\frac{29+1000\times 2^{4/15}\sqrt[15]{4+\sqrt{1097}\,\pi}}{1000}$$

-

Series representations:

$$\frac{29}{10^3}+\sqrt[15]{64+\frac{1}{5}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)}=$$
$$\frac{29}{1000}+\sqrt[15]{64+\frac{16}{5}\pi\sqrt{27424}\sum_{k=0}^{\infty}27424^{-k}\binom{\frac{1}{2}}{k}}$$

-

$$\frac{29}{10^3}+\sqrt[15]{64+\frac{1}{5}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)} =$$
$$\frac{29}{1000}+\sqrt[15]{64+\frac{16}{5}\pi\sqrt{27424}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{27424}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}$$

- $$\frac{29}{10^3}+\sqrt[15]{64+\frac{1}{5}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)} =$$
$$\frac{29}{1000}+\sqrt[15]{64+\frac{8\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}27424^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{5\sqrt{\pi}}}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

(4-29)/10^3+[64+1/5* (((((((4*Pi * ((sqrt(27425))) * (2+1/2))))) + ((((4*Pi * ((sqrt(27425))) * (2-1/2))))))))]^1/15

Input:

$$\frac{4-29}{10^3}+\sqrt[15]{64+\frac{1}{5}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)}$$

Exact result:

$$\sqrt[15]{64+16\sqrt{1097}\,\pi}-\frac{1}{40}$$

Decimal approximation:

1.618805249321783065876164662703411488903736022858848951846...

1.61880524932…

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

Property:

$-\frac{1}{40}+\sqrt[15]{64+16\sqrt{1097}\,\pi}$ is a transcendental number

- **Alternate form:**

$\frac{1}{40}\left(40\times 2^{4/15}\sqrt[15]{4+\sqrt{1097}\,\pi}-1\right)$

- **Series representations:**

$$\frac{4-29}{10^3}+\sqrt[15]{64+\frac{1}{5}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)}=-\frac{1}{40}+\sqrt[15]{64+\frac{16}{5}\pi\sqrt{27424}\sum_{k=0}^{\infty}27424^{-k}\binom{\frac{1}{2}}{k}}$$

- $$\frac{4-29}{10^3}+\sqrt[15]{64+\frac{1}{5}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)}=-\frac{1}{40}+\sqrt[15]{64+\frac{16}{5}\pi\sqrt{27424}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{27424}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}$$

- $$\frac{4-29}{10^3}+\sqrt[15]{64+\frac{1}{5}\left(4\pi\sqrt{27425}\left(2+\frac{1}{2}\right)+4\pi\sqrt{27425}\left(2-\frac{1}{2}\right)\right)}=-\frac{1}{40}+\sqrt[15]{64+\frac{8\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}27424^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{5\sqrt{\pi}}}$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

Now, we have that:

The infinite series (15) is approximated well enough by a finite sum. The accuracy of the approximation increases when the total number of summands of the approximating sum increases. We shall denote this total number of summands by $2\nu_1 + 1$ and assume that ν_1 is an arbitrary integer from the interval

$$1 < \nu_1 \leq \frac{1}{2} m_1$$

(later on, we shall define ν_1 precisely). Then for $F_1(T)$ the following formula is valid:

$$F_1(T) = F_2(T) + 4\theta \frac{m_1}{\nu_1} \left(1 + \frac{a}{m_1}\right)^{-1} \exp\left(-\frac{\nu_1^2}{4m_1}\right), \tag{16}$$

$$m_2 - m_1 + a + 1, \tag{22}$$

$$\beta_0 = T\sqrt{m_2}, \quad \beta_1 = \frac{T}{2\sqrt{m_2}}, \quad \beta_2 = \frac{T}{8\sqrt{m_2^3}}. \tag{23}$$

$$F_2(T) = \left(1 + \frac{a}{m_1 + 1}\right)^{-1} \left(F_3(T) + \frac{1}{2}\theta_1 T m_1^2 m_2^{-\frac{5}{2}} + 10\theta_2\right), \tag{25}$$

where

$$F_3(T) = \sum_{-\nu_1 \leqslant \nu \leqslant \nu_1} \exp\left(-\frac{\nu^2}{2m_1}\right) \cos\left(\beta_0 + \beta_1 \nu - \beta_2 \nu^2\right). \tag{26}$$

For $\nu = 2900$, $m_1 = 10000$, $a = 17424$, $T = 4162.106395179\ldots$; $m_2 = 27425$

$\beta_0 = 689265.427$; $\beta_1 = 12.5663706$; $\beta_2 = 0.000114552148$;

we obtain, from (26):

exp(((-2900^2)/(20000))) * cos((((((((4162.10639*sqrt(27425)+((((4162.10639)/(2*sqrt(27425)))*2900))))-((4162.10639)/(8*sqrt(27425^3)))*2900^2)))))))

Input interpretation:

$$\exp\left(-\frac{2900^2}{20\,000}\right)$$
$$\cos\left(\left(4162.10639\sqrt{27425}+\frac{4162.10639}{2\sqrt{27425}}\times 2900\right)-\frac{4162.10639}{8\sqrt{27425^3}}\times 2900^2\right)$$

Result:

$$-1.11901\ldots\times 10^{-183}$$

-1.11901…*10^{-183}

We note that, from the algebraic sum of the below results of Ramanujan continued fractions (Rogers-Ramanujan identities), we obtain:

2,0663656771 - 0,9568666373 = 1,1094990398

Addition formulas:

$$\exp\left(-\frac{2900^2}{20\,000}\right)\cos\left(\left(4162.11\sqrt{27425}+\frac{2900\times 4162.11}{2\sqrt{27425}}\right)-\frac{2900^2\times 4162.11}{8\sqrt{27425^3}}\right)=$$
$$\exp\left(-\frac{841}{2}\right)\left(\cos\left(\frac{6.03505\times 10^6}{\sqrt{27425}}\right)\cos\left(-4162.11\sqrt{27425}+\frac{4.37541\times 10^9}{\sqrt{20\,627\,182\,390\,625}}\right)+\right.$$
$$\left.\sin\left(\frac{6.03505\times 10^6}{\sqrt{27425}}\right)\sin\left(-4162.11\sqrt{27425}+\frac{4.37541\times 10^9}{\sqrt{20\,627\,182\,390\,625}}\right)\right)$$

-

$$\exp\left(-\frac{2900^2}{20\,000}\right)\cos\left(\left(4162.11\sqrt{27425}+\frac{2900\times 4162.11}{2\sqrt{27425}}\right)-\frac{2900^2\times 4162.11}{8\sqrt{27425^3}}\right)=$$
$$\exp\left(-\frac{841}{2}\right)\left(\cos\left(\frac{6.03505\times 10^6}{\sqrt{27425}}\right)\cos\left(4162.11\sqrt{27425}-\frac{4.37541\times 10^9}{\sqrt{20\,627\,182\,390\,625}}\right)-\right.$$
$$\left.\sin\left(\frac{6.03505\times 10^6}{\sqrt{27425}}\right)\sin\left(4162.11\sqrt{27425}-\frac{4.37541\times 10^9}{\sqrt{20\,627\,182\,390\,625}}\right)\right)$$

-

$$\exp\left(-\frac{2900^2}{20\,000}\right)\cos\left(\left(4162.11\sqrt{27425}+\frac{2900\times 4162.11}{2\sqrt{27425}}\right)-\frac{2900^2\times 4162.11}{8\sqrt{27\,425^3}}\right)=$$
$$\exp\left(-\frac{841}{2}\right)$$
$$\left(\cosh\left(i\left(4162.11\sqrt{27425}-\frac{4.37541\times 10^9}{\sqrt{20\,627\,182\,390\,625}}\right)\right)\cos\left(\frac{6.03505\times 10^6}{\sqrt{27425}}\right)+\right.$$
$$\left.i\sinh\left(i\left(4162.11\sqrt{27425}-\frac{4.37541\times 10^9}{\sqrt{20\,627\,182\,390\,625}}\right)\right)\sin\left(\frac{6.03505\times 10^6}{\sqrt{27425}}\right)\right)$$

-

$$\exp\left(-\frac{2900^2}{20\,000}\right)\cos\left(\left(4162.11\sqrt{27425}+\frac{2900\times 4162.11}{2\sqrt{27425}}\right)-\frac{2900^2\times 4162.11}{8\sqrt{27\,425^3}}\right)=$$
$$\exp\left(-\frac{841}{2}\right)$$
$$\left(\cosh\left(-i\left(4162.11\sqrt{27425}-\frac{4.37541\times 10^9}{\sqrt{20\,627\,182\,390\,625}}\right)\right)\cos\left(\frac{6.03505\times 10^6}{\sqrt{27425}}\right)-\right.$$
$$\left.i\left(\sinh\left(-i\left(4162.11\sqrt{27425}-\frac{4.37541\times 10^9}{\sqrt{20\,627\,182\,390\,625}}\right)\right)\sin\left(\frac{6.03505\times 10^6}{\sqrt{27425}}\right)\right)\right)$$

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

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

i is the imaginary unit

-

Alternative representations:

$$\exp\left(-\frac{2900^2}{20\,000}\right)\cos\left(\left(4162.11\sqrt{27425}+\frac{2900\times 4162.11}{2\sqrt{27425}}\right)-\frac{2900^2\times 4162.11}{8\sqrt{27\,425^3}}\right)=$$
$$\cosh\left(i\left(\frac{1.20701\times 10^7}{2\sqrt{27425}}-\frac{4162.11\times 2900^2}{8\sqrt{27\,425^3}}+4162.11\sqrt{27425}\right)\right)\exp\left(-\frac{2900^2}{20\,000}\right)$$

-

$$\exp\left(-\frac{2900^2}{20\,000}\right)\cos\left(\left(4162.11\sqrt{27425}+\frac{2900\times 4162.11}{2\sqrt{27425}}\right)-\frac{2900^2\times 4162.11}{8\sqrt{27\,425^3}}\right)=$$
$$\cosh\left(-i\left(\frac{1.20701\times 10^7}{2\sqrt{27425}}-\frac{4162.11\times 2900^2}{8\sqrt{27\,425^3}}+4162.11\sqrt{27425}\right)\right)\exp\left(-\frac{2900^2}{20\,000}\right)$$

- $$\exp\left(-\frac{2900^2}{20\,000}\right)\cos\left(\left(4162.11\sqrt{27425}+\frac{2900\times 4162.11}{2\sqrt{27425}}\right)-\frac{2900^2\times 4162.11}{8\sqrt{27\,425^3}}\right)=$$
$$\frac{1}{2}\exp\left(-\frac{2900^2}{20\,000}\right)\left(e^{-i\left(\frac{1.20701\times 10^7}{2\sqrt{27425}}-\frac{4162.11\times 2900^2}{8\sqrt{27425^3}}+4162.11\sqrt{27425}\right)}+e^{i\left(\frac{1.20701\times 10^7}{2\sqrt{27425}}-\frac{4162.11\times 2900^2}{8\sqrt{27425^3}}+4162.11\sqrt{27425}\right)}\right)$$

- **Series representations:**

$$\exp\left(-\frac{2900^2}{20\,000}\right)\cos\left(\left(4162.11\sqrt{27425}+\frac{2900\times 4162.11}{2\sqrt{27425}}\right)-\frac{2900^2\times 4162.11}{8\sqrt{27\,425^3}}\right)=$$
$$\exp\left(-\frac{841}{2}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{6.03505\times 10^6}{\sqrt{27425}}+4162.11\sqrt{27425}-\frac{4.37541\times 10^9}{\sqrt{20\,627\,182\,390\,625}}\right)^{2k}}{(2k)!}$$

- $$\exp\left(-\frac{2900^2}{20\,000}\right)\cos\left(\left(4162.11\sqrt{27425}+\frac{2900\times 4162.11}{2\sqrt{27425}}\right)-\frac{2900^2\times 4162.11}{8\sqrt{27\,425^3}}\right)=$$
$$J_0\left(\frac{6.03505\times 10^6}{\sqrt{27425}}+4162.11\sqrt{27425}-\frac{4.37541\times 10^9}{\sqrt{20\,627\,182\,390\,625}}\right)\exp\left(-\frac{841}{2}\right)+$$
$$2\exp\left(-\frac{841}{2}\right)\sum_{k=1}^{\infty}(-1)^k J_{2k}\left(\frac{6.03505\times 10^6}{\sqrt{27425}}+4162.11\sqrt{27\,425}-\frac{4.37541\times 10^9}{\sqrt{20\,627\,182\,390\,625}}\right)$$

$n!$ is the factorial function

$J_n(z)$ is the Bessel function of the first kind

- **Integral representations:**

$$\exp\left(-\frac{2900^2}{20000}\right)\cos\left(\left(4162.11\sqrt{27425}+\frac{2900\times 4162.11}{2\sqrt{27425}}\right)-\frac{2900^2\times 4162.11}{8\sqrt{27425^3}}\right)= -\exp\left(-\frac{841}{2}\right)\int_{\frac{\pi}{2}}^{\frac{6.03505\times 10^6}{\sqrt{27425}}+4162.11\sqrt{27425}-\frac{4.37541\times 10^9}{\sqrt{20627182390625}}}\sin(t)\,dt$$

•

$$\exp\left(-\frac{2900^2}{20000}\right)\cos\left(\left(4162.11\sqrt{27425}+\frac{2900\times 4162.11}{2\sqrt{27425}}\right)-\frac{2900^2\times 4162.11}{8\sqrt{27425^3}}\right)= \exp\left(-\frac{841}{2}\right)\left(1+-\frac{6.03505\times 10^6}{\sqrt{27425}}-4162.11\sqrt{27425}+\frac{4.37541\times 10^9}{\sqrt{20627182390625}} \int_0^1 \sin\left(t\left(\frac{6.03505\times 10^6}{\sqrt{27425}}+4162.11\sqrt{27425}-\frac{4.37541\times 10^9}{\sqrt{20627182390625}}\right)\right)dt\right)$$

•

$$\exp\left(-\frac{2900^2}{20000}\right)\cos\left(\left(4162.11\sqrt{27425}+\frac{2900\times 4162.11}{2\sqrt{27425}}\right)-\frac{2900^2\times 4162.11}{8\sqrt{27425^3}}\right)= \frac{\exp\left(-\frac{841}{2}\right)\sqrt{\pi}}{2\,i\,\pi} \int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{s-\left(\frac{6.03505\times 10^6}{\sqrt{27425}}+4162.11\sqrt{27425}-\frac{4.37541\times 10^9}{\sqrt{20627182390625}}\right)^2/(4s)}}{\sqrt{s}}\,ds \quad \text{for } \gamma>0$$

•

$$\exp\left(-\frac{2900^2}{20000}\right)\cos\left(\left(4162.11\sqrt{27425}+\frac{2900\times 4162.11}{2\sqrt{27425}}\right)-\frac{2900^2\times 4162.11}{8\sqrt{27425^3}}\right)= \frac{\exp\left(-\frac{841}{2}\right)\sqrt{\pi}}{2\,i\,\pi} \int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{4^s\,\Gamma(s)\left(\frac{6.03505\times 10^6}{\sqrt{27425}}+4162.11\sqrt{27425}-\frac{4.37541\times 10^9}{\sqrt{20627182390625}}\right)^{-2s}}{\Gamma\left(\frac{1}{2}-s\right)}\,ds$$

$$\text{for } 0<\gamma<\frac{1}{2}$$

$\Gamma(x)$ is the gamma function

For $\nu = 2900$, $m_1 = 10000$, $a = 17424$, $T = 4162.106395179\ldots$; $m_2 = 27425$

$\beta_0 = 689265.427$; $\beta_1 = 12.5663706$; $\beta_2 = 0.000114552148$;

$$F_2(T) = \left(1 + \frac{a}{m_1+1}\right)^{-1} \left(F_3(T) + \frac{1}{2}\theta_1 T m_1^2 m_2^{-\frac{5}{2}} + 10\theta_2\right)$$

(1+(17424/10001))^-1 * (((-1.11901*10^{-183} + 1/2*4162.106395*10000^2*27425^(-2.5)+10))

Input interpretation:

$$\frac{-\frac{1.11901}{10^{183}} + \frac{\frac{1}{2}\times 4162.106395\times 10\,000^2}{27425^{2.5}} + 10}{1 + \frac{17\,424}{10001}}$$

Result:

4.255947777744795774067796008585820617910706468273551850 22...

4.25594777….

We note that, from the sum of the below results of Ramanujan continued fractions (Rogers-Ramanujan identities), we obtain:

0,9991104684 + 0,9568666373 + 0,5269391135 + 0,5683 + 0,655679 + 0,5269391135 = 4,2338343327 a value very near to the result of equation 4.255947...

Now, we have that:

$$F_4(T) = \sum_{\nu=-\infty}^{+\infty} \exp\left(-\frac{\nu^2}{2m_1}\right) \cos\left(\beta_2\nu^2 - \beta_1\nu - \beta_0\right).$$

For ν = 2900, m_1 = 10000, a = 17424, T = 4162.106395179…; m_2 = 27425

β_0 = 689265.427; β_1 = 12.5663706; β_2 = 0.000114552148; we obtain:

exp(-2900^2/20000) cos(0.000114552148*2900^2-12.5663706*2900-689265.427)

Input interpretation:

$$\exp\left(-\frac{2900^2}{20\,000}\right)\cos(0.000114552148\times 2900^2 + 2900\times(-12.5663706) - 689\,265.427)$$

Result:

$-1.11973... \times 10^{-183}$

-1.11973…*10^{-183}

We note that, from the algebraic sum of the below results of Ramanujan continued fractions (Rogers-Ramanujan identities), we obtain:

2,0663656771 - 0,9568666373 = 1,1094990398

Alternative representations:

$$\exp\left(-\frac{2900^2}{20\,000}\right)\cos(0.000114552\times 2900^2-12.5664\times 2900-689\,265.)=$$
$$\cosh(i\,(-725\,708.+0.000114552\times 2900^2))\exp\left(-\frac{2900^2}{20\,000}\right)$$

-

$$\exp\left(-\frac{2900^2}{20\,000}\right)\cos(0.000114552\times 2900^2-12.5664\times 2900-689\,265.)=$$
$$\cosh(-i\,(-725\,708.+0.000114552\times 2900^2))\exp\left(-\frac{2900^2}{20\,000}\right)$$

-

$$\exp\left(-\frac{2900^2}{20\,000}\right)\cos(0.000114552\times 2900^2-12.5664\times 2900-689\,265.)=$$
$$\frac{1}{2}\exp\left(-\frac{2900^2}{20\,000}\right)\left(e^{-i\,(-725\,708.+0.000114552\times 2900^2)}+e^{i\,(-725\,708.+0.000114552\times 2900^2)}\right)$$

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

i is the imaginary unit

-

Series representations:

$$\exp\left(-\frac{2900^2}{20\,000}\right)\cos(0.000114552\times 2900^2-12.5664\times 2900-689\,265.)=$$
$$\exp\left(-\frac{841}{2}\right)\sum_{k=0}^{\infty}\frac{(-724\,745.)^{2k}\,(-1)^k}{(2\,k)!}$$

-

$$\exp\left(-\frac{2900^2}{20\,000}\right)\cos(0.000114552\times 2900^2-12.5664\times 2900-689\,265.)=$$
$$-\exp\left(-\frac{841}{2}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-724\,745.-\frac{\pi}{2}\right)^{1+2\,k}}{(1+2\,k)!}$$

•

$$\exp\left(-\frac{2900^2}{20\,000}\right)\cos(0.000114552\times 2900^2-12.5664\times 2900-689\,265.)=$$
$$\exp\left(-\frac{841}{2}\right)\sum_{k=0}^{\infty}\frac{\cos\left(\frac{k\pi}{2}+z_0\right)(-724\,745.-z_0)^k}{k!}$$

$n!$ is the factorial function

•

Integral representations:

$$\exp\left(-\frac{2900^2}{20\,000}\right)\cos(0.000114552\times 2900^2-12.5664\times 2900-689\,265.)=$$
$$\exp\left(-\frac{841}{2}\right)+724\,745.\exp\left(-\frac{841}{2}\right)\int_0^1\sin(-724\,745.\,t)\,dt$$

•

$$\exp\left(-\frac{2900^2}{20\,000}\right)\cos(0.000114552\times 2900^2-12.5664\times 2900-689\,265.)=$$
$$-\exp\left(-\frac{841}{2}\right)\int_{\frac{\pi}{2}}^{-724\,745.}\sin(t)\,dt$$

•

$$\exp\left(-\frac{2900^2}{20\,000}\right)\cos(0.000114552\times 2900^2-12.5664\times 2900-689\,265.)=$$
$$\frac{\exp\left(-\frac{841}{2}\right)\sqrt{\pi}}{2\,i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-1.31314\times 10^{11}/s+s}}{\sqrt{s}}\,ds\quad\text{for }\gamma>0$$

From (26) one can see that $F_3(T)$ is a "principal part" of the Theta series $F_4(T)$:

$$F_3(T)=F_4(T)+\ 10\theta_1\frac{m_1}{v_1}\exp\left(-\frac{v_1^2}{2m_1}\right),\qquad(27)$$

We obtain, from:

$$F_3(T)=F_4(T)+\ 10\theta_1\frac{m_1}{v_1}\exp\left(-\frac{v_1^2}{2m_1}\right),$$

-1.11973*10^-183 + 10*(10000/5000)* exp(((-5000^2)/(20000)))

Input interpretation:

$$-\frac{1.11973}{10^{183}}+10\times\frac{10\,000}{5000}\exp\left(-\frac{5000^2}{20\,000}\right)$$

Result:

$-1.1197299999999999999999999999999999999999999999999999... \times 10^{-183}$

$-1.11973 * 10^{-183}$

Now, we have that:

Now we apply the functional equation to the Theta function $F_4(T)$. We can rewrite $F_4(T)$ in the form

$$F_4(T)=\Re\sum_{\nu=-\infty}^{+\infty}\exp\left(-\frac{\nu^2}{2m_1}\right)\exp\left(i\left(\beta_2\nu^2-\beta_1\nu-\beta_0\right)\right).$$

Lemma 1. *Let*

$$F_4(T)=\sum_{\nu=-\infty}^{+\infty}\exp\left(-\frac{\nu^2}{2m_1}\right)\cos\left(\beta_2\nu^2-\beta_1\nu-\beta_0\right).$$

Then the following formula holds

$$F_4(T)=T_2^{-\frac{1}{4}}\sum_{n=-\infty}^{+\infty}\exp\left(-\frac{1}{2m_1T_2}\left(n-\frac{\beta_1}{2\pi}\right)^2\right)\cos\left(-\frac{\beta_2}{T_2}\left(n-\frac{\beta_1}{2\pi}\right)^2+\frac{\varphi_1}{2}-\beta_0\right),$$

where

$$\varphi_1=\arctan(2m_1\beta_2),$$
$$T_2=\frac{1}{4\pi^2m_1^2}+\frac{\beta_2^2}{\pi^2}.$$

For $\nu = 2900$, $m_1 = 10000$, $a = 17424$, $T = 4162.106395179…$; $m_2 = 27425$

$\beta_0 = 689265.427$; $\beta_1 = 12.5663706$; $\beta_2 = 0.000114552148$; we obtain:

atan(20000*0.000114552148)

$\tan^{-1}(20\,000\times 0.000114552148)$

$\tan^{-1}(x)$ is the inverse tangent function

1.15924030...

(result in radians)

1.15924030.... = φ_1

1/(4Pi^2*10000^2)+(0.000114552148)^2/(Pi^2)

$$\frac{1}{4\pi^2 \times 10000^2} + \frac{0.000114552148^2}{\pi^2}$$

$1.58285925... \times 10^{-9}$

$1.58285925 * 10^{-9} = T_2$

We have from:

$$F_4(T) = T_2^{-\frac{1}{4}} \sum_{n=-\infty}^{+\infty} \exp\left(-\frac{1}{2m_1T_2}\left(n-\frac{\beta_1}{2\pi}\right)^2\right) \cos\left(-\frac{\beta_2}{T_2}\left(n-\frac{\beta_1}{2\pi}\right)^2 + \frac{\varphi_1}{2} - \beta_0\right),$$

And

For $\nu = 2900$, $m_1 = 10000$, $a = 17424$, $T = 4162.106395179…$; $m_2 = 27425$

$\beta_0 = 689265.427$; $\beta_1 = 12.5663706$; $\beta_2 = 0.000114552148$; we obtain:

From:
(1.58285925*10^-9)^-0.25 * exp((((-1/(20000*1.58285925*10^-9))*((16-12.5663706/(2Pi))^2)))) * cos((((((-0.000114552148/1.58285925*10^-9))*(((16-12.5663706/(2Pi))^2)))+1.15924030/2-689265.427)))))

we obtain:

(1.5828592*10^-9)^-0.25 * sum [exp((((-1/(20000*1.5828592*10^-9))*((n-12.56637/(2Pi))^2))))* cos(((((-0.000114552/1.5828592*10^-9))*(((n-12.56637/(2Pi))^2)))+1.15924/2-689265.4)))))] n = 0 to infinity

Input interpretation:

$$\left(\sum_{n=0}^{\infty} \exp\left(-\frac{\left(n-\frac{12.56637}{2\pi}\right)^2}{20\,000\times 1.5828592\times 10^{-9}}\right) \cos\left(-\frac{0.000114552}{1.5828592\times 10^{-9}}\left(16-\frac{12.56637}{2\pi}\right)^2+\frac{1.15924}{2}-689\,265.4\right)\right) \Big/ \left(1.5828592\times 10^{-9}\right)^{0.25}$$

Result:

102.466

102.466

Or, more precisely:

sum [exp((((-1/(20000*1.58285925*10^-9))*((n-12.5663706/(2Pi))^2))))* cos((((-0.000114552148/1.58285925*10^-9))*(((n-12.5663706/(2Pi))^2)))+1.15924030/2-689265.427)] n = 0 to infinity)]

Input interpretation:

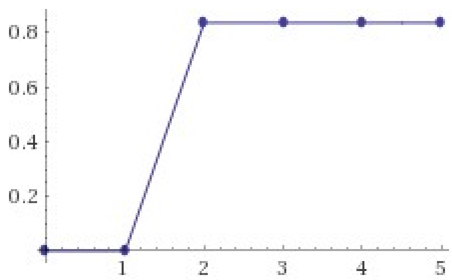
$$\sum_{n=0}^{\infty} \exp\left(-\frac{\left(n-\frac{12.5664}{2\pi}\right)^2}{20\,000\times 1.58285925\times 10^{-9}}\right) \cos\left(-\frac{0.000114552\left(n-\frac{12.5664}{2\pi}\right)^2}{1.58285925\times 10^{-9}}+\frac{1.15924}{2}-689\,265.\right)$$

Approximated sum:

$$\sum_{n=0}^{\infty} \exp\left(-\frac{\left(n-\frac{12.5664}{2\pi}\right)^2}{20\,000\times 1.58285925\times 10^{-9}}\right) \cos\left(-\frac{0.000114552\left(n-\frac{12.5664}{2\pi}\right)^2}{1.58285925\times 10^{-9}}+\frac{1.15924}{2}-689\,265.\right) \approx 0.836014$$

0.836014

Partial sums:



(1.58285925*10^-9)^-0.25 * 0.836014

Input interpretation:

$$\frac{0.836014}{(1.58285925\times 10^{-9})^{0.25}}$$

Result:

132.541833978974262431075424734807037571305821779577838034 7...

132.541833978....

5+13 * (1.58285925*10^-9)^-0.25 * 0.836014

Where 5 and 13 are Fibonacci numbers

Input interpretation:

$$5+\frac{13\times 0.836014}{(1.58285925\times 10^{-9})^{0.25}}$$

Result:

1728.04...

1728.04...

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

((((5+13 * (1.58285925*10^-9)^-0.25 * 0.836014))))^1/15

Input interpretation:

$$\sqrt[15]{5+\frac{13\times 0.836014}{(1.58285925\times 10^{-9})^{0.25}}}$$

Result:

1.643754609766654109701091873511518749449788465730368493267...

1.6437546097.... ≈ ζ(2) = $\frac{\pi^2}{6} = 1.644934$ ...

(21/10^3+7/10^3)+((((5+13 * (1.58285925*10^-9)^-0.25 * 0.836014))))^1/15

Where 21 is a Fibonacci number and 7 is a Lucas number

Input interpretation:

$$\left(\frac{21}{10^3}+\frac{7}{10^3}\right)+\sqrt[15]{5+\frac{13\times 0.836014}{(1.58285925\times 10^{-9})^{0.25}}}$$

Result:

1.671754609766654109701091873511518749449788465730368493267...

1.6717546097…

We note that 1.6717546097... is a result practically equal to the value of the formula:

$m_{p\prime} = 2\times\frac{\eta}{R}m_P = 1.6714213\times 10^{-24}$ gm

that is the holographic proton mass

-(21/10^3+4/10^3)+((((5+13 * (1.58285925*10^-9)^-0.25 * 0.836014))))^1/15

Where 21 is a Fibonacci number and 4 is a Lucas number

Input interpretation:

$$-\left(\frac{21}{10^3}+\frac{4}{10^3}\right)+\sqrt[15]{5+\frac{13\times 0.836014}{(1.58285925\times 10^{-9})^{0.25}}}$$

Result:

1.618754609766654109701091873511518749449788465730368493267...

1.61875460976….

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

From the principal result, we have also:

((((1.58285925*10^-9)^-0.25 * 0.836014)))^1/10

Input interpretation:

$$\sqrt[10]{\frac{0.836014}{(1.58285925\times 10^{-9})^{0.25}}}$$

Result:

1.630179012444008356380975673435552441156274293224377178227...

1.6301790124....

(11/10^3+4/10^3)+((((1.58285925*10^-9)^-0.25 * 0.836014)))^1/10

Where 11 and 4 are Lucas number

Input interpretation:

$$\left(\frac{11}{10^3}+\frac{4}{10^3}\right)+\sqrt[10]{\frac{0.836014}{(1.58285925\times 10^{-9})^{0.25}}}$$

Result:

1.645179012444008356380975673435552441156274293224377178227...

1.6451790124.... ≈ $\zeta(2) = \frac{\pi^2}{6} = 1.644934$ ...

(34/10^3+7/10^3)+((((1.58285925*10^-9)^-0.25 * 0.836014)))^1/10

Where 34 is a Fibonacci numbers and 7 is a Lucas number

Input interpretation:

$$\left(\frac{34}{10^3}+\frac{7}{10^3}\right)+\sqrt[10]{\frac{0.836014}{(1.58285925\times 10^{-9})^{0.25}}}$$

Result:

1.671179012444008356380975673435552441156274293224377178227...

1.6711790124….

We note that 1.6711790124... is a result practically equal to the value of the formula:

$m_{p\prime} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

-(5/10^3+7/10^3)+((((1.58285925*10^-9)^-0.25 * 0.836014)))^1/10

Where 5 is a Fibonacci number and 7 is a Lucas number

Input interpretation:

$$-\left(\frac{5}{10^3}+\frac{7}{10^3}\right)+\sqrt[10]{\frac{0.836014}{(1.58285925\times 10^{-9})^{0.25}}}$$

Result:

1.618179012444008356380975673435552441156274293224377178227...

1.6181790124....

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

Now, we have that:

$$\sum_{\substack{n=-\infty \\ n\neq n_1}}^{+\infty} \exp\left(-\frac{1}{2m_1T_2}\left(n-\frac{\beta_1}{2\pi}\right)^2\right) \leq 2\left(\exp\left(-\frac{\pi^2}{4}m_1\right)+\exp\left(-4\pi^2 m_2^{\frac{1}{3}}\right)\right).$$

2*((((exp(-Pi^2/4 * 10000)+exp(-4Pi^2*17424^(1/3))))

Input:

$$2\left(\exp\left(-\frac{\pi^2}{4}\times 10\,000\right)+\exp\left(-4\,\pi^2\,\sqrt[3]{17424}\right)\right)$$

Exact result:

$$2\left(e^{-2500\,\pi^2}+e^{-8\,\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)$$

Decimal approximation:

$$6.502336010061139407524618921437846927844004174613568\ldots\times 10^{-445}$$

$6.50233601\ldots*10^{-445}$

We note that, from the below results of Ramanujan continued fractions (Rogers-Ramanujan identities), we obtain:

0.6556795424 multiplied by 10^{-444}, is equal to $6.5567\ldots * 10^{-445}$

Alternate forms:

$$2\,e^{-2500\,\pi^2}+2\,e^{-8\,\sqrt[3]{2}\,33^{2/3}\,\pi^2}$$

-

$$2\,e^{-2500\,\pi^2-8\,\sqrt[3]{2}\,33^{2/3}\,\pi^2}\left(e^{2500\,\pi^2}+e^{8\,\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)$$

-

Series representations:

$$2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\,\pi^2\,\sqrt[3]{17424}\right)\right)=$$
$$2\,e^{-15\,000\times\sum_{k=1}^{\infty}1/k^2}+2\,e^{-48\,\sqrt[3]{2}\,33^{2/3}\times\sum_{k=1}^{\infty}1/k^2}$$

-

$$2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\,\pi^2\,\sqrt[3]{17424}\right)\right)=$$
$$2\,e^{-40\,000\left(\sum_{k=0}^{\infty}(-1)^k/(1+2\,k)\right)^2}+2\exp\left(-128\,\sqrt[3]{2}\,33^{2/3}\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2\,k}\right)^2\right)$$

- $$2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\,\pi^2\,\sqrt[3]{17424}\right)\right)=$$
$$2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-15\,000\times\sum_{k=1}^{\infty}1/k^2}+2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-48\,\sqrt[3]{2}\,33^{2/3}\times\sum_{k=1}^{\infty}1/k^2}$$

$n!$ is the factorial function

colog(((2*((((exp(-Pi^2/4 * 10000)+exp(-4Pi^2*17424^(1/3)))))))))

Input:
$$-\log\left(2\left(\exp\left(-\frac{\pi^2}{4}\times10\,000\right)+\exp\left(-4\,\pi^2\,\sqrt[3]{17424}\right)\right)\right)$$

$\log(x)$ is the natural logarithm

Exact result:
$$-\log\left(2\left(e^{-2500\,\pi^2}+e^{-8\,\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)\right)$$

Decimal approximation:
1022.7782048838492245003506325054281079041429285059935724 64...

1022.77820488… result very near to the rest mass of Phi meson 1019.445

Alternate forms:
$$-\log(2)-\log\left(e^{-2500\,\pi^2}+e^{-8\,\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)$$

- $$\left(2500+8\,\sqrt[3]{2}\,33^{2/3}\right)\pi^2-\log\left(2\left(e^{2500\,\pi^2}+e^{8\,\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)\right)$$

$$4\left(625+2\,\sqrt[3]{2}\,33^{2/3}\right)\pi^2-\log(2)-\log\left(e^{2500\,\pi^2}+e^{8\,\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)$$

Alternative representations:

$$-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\,\pi^2\,\sqrt[3]{17424}\right)\right)\right)=$$
$$-\log_e\left(2\left(\exp\left(-\frac{10\,000\,\pi^2}{4}\right)+\exp\left(-4\,\sqrt[3]{17\,424}\,\pi^2\right)\right)\right)$$

•

$$-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\,\pi^2\,\sqrt[3]{17424}\right)\right)\right)=$$
$$-\log(a)\,\log_a\left(2\left(\exp\left(-\frac{10\,000\,\pi^2}{4}\right)+\exp\left(-4\,\sqrt[3]{17\,424}\,\pi^2\right)\right)\right)$$

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

Series representations:

$$-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\,\pi^2\,\sqrt[3]{17424}\right)\right)\right)=$$
$$\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+2\left(e^{-2500\,\pi^2}+e^{-8\,\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)\right)^k}{k}$$

•

$$-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\,\pi^2\,\sqrt[3]{17424}\right)\right)\right)=$$
$$-2\,i\,\pi\left\lfloor\frac{\arg\left(2\left(e^{-2500\,\pi^2}+e^{-8\,\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)-x\right)}{2\,\pi}\right\rfloor-\log(x)+$$
$$\sum_{k=1}^{\infty}\frac{(-1)^k\left(2\left(e^{-2500\,\pi^2}+e^{-8\,\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)-x\right)^k\,x^{-k}}{k}\quad\text{for } x<0$$

•

$$-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\,\pi^2\,\sqrt[3]{17424}\right)\right)\right)=-2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor-$$
$$\log(z_0)+\sum_{k=1}^{\infty}\frac{(-1)^k\left(2\left(e^{-2500\,\pi^2}+e^{-8\,\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)-z_0\right)^k\,z_0^{-k}}{k}$$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

Integral representation:

$$-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\,\pi^2\sqrt[3]{17424}\right)\right)\right)=$$
$$-\int_1^{2\left(e^{-2500\,\pi^2}+e^{-8\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)}\frac{1}{t}\,dt$$

(521+199-11-3)+colog(((2*((((exp(-Pi^2/4 * 10000)+exp(-4Pi^2*17424^(1/3))))))))

Where 3, 11, 199 and 521 are Lucas numbers

Input:

$$(521+199-11-3)-\log\left(2\left(\exp\left(-\frac{\pi^2}{4}\times 10\,000\right)+\exp\left(-4\,\pi^2\sqrt[3]{17424}\right)\right)\right)$$

$\log(x)$ is the natural logarithm

Exact result:

$$706-\log\left(2\left(e^{-2500\,\pi^2}+e^{-8\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)\right)$$

Decimal approximation:

1728.7782048838492245003506325054281079041429285059935724 64...

1728.7782…

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

Alternate forms:

$$706-\log(2)-\log\left(e^{-2500\,\pi^2}+e^{-8\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)$$

•

$$706+\left(2500+8\sqrt[3]{2}\,33^{2/3}\right)\pi^2-\log\left(2\left(e^{2500\,\pi^2}+e^{8\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)\right)$$

$$706+4\left(625+2\sqrt[3]{2}\ 33^{2/3}\right)\pi^2-\log(2)-\log\left(e^{2500\pi^2}+e^{8\sqrt[3]{2}\ 33^{2/3}\pi^2}\right)$$

Alternative representations:

$$(521+199-11-3)-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\pi^2\sqrt[3]{17\,424}\right)\right)\right)=$$
$$706-\log_e\left(2\left(\exp\left(-\frac{10\,000\,\pi^2}{4}\right)+\exp\left(-4\sqrt[3]{17\,424}\ \pi^2\right)\right)\right)$$

-

$$(521+199-11-3)-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\pi^2\sqrt[3]{17\,424}\right)\right)\right)=$$
$$706-\log(a)\log_a\left(2\left(\exp\left(-\frac{10\,000\,\pi^2}{4}\right)+\exp\left(-4\sqrt[3]{17\,424}\ \pi^2\right)\right)\right)$$

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

Series representations:

$$(521+199-11-3)-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\pi^2\sqrt[3]{17\,424}\right)\right)\right)=$$
$$706+\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+2\left(e^{-2500\pi^2}+e^{-8\sqrt[3]{2}\ 33^{2/3}\pi^2}\right)\right)^k}{k}$$

-

$$(521+199-11-3)-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\pi^2\sqrt[3]{17\,424}\right)\right)\right)=$$
$$706-2i\pi\left\lfloor\frac{\arg\left(2\left(e^{-2500\pi^2}+e^{-8\sqrt[3]{2}\ 33^{2/3}\pi^2}\right)-x\right)}{2\pi}\right\rfloor-\log(x)+$$
$$\sum_{k=1}^{\infty}\frac{(-1)^k\left(2\left(e^{-2500\pi^2}+e^{-8\sqrt[3]{2}\ 33^{2/3}\pi^2}\right)-x\right)^k x^{-k}}{k}\quad\text{for } x<0$$

-

$$(521+199-11-3)-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\pi^2\sqrt[3]{17424}\right)\right)\right)=$$

$$706-2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor-\log(z_0)+\sum_{k=1}^{\infty}\frac{(-1)^k\left(2\left(e^{-2500\pi^2}+e^{-8\sqrt[3]{2}\,33^{2/3}\pi^2}\right)-z_0\right)^k z_0^{-k}}{k}$$

arg(z) is the complex argument

⌊x⌋ is the floor function

Integral representation:

$$(521+199-11-3)-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\pi^2\sqrt[3]{17424}\right)\right)\right)=$$

$$706-\int_1^{2\left(e^{-2500\pi^2}+e^{-8\sqrt[3]{2}\,33^{2/3}\pi^2}\right)}\frac{1}{t}\,dt$$

(((((521+199-11-3)+colog(((2*((((exp(-Pi^2/4 * 10000)+exp(-4Pi^2*17424^(1/3))))))))))))^1/15

Input:

$$\sqrt[15]{(521+199-11-3)-\log\left(2\left(\exp\left(-\frac{\pi^2}{4}\times 10\,000\right)+\exp\left(-4\pi^2\sqrt[3]{17424}\right)\right)\right)}$$

log(x) is the natural logarithm

Exact result:

$$\sqrt[15]{706-\log\left(2\left(e^{-2500\pi^2}+e^{-8\sqrt[3]{2}\,33^{2/3}\pi^2}\right)\right)}$$

Decimal approximation:

1.643801170062893407475549841581058198710496916603578441546...

$1.64380117.... \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 ...$

Alternate forms:

$$\sqrt[15]{706 - \log(2) - \log\left(e^{-2500\pi^2} + e^{-8\sqrt[3]{2}\,33^{2/3}\pi^2}\right)}$$

- $$\sqrt[15]{706 + 4\left(625 + 2\sqrt[3]{2}\,33^{2/3}\right)\pi^2 - \log\left(2\left(e^{2500\pi^2} + e^{8\sqrt[3]{2}\,33^{2/3}\pi^2}\right)\right)}$$

All 15th roots of 706 - log(2 (e^(-2500 π^2) + e^(-8 2^(1/3) 33^(2/3) π^2))):

- Polar form

$$e^0 \sqrt[15]{706 - \log\left(2\left(e^{-2500\pi^2} + e^{-8\sqrt[3]{2}\,33^{2/3}\pi^2}\right)\right)} \approx 1.64380 \text{ (real, principal root)}$$

- $$e^{(2i\pi)/15} \sqrt[15]{706 - \log\left(2\left(e^{-2500\pi^2} + e^{-8\sqrt[3]{2}\,33^{2/3}\pi^2}\right)\right)} \approx 1.50169 + 0.6686\,i$$

- $$e^{(4i\pi)/15} \sqrt[15]{706 - \log\left(2\left(e^{-2500\pi^2} + e^{-8\sqrt[3]{2}\,33^{2/3}\pi^2}\right)\right)} \approx 1.0999 + 1.2216\,i$$

- $$e^{(2i\pi)/5} \sqrt[15]{706 - \log\left(2\left(e^{-2500\pi^2} + e^{-8\sqrt[3]{2}\,33^{2/3}\pi^2}\right)\right)} \approx 0.5080 + 1.5633\,i$$

- $$e^{(8i\pi)/15} \sqrt[15]{706 - \log\left(2\left(e^{-2500\pi^2} + e^{-8\sqrt[3]{2}\,33^{2/3}\pi^2}\right)\right)} \approx -0.17182 + 1.63480\,i$$

Alternative representations:

$$\sqrt[15]{(521 + 199 - 11 - 3) - \log\left(2\left(\exp\left(\frac{10\,000(-\pi^2)}{4}\right) + \exp\left(-4\pi^2\sqrt[3]{17424}\right)\right)\right)} =$$

$$\sqrt[15]{706 - \log_e\left(2\left(\exp\left(-\frac{10\,000\,\pi^2}{4}\right) + \exp\left(-4\sqrt[3]{17424}\,\pi^2\right)\right)\right)}$$

•

$$\sqrt[15]{(521+199-11-3)-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\,\pi^2\,\sqrt[3]{17424}\right)\right)\right)} = \sqrt[15]{706-\log(a)\log_a\left(2\left(\exp\left(-\frac{10\,000\,\pi^2}{4}\right)+\exp\left(-4\,\sqrt[3]{17424}\,\pi^2\right)\right)\right)}$$

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

Series representations:

$$\sqrt[15]{(521+199-11-3)-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\,\pi^2\,\sqrt[3]{17424}\right)\right)\right)} = \sqrt[15]{706+\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+2\left(e^{-2500\,\pi^2}+e^{-8\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)\right)^k}{k}}$$

•

$$\sqrt[15]{(521+199-11-3)-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\,\pi^2\,\sqrt[3]{17424}\right)\right)\right)} = \left(706-2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor-\log(z_0)+\sum_{k=1}^{\infty}\frac{(-1)^k\left(2\left(e^{-2500\,\pi^2}+e^{-8\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)-z_0\right)^k z_0^{-k}}{k}\right)^{\wedge}(1/15)$$

•

$$\sqrt[15]{(521+199-11-3)-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\,\pi^2\,\sqrt[3]{17424}\right)\right)\right)} = \left(706-2\,i\,\pi\left\lfloor\frac{\arg\left(2\left(e^{-2500\,\pi^2}+e^{-8\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)-x\right)}{2\,\pi}\right\rfloor-\log(x)+\sum_{k=1}^{\infty}\frac{(-1)^k\left(2\left(e^{-2500\,\pi^2}+e^{-8\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)-x\right)^k x^{-k}}{k}\right)^{\wedge}(1/15) \quad \text{for } x<0$$

$\arg(z)$ is the complex argument

$\lfloor x \rfloor$ is the floor function

Integral representation:

$$\sqrt[15]{(521+199-11-3)-\log\left(2\left(\exp\left(\frac{10\,000(-\pi^2)}{4}\right)+\exp\left(-4\pi^2\sqrt[3]{17424}\right)\right)\right)} = \sqrt[15]{706-\int_1^{2\left(e^{-2500\pi^2}+e^{-8\sqrt[3]{2}\,33^{2/3}\pi^2}\right)}\frac{1}{t}\,dt}$$

(21/10^3+7/10^3)+(((((521+199-11-3)+colog(((2*((((exp(-Pi^2/4 * 10000)+exp(-4Pi^2*17424^(1/3)))))))))))))^1/15

Where 21 is a Fibonacci number and 7 is a Lucas number

Input:

$$\left(\frac{21}{10^3}+\frac{7}{10^3}\right)+\sqrt[15]{(521+199-11-3)-\log\left(2\left(\exp\left(-\frac{\pi^2}{4}\times 10\,000\right)+\exp\left(-4\pi^2\sqrt[3]{17424}\right)\right)\right)}$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{7}{250}+\sqrt[15]{706-\log\left(2\left(e^{-2500\pi^2}+e^{-8\sqrt[3]{2}\,33^{2/3}\pi^2}\right)\right)}$$

Decimal approximation:

1.671801170062893407475549841581058198710496916603578441546...

1.67180117…

We note that 1.67180117... is a result practically equal to the value of the formula:

$m_{p'} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

Alternate forms:

$$\frac{7}{250}+\sqrt[15]{706-\log(2)-\log\left(e^{-2500\pi^2}+e^{-8\sqrt[3]{2}\ 33^{2/3}\pi^2}\right)}$$

•

$$\frac{1}{250}\left(7+250\sqrt[15]{706-\log\left(2\left(e^{-2500\pi^2}+e^{-8\sqrt[3]{2}\ 33^{2/3}\pi^2}\right)\right)}\right)$$

•

$$\frac{7}{250}+\sqrt[15]{706+4\left(625+2\sqrt[3]{2}\ 33^{2/3}\right)\pi^2-\log\left(2\left(e^{2500\pi^2}+e^{8\sqrt[3]{2}\ 33^{2/3}\pi^2}\right)\right)}$$

Alternative representations:

$$\left(\frac{21}{10^3}+\frac{7}{10^3}\right)+\sqrt[15]{(521+199-11-3)-\log\left(2\left(\exp\left(\frac{10\,000(-\pi^2)}{4}\right)+\exp\left(-4\pi^2\sqrt[3]{17424}\right)\right)\right)}=\sqrt[15]{706-\log_e\left(2\left(\exp\left(-\frac{10\,000\pi^2}{4}\right)+\exp\left(-4\sqrt[3]{17424}\ \pi^2\right)\right)\right)}+\frac{28}{10^3}$$

•

$$\left(\frac{21}{10^3}+\frac{7}{10^3}\right)+\sqrt[15]{(521+199-11-3)-\log\left(2\left(\exp\left(\frac{10\,000(-\pi^2)}{4}\right)+\exp\left(-4\pi^2\sqrt[3]{17424}\right)\right)\right)}=\sqrt[15]{706-\log(a)\log_a\left(2\left(\exp\left(-\frac{10\,000\pi^2}{4}\right)+\exp\left(-4\sqrt[3]{17424}\ \pi^2\right)\right)\right)}+\frac{28}{10^3}$$

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

Series representations:

$$\left(\frac{21}{10^3}+\frac{7}{10^3}\right)+\sqrt[15]{(521+199-11-3)-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\pi^2\sqrt[3]{17424}\right)\right)\right)}=\frac{7}{250}+\sqrt[15]{706+\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+2\left(e^{-2500\pi^2}+e^{-8\sqrt[3]{2}\,33^{2/3}\pi^2}\right)\right)^k}{k}}$$

•

$$\left(\frac{21}{10^3}+\frac{7}{10^3}\right)+\sqrt[15]{(521+199-11-3)-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\pi^2\sqrt[3]{17424}\right)\right)\right)}=\frac{7}{250}+\left(706-2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor-\log(z_0)+\sum_{k=1}^{\infty}\frac{(-1)^k\left(2\left(e^{-2500\pi^2}+e^{-8\sqrt[3]{2}\,33^{2/3}\pi^2}\right)-z_0\right)^k z_0^{-k}}{k}\right)\hat{}\,(1/15)$$

•

$$\left(\frac{21}{10^3}+\frac{7}{10^3}\right)+\sqrt[15]{(521+199-11-3)-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\pi^2\sqrt[3]{17424}\right)\right)\right)}=\frac{7}{250}+\left(706-2i\pi\left\lfloor\frac{\arg\left(2\left(e^{-2500\pi^2}+e^{-8\sqrt[3]{2}\,33^{2/3}\pi^2}\right)-x\right)}{2\pi}\right\rfloor-\log(x)+\sum_{k=1}^{\infty}\frac{(-1)^k\left(2\left(e^{-2500\pi^2}+e^{-8\sqrt[3]{2}\,33^{2/3}\pi^2}\right)-x\right)^k x^{-k}}{k}\right)\hat{}\,(1/15)\quad\text{for } x<0$$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

Integral representation:

$$\left(\frac{21}{10^3}+\frac{7}{10^3}\right)+\sqrt[15]{(521+199-11-3)-\log\left(2\left(\exp\left(\frac{10\,000\,(-\pi^2)}{4}\right)+\exp\left(-4\,\pi^2\,\sqrt[3]{17424}\right)\right)\right)} =$$

$$\frac{7}{250}+\sqrt[15]{706-\int_1^2\left(e^{-2500\,\pi^2}+e^{-8\,\sqrt[3]{2}\,33^{2/3}\,\pi^2}\right)\frac{1}{t}\,dt}$$

Now, we have that:

$$\Upsilon_1(k)=\sqrt{64\pi^2 m_1 m_2 \ln m_2\left(\frac{1}{4\pi^2 m_1^2}+\frac{\left(k+\frac{1}{2}\right)^2}{4m_2^2}\right)}, \qquad (45)$$

For ν = 2900, m_1 = 10000, a = 17424, T = 4162.106395179…; m_2 = 27425

β_0 = 689265.427; β_1 = 12.5663706; β_2 = 0.000114552148; we obtain:

sqrt[64*Pi^2*10000*27425 ln(27425) ((((1/(4Pi^2*10000^2)+((2+1/2)^2)/(4*27425^2))))]

Input:

$$\sqrt{(64\,\pi^2\times 10\,000\times 27425)\log(27425)\left(\frac{1}{4\,\pi^2\times 10\,000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)}$$

log(x) is the natural logarithm

Exact result:

$$4000\,\pi\sqrt{1097\left(\frac{1}{481\,363\,600}+\frac{1}{400\,000\,000\,\pi^2}\right)\log(27425)}$$

Decimal approximation:

64.234487377701942110028504857866467357474056266785416209 51…

64.2344873…

Alternate forms:

$$\frac{1}{5}\sqrt{\frac{(1\,203\,409+1\,000\,000\,\pi^2)\log(27\,425)}{1097}}$$

-

$$\frac{1}{5}\sqrt{\frac{(1\,203\,409+1\,000\,000\,\pi^2)(2\log(5)+\log(1097))}{1097}}$$

$$4000\,\pi\sqrt{1097\left(\frac{1}{481\,363\,600}+\frac{1}{400\,000\,000\,\pi^2}\right)(2\log(5)+\log(1097))}$$

All 2nd roots of 17552000000 (1/481363600 + 1/(400000000 π^2)) π^2 log(27425):

- Polar form

$$4000\,\pi\,e^0\sqrt{1097\left(\frac{1}{481\,363\,600}+\frac{1}{400\,000\,000\,\pi^2}\right)\log(27\,425)}\approx 64.23$$

(real, principal root)

-

$$4000\,\pi\,e^{i\pi}\sqrt{1097\left(\frac{1}{481\,363\,600}+\frac{1}{400\,000\,000\,\pi^2}\right)\log(27\,425)}\approx -64.23 \text{ (real root)}$$

Alternative representations:

$$\sqrt{\left(\log(27\,425)\left(\frac{1}{4\,\pi^2\,10\,000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)\right)64\left(\pi^2\,10\,000\times 27\,425\right)}=$$
$$\sqrt{17\,552\,000\,000\log_e(27\,425)\,\pi^2\left(\frac{\left(\frac{5}{2}\right)^2}{4\times 27\,425^2}+\frac{1}{4\times 10\,000^2\,\pi^2}\right)}$$

-

$$\sqrt{\left(\log(27\,425)\left(\frac{1}{4\,\pi^2\,10\,000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)\right)64\left(\pi^2\,10\,000\times 27\,425\right)}=$$
$$\sqrt{17\,552\,000\,000\log(a)\log_a(27\,425)\,\pi^2\left(\frac{\left(\frac{5}{2}\right)^2}{4\times 27\,425^2}+\frac{1}{4\times 10\,000^2\,\pi^2}\right)}$$

- $$\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\,10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\,10000\times 27425\right)} =$$
$$\sqrt{-17552000000\,\mathrm{Li}_1(-27424)\,\pi^2\left(\frac{\left(\frac{5}{2}\right)^2}{4\times 27425^2}+\frac{1}{4\times 10000^2\,\pi^2}\right)}$$

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

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations:

$$\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\,10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\,10000\times 27425\right)} =$$
$$\frac{1}{5}\sqrt{1097+\frac{1000000\,\pi^2}{1097}}\,\sqrt{\log(27424)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{27424}\right)^k}{k}}$$

- $$\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\,10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\,10000\times 27425\right)} =$$
$$\frac{1}{5}\sqrt{1097+\frac{1000000\,\pi^2}{1097}}\,\sqrt{2\,i\,\pi\left\lfloor\frac{\arg(27425-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(27425-x)^k\,x^{-k}}{k}} \quad \text{for } x<0$$

- $$\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\,10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\,10000\times 27425\right)} =$$
$$4000\sqrt{1097\left(\frac{1}{481363600}+\frac{1}{400000000\,\pi^2}\right)}\,\pi\,\sqrt{2\,i\,\pi\left\lfloor\frac{\arg(27425-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(27425-x)^k\,x^{-k}}{k}} \quad \text{for } x<0$$

$\arg(z)$ is the complex argument

$\lfloor x \rfloor$ is the floor function

Integral representations:

$$\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\ 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\ 10000\times 27425\right)} = \frac{1}{5}\sqrt{1097+\frac{1000000\,\pi^2}{1097}}\ \sqrt{\int_1^{27425}\frac{1}{t}\,dt}$$

•

$$\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\ 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\ 10000\times 27425\right)} = \frac{1}{5}\sqrt{\frac{1097}{2\pi}+\frac{500000\,\pi}{1097}}\ \sqrt{-i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{27424^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds} \quad \text{for } -1<\gamma<0$$

$\Gamma(x)$ is the gamma function

-5+sqrt(728)*sqrt[64*Pi^2*10000*27425 ln(27425)
((((1/(4Pi^2*10000^2)+((2+1/2)^2)/(4*27425^2))))]

Input:

$$-5+\sqrt{728}\ \sqrt{\left(64\pi^2\times 10000\times 27425\right)\log(27425)\left(\frac{1}{4\pi^2\times 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)}$$

$\log(x)$ is the natural logarithm

Exact result:

$$8000\,\pi\sqrt{199654\left(\frac{1}{481363600}+\frac{1}{400000000\,\pi^2}\right)\log(27425)}\ -5$$

Decimal approximation:

1728.1412234426360472636151906455849299671628318848294787 26...

1728.1412234…

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

Alternate forms:

$$\frac{2}{5}\sqrt{\frac{182\left(1\,203\,409+1\,000\,000\,\pi^2\right)\log(27\,425)}{1097}}-5$$

•

$$\frac{2\sqrt{199\,654\left(1\,203\,409+1\,000\,000\,\pi^2\right)\log(27\,425)}-27\,425}{5485}$$

•

$$\frac{2}{5}\sqrt{\frac{182\left(1\,203\,409+1\,000\,000\,\pi^2\right)(2\log(5)+\log(1097))}{1097}}-5$$

Alternative representations:

$$-5+\sqrt{728}\sqrt{\left(\log(27\,425)\left(\frac{1}{4\pi^2\,10\,000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)\right)64\left(\pi^2\,10\,000\times 27\,425\right)}=$$

$$-5+\sqrt{728}\sqrt{17\,552\,000\,000\log_e(27\,425)\,\pi^2\left(\frac{\left(\frac{5}{2}\right)^2}{4\times 27\,425^2}+\frac{1}{4\times 10\,000^2\,\pi^2}\right)}$$

•

$$-5+\sqrt{728}\sqrt{\left(\log(27\,425)\left(\frac{1}{4\pi^2\,10\,000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)\right)64\left(\pi^2\,10\,000\times 27\,425\right)}=$$

$$-5+\sqrt{728}\sqrt{17\,552\,000\,000\log(a)\log_a(27\,425)\,\pi^2\left(\frac{\left(\frac{5}{2}\right)^2}{4\times 27\,425^2}+\frac{1}{4\times 10\,000^2\,\pi^2}\right)}$$

•

$$-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\,10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\,10000\times 27425\right)} = -5+\sqrt{728}\sqrt{-17552000000\,\mathrm{Li}_1(-27424)\,\pi^2\left(\frac{\left(\frac{5}{2}\right)^2}{4\times 27425^2}+\frac{1}{4\times 10000^2\,\pi^2}\right)}$$

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

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations:

$$-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\,10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\,10000\times 27425\right)} = -5+\frac{2}{5}\sqrt{199654+\frac{182000000\pi^2}{1097}}\sqrt{\log(27424)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{27424}\right)^k}{k}}$$

•

$$-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\,10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\,10000\times 27425\right)} = -5+ 8000\sqrt{199654\left(\frac{1}{481363600}+\frac{1}{400000000\pi^2}\right)}\,\pi\sqrt{\log(27424)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{27424}\right)^k}{k}}$$

•

$$-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\,10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\,10000\times 27425\right)} = -5+8000\sqrt{199654\left(\frac{1}{481363600}+\frac{1}{400000000\pi^2}\right)}\,\pi \sqrt{2\,i\,\pi\left\lfloor\frac{\arg(27425-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(27425-x)^k\,x^{-k}}{k}} \quad \text{for } x<0$$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

Integral representations:

$$-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\ 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\ 10000\times 27425\right)}=$$
$$-5+\frac{2}{5}\sqrt{199654+\frac{182000000\pi^2}{1097}}\sqrt{\int_1^{27425}\frac{1}{t}\,dt}$$

•

$$-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\ 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\ 10000\times 27425\right)}=$$
$$-5+8000\sqrt{99827\left(\frac{1}{481363600}+\frac{1}{400000000\pi^2}\right)\pi}\sqrt{-i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{27424^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}\quad\text{for } -1<\gamma<0$$

$\Gamma(x)$ is the gamma function

[-5+sqrt(728)*sqrt[64*Pi^2*10000*27425 ln(27425) (((1/(4Pi^2*10000^2)+((2+1/2)^2)/(4*27425^2))))]]^1/15

Input:

$$\sqrt[15]{-5+\sqrt{728}\sqrt{\left(64\pi^2\times 10000\times 27425\right)\log(27425)\left(\frac{1}{4\pi^2\times 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)}}$$

$\log(x)$ is the natural logarithm

Exact result:

$$\sqrt[15]{8000\pi\sqrt{199654\left(\frac{1}{481363600}+\frac{1}{400000000\pi^2}\right)\log(27425)}-5}$$

Decimal approximation:

1.643760785051146018125420077333576639220249739063901555376...

1.643760785…. ≈ ζ(2) = $\frac{\pi^2}{6}$ = 1.644934 ...

Alternate forms:

$$\sqrt[15]{\frac{2}{5}\sqrt{\frac{182\left(1\,203\,409+1\,000\,000\,\pi^2\right)\log(27\,425)}{1097}}-5}$$

- $$\sqrt[15]{\frac{2\sqrt{199\,654\left(1\,203\,409+1\,000\,000\,\pi^2\right)\log(27\,425)}-27\,425}{5485}}$$

- $$\frac{1}{\sqrt[15]{\frac{5}{2\sqrt{\frac{182\left(1\,203\,409+1\,000\,000\,\pi^2\right)(2\log(5)+\log(1097))}{1097}}-25}}}$$

All 15th roots of 8000 π sqrt(199654 (1/481363600 + 1/(400000000 π^2)) log(27425)) - 5:

- Polar form

$$e^0\sqrt[15]{8000\,\pi\sqrt{199\,654\left(\frac{1}{481\,363\,600}+\frac{1}{400\,000\,000\,\pi^2}\right)\log(27\,425)}-5}\approx 1.64376$$

(real, principal root)

- $$e^{(2\,i\,\pi)/15}\sqrt[15]{8000\,\pi\sqrt{199\,654\left(\frac{1}{481\,363\,600}+\frac{1}{400\,000\,000\,\pi^2}\right)\log(27\,425)}-5}$$

$\approx 1.50165+0.6686\,i$

- $$e^{(4\,i\,\pi)/15}\sqrt[15]{8000\,\pi\sqrt{199\,654\left(\frac{1}{481\,363\,600}+\frac{1}{400\,000\,000\,\pi^2}\right)\log(27\,425)}-5}$$

$\approx 1.0999+1.2216\,i$

- $$e^{(2\,i\,\pi)/5}\sqrt[15]{8000\,\pi\sqrt{199\,654\left(\frac{1}{481\,363\,600}+\frac{1}{400\,000\,000\,\pi^2}\right)\log(27\,425)}-5}$$

$\approx 0.5080+1.5633\,i$

-

$$e^{(8 i \pi)/15} \sqrt[15]{8000 \pi \sqrt{199654 \left(\frac{1}{481363600} + \frac{1}{400000000 \pi^2}\right) \log(27425)} - 5}$$
$$\approx -0.17182 + 1.63476 i$$

Alternative representations:

$$\sqrt[15]{-5 + \sqrt{728} \sqrt{\left(\log(27425)\left(\frac{1}{4 \pi^2 10000^2} + \frac{\left(2 + \frac{1}{2}\right)^2}{4 \times 27425^2}\right)\right) 64 \left(\pi^2 10000 \times 27425\right)}} = \sqrt[15]{-5 + \sqrt{728} \sqrt{17552000000 \log_e(27425) \pi^2 \left(\frac{\left(\frac{5}{2}\right)^2}{4 \times 27425^2} + \frac{1}{4 \times 10000^2 \pi^2}\right)}}$$

- $$\sqrt[15]{-5 + \sqrt{728} \sqrt{\left(\log(27425)\left(\frac{1}{4 \pi^2 10000^2} + \frac{\left(2 + \frac{1}{2}\right)^2}{4 \times 27425^2}\right)\right) 64 \left(\pi^2 10000 \times 27425\right)}} = \left(-5 + \sqrt{728} \sqrt{17552000000 \log(a) \log_a(27425) \pi^2 \left(\frac{\left(\frac{5}{2}\right)^2}{4 \times 27425^2} + \frac{1}{4 \times 10000^2 \pi^2}\right)}\right)^{\wedge}(1/15)$$

- $$\sqrt[15]{-5 + \sqrt{728} \sqrt{\left(\log(27425)\left(\frac{1}{4 \pi^2 10000^2} + \frac{\left(2 + \frac{1}{2}\right)^2}{4 \times 27425^2}\right)\right) 64 \left(\pi^2 10000 \times 27425\right)}} = \sqrt[15]{-5 + \sqrt{728} \sqrt{-17552000000 \operatorname{Li}_1(-27424) \pi^2 \left(\frac{\left(\frac{5}{2}\right)^2}{4 \times 27425^2} + \frac{1}{4 \times 10000^2 \pi^2}\right)}}$$

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

$\operatorname{Li}_n(x)$ is the polylogarithm function

Series representations:

$$\sqrt[15]{-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\ 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\ 10000\times 27425\right)}} =$$

$$\sqrt[15]{-5+\frac{2}{5}\sqrt{199654+\frac{182000000\pi^2}{1097}}\sqrt{\log(27424)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{27424}\right)^k}{k}}}$$

-

$$\sqrt[15]{-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\ 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\ 10000\times 27425\right)}} =$$

$$\left(-5+8000\sqrt{199654\left(\frac{1}{481363600}+\frac{1}{400000000\pi^2}\right)}\right.$$

$$\left.\pi\sqrt{\log(27424)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{27424}\right)^k}{k}}\right)\hat{}\ (1/15)$$

-

$$\sqrt[15]{-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\ 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\ 10000\times 27425\right)}} =$$

$$\left(-5+8000\sqrt{199654\left(\frac{1}{481363600}+\frac{1}{400000000\pi^2}\right)}\ \pi\right.$$

$$\left.\sqrt{2i\pi\left\lfloor\frac{\arg(27425-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(27425-x)^k\,x^{-k}}{k}}\right)\hat{}\ (1/15)$$

for $x < 0$

$\arg(z)$ is the complex argument

$\lfloor x\rfloor$ is the floor function

Integral representations:

$$\sqrt[15]{-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\ 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\ 10000\times 27425\right)}} =$$
$$\sqrt[15]{-5+8000\sqrt{199654\left(\frac{1}{481363600}+\frac{1}{400000000\,\pi^2}\right)}\ \pi\sqrt{\int_1^{27425}\frac{1}{t}\,dt}}$$

- $$\sqrt[15]{-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\ 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\ 10000\times 27425\right)}} =$$

$$\left(-5+8000\sqrt{99827\left(\frac{1}{481363600}+\frac{1}{400000000\,\pi^2}\right)}\pi\sqrt{-i\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{27424^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}\right)\wedge(1/15)\ \text{for } -1<\gamma<0$$

$\Gamma(x)$ is the gamma function

(21/10^3+7/10^3)+[-5+sqrt(728)*sqrt[64*Pi^2*10000*27425 ln(27425) (((1/(4Pi^2*10000^2)+((2+1/2)^2)/(4*27425^2))))]]^1/15

Where 21 is a Fibonacci number and 7 is a Lucas number

Input:

$$\left(\frac{21}{10^3}+\frac{7}{10^3}\right)+\sqrt[15]{-5+\sqrt{728}\sqrt{\left(64\,\pi^2\times 10000\times 27425\right)\log(27425)\left(\frac{1}{4\pi^2\times 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)}}$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{7}{250}+\sqrt[15]{8000\,\pi\sqrt{199654\left(\frac{1}{481363600}+\frac{1}{400000000\,\pi^2}\right)\log(27425)}-5}$$

Decimal approximation:

1.671760785051146018125420077333576639220249739063901555376...

1.671760785…

We note that 1.67176... is a result practically equal to the value of the formula:

$m_{p'} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass

Alternate forms:

$$\frac{7}{250} + \sqrt[15]{\frac{2}{5}\sqrt{\frac{182\,(1\,203\,409 + 1\,000\,000\,\pi^2)\log(27\,425)}{1097}} - 5}$$

- $$\frac{7679 + 50 \times 5485^{14/15}\sqrt[15]{2\sqrt{199\,654\,(1\,203\,409 + 1\,000\,000\,\pi^2)\log(27\,425)} - 27\,425}}{274\,250}$$

- $$\frac{7\sqrt[15]{5} + 250\sqrt[15]{2\sqrt{\frac{182\,(1\,203\,409+1\,000\,000\,\pi^2)(2\log(5)+\log(1097))}{1097}} - 25}}{250\sqrt[15]{5}}$$

Alternative representations:

$$\left(\frac{21}{10^3} + \frac{7}{10^3}\right) + \left(-5 + \sqrt{728}\sqrt{\left(\log(27\,425)\left(\frac{1}{4\,\pi^2\,10\,000^2} + \frac{\left(2 + \frac{1}{2}\right)^2}{4 \times 27\,425^2}\right)\right)64\,(\pi^2\,10\,000 \times 27\,425)}\right)^\wedge (1/15) = \frac{28}{10^3} + \sqrt[15]{-5 + \sqrt{728}\sqrt{17\,552\,000\,000\log_e(27\,425)\,\pi^2\left(\frac{\left(\frac{5}{2}\right)^2}{4 \times 27\,425^2} + \frac{1}{4 \times 10\,000^2\,\pi^2}\right)}}$$

- $$\left(\frac{21}{10^3}+\frac{7}{10^3}\right)+\left(-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\ 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\ 10000\times 27425\right)}\right)\hat{}(1/15)=\frac{28}{10^3}+\left(-5+\sqrt{728}\sqrt{17552000000\ \log(a)\log_a(27425)\,\pi^2\left(\frac{\left(\frac{5}{2}\right)^2}{4\times 27425^2}+\frac{1}{4\times 10000^2\,\pi^2}\right)}\right)\hat{}(1/15)$$

- $$\left(\frac{21}{10^3}+\frac{7}{10^3}\right)+\left(-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\ 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\ 10000\times 27425\right)}\right)\hat{}(1/15)=\frac{28}{10^3}+\sqrt[15]{-5+\sqrt{728}\sqrt{-17552000000\ \mathrm{Li}_1(-27424)\,\pi^2\left(\frac{\left(\frac{5}{2}\right)^2}{4\times 27425^2}+\frac{1}{4\times 10000^2\,\pi^2}\right)}}$$

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

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations:

$$\left(\frac{21}{10^3}+\frac{7}{10^3}\right)+\left(-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\ 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\ 10000\times 27425\right)}\right)\hat{}\,(1/15)=\frac{7}{250}+\sqrt[15]{-5+\frac{2}{5}\sqrt{199654+\frac{182000000\pi^2}{1097}}\sqrt{\log(27424)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{27424}\right)^k}{k}}}$$

- $$\left(\frac{21}{10^3}+\frac{7}{10^3}\right)+\left(-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\ 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\ 10000\times 27425\right)}\right)\hat{}\,(1/15)=\frac{7}{250}+\left(-5+8000\sqrt{199654\left(\frac{1}{481363600}+\frac{1}{400000000\pi^2}\right)}\,\pi\sqrt{\log(27424)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{27424}\right)^k}{k}}\right)\hat{}\,(1/15)$$

- $$\left(\frac{21}{10^3}+\frac{7}{10^3}\right)+\left(-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\ 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\ 10000\times 27425\right)}\right)\hat{}\,(1/15)=\frac{7}{250}+\left(-5+8000\sqrt{199654\left(\frac{1}{481363600}+\frac{1}{400000000\pi^2}\right)}\,\pi\sqrt{2i\pi\left\lfloor\frac{\arg(27425-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(27425-x)^k\,x^{-k}}{k}}\right)\hat{}\,(1/15)\quad\text{for } x<0$$

arg(z) is the complex argument

$\lfloor x \rfloor$ is the floor function

Integral representations:

$$\left(\frac{21}{10^3}+\frac{7}{10^3}\right)+\left(-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\ 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\ 10000\times 27425\right)}\right)^\wedge(1/15)=\frac{7}{250}+\sqrt[15]{-5+8000\sqrt{199654\left(\frac{1}{481363600}+\frac{1}{400000000\pi^2}\right)}\ \pi\sqrt{\int_1^{27425}\frac{1}{t}\,dt}}$$

-

$$\left(\frac{21}{10^3}+\frac{7}{10^3}\right)+\left(-5+\sqrt{728}\sqrt{\left(\log(27425)\left(\frac{1}{4\pi^2\ 10000^2}+\frac{\left(2+\frac{1}{2}\right)^2}{4\times 27425^2}\right)\right)64\left(\pi^2\ 10000\times 27425\right)}\right)^\wedge(1/15)=\frac{7}{250}+\left(-5+8000\sqrt{99827\left(\frac{1}{481363600}+\frac{1}{400000000\pi^2}\right)}\ \pi\sqrt{-i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{27424^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}\right)^\wedge(1/15)\quad \text{for } -1<\gamma<0$$

We have also:

$$\Upsilon_0(k) = \sqrt{64\pi^2 m_1 m_2 \left(\frac{1}{4\pi^2 m_1^2} + \frac{\left(k-\frac{1}{2}\right)^2}{4m_2^2}\right)},$$

sqrt[64*Pi^2*10000*27425*((((1/(4Pi^2*10000^2)+((2-1/2)^2)/(4*27425^2))))]

Input:

$$\sqrt{64\,\pi^2\times 10\,000\times 27\,425\left(\frac{1}{4\,\pi^2\times 10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)}$$

Exact result:

$$4000\sqrt{1097\left(\frac{9}{12\,034\,090\,000}+\frac{1}{400\,000\,000\,\pi^2}\right)}\,\pi$$

Decimal approximation:

13.16948848515069127110459576682013789468162265450481530236...

13.169488485…

Property:

$4000\sqrt{1097\left(\frac{9}{12\,034\,090\,000}+\frac{1}{400\,000\,000\,\pi^2}\right)}\,\pi$ is a transcendental number

- **Alternate forms:**

$$\frac{1}{5}\sqrt{1097+\frac{360\,000\,\pi^2}{1097}}$$

- $$\frac{1}{5}\sqrt{\frac{1\,203\,409+360\,000\,\pi^2}{1097}}$$

- **All 2nd roots of 17552000000 (9/12034090000 + 1/(400000000 π^2)) π^2:**

- Polar form

$$4000\sqrt{1097\left(\frac{9}{12\,034\,090\,000}+\frac{1}{400\,000\,000\,\pi^2}\right)}\,\pi\,e^0 \approx 13.169 \quad \text{(real, principal root)}$$

-

$$4000\sqrt{1097\left(\frac{9}{12\,034\,090\,000}+\frac{1}{400\,000\,000\,\pi^2}\right)}\,\pi\,e^{i\pi} \approx -13.169 \quad \text{(real root)}$$

Series representations:

$$\sqrt{64\,\pi^2\,10\,000\times 27425\left(\frac{1}{4\,\pi^2\,10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27425^2}\right)} = \sqrt{\frac{1072}{25}+\frac{14400\,\pi^2}{1097}}\;\sum_{k=0}^{\infty}\left(\frac{1072}{25}+\frac{14400\,\pi^2}{1097}\right)^{-k}\binom{\frac{1}{2}}{k}$$

-

$$\sqrt{64\,\pi^2\,10\,000\times 27425\left(\frac{1}{4\,\pi^2\,10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27425^2}\right)} = \sqrt{\frac{1072}{25}+\frac{14400\,\pi^2}{1097}}\;\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1072}{25}+\frac{14400\,\pi^2}{1097}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

-

$$\sqrt{64\,\pi^2\,10\,000\times 27425\left(\frac{1}{4\,\pi^2\,10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27425^2}\right)} = \sqrt{z_0}\;\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1097}{25}+\frac{14400\,\pi^2}{1097}-z_0\right)^k z_0^{-k}}{k!} \quad \text{for not } ((z_0\in\mathbb{R} \text{ and } -\infty < z_0 \le 0))$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

More information »

64.234487377701942 / (((3*sqrt[64*Pi^2*10000*27425*((((1/(4Pi^2*10000^2)+((2-1/2)^2)/(4*27425^2))))]))))

Input interpretation:

$$\frac{64.234487377701942}{3\sqrt{64\,\pi^2\times 10\,000\times 27\,425\left(\frac{1}{4\,\pi^2\times 10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)}}$$

Result:

1.6258411111950119...

1.62584111….

- **Series representations:**

$$\frac{64.2344873777019420000}{3\sqrt{64\,\pi^2\,10\,000\times 27\,425\left(\frac{1}{4\,\pi^2\,10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)}}=\frac{21.4114957925673140000}{\sqrt{\frac{1072}{25}+\frac{14400\,\pi^2}{1097}}\sum_{k=0}^{\infty}\left(\frac{1072}{25}+\frac{14400\,\pi^2}{1097}\right)^{-k}\binom{\frac{1}{2}}{k}}$$

- $$\frac{64.2344873777019420000}{3\sqrt{64\,\pi^2\,10\,000\times 27\,425\left(\frac{1}{4\,\pi^2\,10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)}}=\frac{21.4114957925673140000}{\sqrt{\frac{1072}{25}+\frac{14400\,\pi^2}{1097}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1072}{25}+\frac{14400\,\pi^2}{1097}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

- $$\frac{64.2344873777019420000}{3\sqrt{64\,\pi^2\,10\,000\times 27\,425\left(\frac{1}{4\,\pi^2\,10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)}}=\frac{21.4114957925673140000}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1097}{25}+\frac{14400\,\pi^2}{1097}-z_0\right)^k z_0^{-k}}{k!}}\quad\text{for not }((z_0\in\mathbb{R}\text{ and }-\infty<z_0\le 0))$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

-7/10^3+ 64.234487377701942 / (((3*sqrt[64*Pi^2*10000*27425*((((1/(4Pi^2*10000^2)+((2-1/2)^2)/(4*27425^2))))]))))

Input interpretation:

$$-\frac{7}{10^3}+\frac{64.234487377701942}{3\sqrt{64\pi^2\times 10\,000\times 27\,425\left(\frac{1}{4\pi^2\times 10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)}}$$

Result:

- More digits

1.6188411111950119...

1.61884111…

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

Series representations:

$$-\frac{7}{10^3}+\frac{64.2344873777019420000}{3\sqrt{64\pi^2\,10\,000\times 27\,425\left(\frac{1}{4\pi^2\,10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)}}=$$
$$-\frac{7}{1000}+\frac{21.4114957925673140000}{\sqrt{\frac{1072}{25}+\frac{14\,400\pi^2}{1097}}\sum_{k=0}^{\infty}\left(\frac{1072}{25}+\frac{14\,400\pi^2}{1097}\right)^{-k}\binom{\frac{1}{2}}{k}}$$

-

$$-\frac{7}{10^3}+\frac{64.2344873777019420000}{3\sqrt{64\pi^2\,10000\times27425\left(\frac{1}{4\pi^2\,10000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times27425^2}\right)}}=$$
$$-\frac{7}{1000}+\frac{21.4114957925673140000}{\sqrt{\frac{1072}{25}+\frac{14400\pi^2}{1097}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1072}{25}+\frac{14400\pi^2}{1097}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

•

$$-\frac{7}{10^3}+\frac{64.2344873777019420000}{3\sqrt{64\pi^2\,10000\times27425\left(\frac{1}{4\pi^2\,10000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times27425^2}\right)}}=$$
$$-\frac{7}{1000}+\frac{21.4114957925673140000}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1097}{25}+\frac{14400\pi^2}{1097}-z_0\right)^k z_0^{-k}}{k!}}$$

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

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

18/10^3+ 64.234487377701942 / (((3*sqrt[64*Pi^2*10000*27425*((((1/(4Pi^2*10000^2)+((2-1/2)^2)/(4*27425^2))))]))))

Input interpretation:

$$\frac{18}{10^3}+\frac{64.234487377701942}{3\sqrt{64\pi^2\times10000\times27425\left(\frac{1}{4\pi^2\times10000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times27425^2}\right)}}$$

Result:

1.6438411111950119...

1.64384111.... ≈ ζ(2) = $\frac{\pi^2}{6}=1.644934$ ...

47/10^3+ 64.234487377701942 / (((3*sqrt[64*Pi^2*10000*27425*((((1/(4Pi^2*10000^2)+((2-1/2)^2)/(4*27425^2))))]))))

Input interpretation:

$$\frac{47}{10^3}+\frac{64.234487377701942}{3\sqrt{64\,\pi^2\times 10\,000\times 27\,425\left(\frac{1}{4\,\pi^2\times 10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)}}$$

Result:

- More digits

1.6728411111950119...

1.67284111…. result that is very near to the proton mass

Series representations:

$$\frac{47}{10^3}+\frac{64.23448737770194200000}{3\sqrt{64\,\pi^2\,10\,000\times 27\,425\left(\frac{1}{4\,\pi^2\,10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)}}=\frac{47}{1000}+\frac{21.41149579256731400000}{\sqrt{\frac{1072}{25}+\frac{14\,400\,\pi^2}{1097}}\sum_{k=0}^{\infty}\left(\frac{1072}{25}+\frac{14\,400\,\pi^2}{1097}\right)^{-k}\binom{\frac{1}{2}}{k}}$$

-

$$\frac{47}{10^3}+\frac{64.23448737770194200000}{3\sqrt{64\,\pi^2\,10\,000\times 27\,425\left(\frac{1}{4\,\pi^2\,10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)}}=\frac{47}{1000}+\frac{21.41149579256731400000}{\sqrt{\frac{1072}{25}+\frac{14\,400\,\pi^2}{1097}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1072}{25}+\frac{14\,400\,\pi^2}{1097}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

-

$$\frac{47}{10^3} + \frac{64.2344873777019420000}{3\sqrt{64\pi^2\, 10000 \times 27425\left(\frac{1}{4\pi^2\, 10000^2} + \frac{\left(2-\frac{1}{2}\right)^2}{4\times 27425^2}\right)}} =$$

$$\frac{47}{1000} + \frac{21.4114957925673140000}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1097}{25}+\frac{14400\pi^2}{1097}-z_0\right)^k z_0^{-k}}{k!}}$$

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

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

47+ 64.234487377701942 * (((sqrt[64*Pi^2*10000*27425*((((1/(4Pi^2*10000^2)+((2-1/2)^2)/(4*27425^2))))]))))

Where 47 is a Lucas number

Input interpretation:

$$47 + 64.234487377701942\sqrt{64\pi^2 \times 10000 \times 27425\left(\frac{1}{4\pi^2 \times 10000^2} + \frac{\left(2-\frac{1}{2}\right)^2}{4\times 27425^2}\right)}$$

Result:

892.93534187020315...

892.935341… result very near to the rest mass of Kaon meson 891.66

-

Series representations:

$$47+64.2344873777019420000\sqrt{64\pi^2\,10000\times 27425\left(\frac{1}{4\pi^2\,10000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27425^2}\right)}=$$

$$47+64.2344873777019420000\sqrt{\frac{1072}{25}+\frac{14400\pi^2}{1097}}\sum_{k=0}^{\infty}\left(\frac{1072}{25}+\frac{14400\pi^2}{1097}\right)^{-k}\binom{\frac{1}{2}}{k}$$

- $$47+64.2344873777019420000\sqrt{64\pi^2\,10000\times 27425\left(\frac{1}{4\pi^2\,10000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27425^2}\right)}=$$

$$47+64.2344873777019420000\sqrt{\frac{1072}{25}+\frac{14400\pi^2}{1097}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1072}{25}+\frac{14400\pi^2}{1097}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

- $$47+64.2344873777019420000\sqrt{64\pi^2\,10000\times 27425\left(\frac{1}{4\pi^2\,10000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27425^2}\right)}=$$

$$47+64.2344873777019420000\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1097}{25}+\frac{14400\pi^2}{1097}-z_0\right)^k z_0^{-k}}{k!}$$

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

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

(322+ 29) + 64.23448737 * (((sqrt[64*Pi^2*10000*27425*((((1/(4Pi^2*10000^2)+((2-1/2)^2)/(4*27425^2))))])))

Where 322 and 29 are Lucas numbers

Input interpretation:

$$(322+29)+64.23448737\sqrt{64\pi^2\times 10\,000\times 27\,425\left(\frac{1}{4\pi^2\times 10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)}$$

Result:

1196.935342...

1196.935342…. result very near to the rest mass of Sigma baryon 1197.449

Series representations:

$$(322+29)+64.2345\sqrt{64\pi^2\,10\,000\times 27\,425\left(\frac{1}{4\pi^2\,10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)}=$$
$$351+64.2345\sqrt{\frac{1072}{25}+\frac{14\,400\pi^2}{1097}}\sum_{k=0}^{\infty}\left(\frac{1072}{25}+\frac{14\,400\pi^2}{1097}\right)^{-k}\binom{\frac{1}{2}}{k}$$

- $$(322+29)+64.2345\sqrt{64\pi^2\,10\,000\times 27\,425\left(\frac{1}{4\pi^2\,10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)}=$$
$$351+64.2345\sqrt{\frac{1072}{25}+\frac{14\,400\pi^2}{1097}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1072}{25}+\frac{14\,400\pi^2}{1097}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

- $$(322+29)+64.2345\sqrt{64\pi^2\,10\,000\times 27\,425\left(\frac{1}{4\pi^2\,10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27\,425^2}\right)}=$$
$$351+64.2345\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1097}{25}+\frac{14\,400\pi^2}{1097}-z_0\right)^k z_0^{-k}}{k!}$$
for not $((z_0\in\mathbb{R}$ and $-\infty<z_0\le 0))$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\mathbb{R}$ is the set of real numbers

[(322+ 29) + 64.23448737 * sqrt[64*Pi^2*10000*27425*(((1/(4Pi^2*10000^2)+((2-1/2)^2)/(4*27425^2))))]]^1/14

Input interpretation:

$$\sqrt[14]{(322+29)+64.23448737\sqrt{64\pi^2\times 10\,000\times 27425\left(\frac{1}{4\pi^2\times 10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27425^2}\right)}}$$

Result:

1.6590603804...

1.6590603804...

13/10^3+[(322+ 29) + 64.23448737 * sqrt[64*Pi^2*10000*27425*(((1/(4Pi^2*10000^2)+((2-1/2)^2)/(4*27425^2))))]]^1/14

Input interpretation:

$$\frac{13}{10^3}+\left((322+29)+64.23448737\sqrt{64\pi^2\times 10\,000\times 27425\left(\frac{1}{4\pi^2\times 10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27425^2}\right)}\right)\hat{}\,(1/14)$$

Result:

1.6720603804...

1.6720603804.... result that is very near to the proton mass

-18+ 27* 64.23448737 + sqrt[64*Pi^2*10000*27425*(((1/(4Pi^2*10000^2)+((2-1/2)^2)/(4*27425^2))))]

Where 18 is a Lucas number

Input interpretation:

$$-18+27\times 64.23448737+\sqrt{64\,\pi^2\times 10\,000\times 27425\left(\frac{1}{4\,\pi^2\times 10\,000^2}+\frac{\left(2-\frac{1}{2}\right)^2}{4\times 27425^2}\right)}$$

Result:

1729.500647...

1729.500647...

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

We have that:

Note that the "amplitude" of k-th revival is equal to

$$Ar_k \approx \left(\frac{1}{4\pi^2 m_1^2}+\frac{k^2}{4m_2^2}\right)^{-\frac{1}{4}},$$

For ν = 2900, m_1 = 10000, a = 17424, T = 4162.106395179…; m_2 = 27425

β_0 = 689265.427; β_1 = 12.5663706; β_2 = 0.000114552148; we obtain:

((((1/(4Pi^2*10000^2) + 2^2/(4*27425^2)))))^(-1/4)

Input:

$$\left(\frac{1}{4\,\pi^2\times 10\,000^2}+\frac{2^2}{4\times 27425^2}\right)^{-1/4}$$

Exact result:

$$\frac{1}{\sqrt[4]{\frac{1}{752\,130\,625}+\frac{1}{400\,000\,000\,\pi^2}}}$$

Decimal approximation:

158.54020876624040703705896558081407775344571907364244776 64...

158.5402087…

From:

1/(158,5402087) + 1 = 1,006307548149…

We note that, the above result is very near to the value of the following Ramanujan continued fraction (Rogers-Ramanujan identities): 1.0018674362

Property:

$$\frac{1}{\sqrt[4]{\frac{1}{752\,130\,625}+\frac{1}{400\,000\,000\,\pi^2}}}$$ is a transcendental number

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Alternate form:

$$\frac{100\sqrt{2194\,\pi}}{\sqrt[4]{1\,203\,409+640\,000\,\pi^2}}$$

All values of 1/(1/752130625 + 1/(400000000 π^2))^(1/4):

- Polar form

$$\frac{e^0}{\sqrt[4]{\frac{1}{752\,130\,625}+\frac{1}{400\,000\,000\,\pi^2}}} \approx 158.540 \quad \text{(real root)}$$

•

$$\frac{e^{-(i\pi)/2}}{\sqrt[4]{\frac{1}{752\,130\,625}+\frac{1}{400\,000\,000\,\pi^2}}} \approx -158.54\,i$$

•

$$\frac{e^{-i\pi}}{\sqrt[4]{\frac{1}{752\,130\,625}+\frac{1}{400\,000\,000\,\pi^2}}} \approx -158.54 \text{ (real root)}$$

- $$\frac{e^{-(3i\pi)/2}}{\sqrt[4]{\frac{1}{752\,130\,625}+\frac{1}{400\,000\,000\,\pi^2}}} \approx 158.540\, i$$

Alternative representations:

$$\left(\frac{1}{4\pi^2\,10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4} = \left(\frac{4}{4\times 27\,425^2}+\frac{1}{4\times 10\,000^2\,(180\,°)^2}\right)^{-1/4}$$

- $$\left(\frac{1}{4\pi^2\,10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4} = \left(\frac{4}{4\times 27\,425^2}+\frac{1}{24\times 10\,000^2\,\zeta(2)}\right)^{-1/4}$$

- $$\left(\frac{1}{4\pi^2\,10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4} = \left(\frac{4}{4\times 27\,425^2}+\frac{1}{4\times 10\,000^2\,\cos^{-1}(-1)^2}\right)^{-1/4}$$

$\zeta(s)$ is the Riemann zeta function

$\cos^{-1}(x)$ is the inverse cosine function

Series representations:

$$\left(\frac{1}{4\pi^2\,10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4} = \frac{1}{\sqrt[4]{\frac{1}{752\,130\,625}+\frac{1}{6\,400\,000\,000\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^2}}}$$

- $$\left(\frac{1}{4\pi^2\,10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4} = \frac{1}{\sqrt[4]{\frac{1}{752\,130\,625}+\frac{1}{400\,000\,000\left(\sum_{k=0}^{\infty}-\frac{4(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^2}}}$$

-

$$\left(\frac{1}{4\pi^2\ 10000^2}+\frac{2^2}{4\times 27425^2}\right)^{-1/4}=\frac{1}{\sqrt[4]{\frac{1}{752130625}+\frac{1}{400000000\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{2}{1+4k}+\frac{2}{2+4k}+\frac{1}{3+4k}\right)\right)^2}}}$$

Integral representations:

$$\left(\frac{1}{4\pi^2\ 10000^2}+\frac{2^2}{4\times 27425^2}\right)^{-1/4}=\frac{1}{\sqrt[4]{\frac{1}{752130625}+\frac{1}{1600000000\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^2}}}$$

$$\left(\frac{1}{4\pi^2\ 10000^2}+\frac{2^2}{4\times 27425^2}\right)^{-1/4}=\frac{1}{\sqrt[4]{\frac{1}{752130625}+\frac{1}{6400000000\left(\int_0^{1}\sqrt{1-t^2}\,dt\right)^2}}}$$

-

$$\left(\frac{1}{4\pi^2\ 10000^2}+\frac{2^2}{4\times 27425^2}\right)^{-1/4}=\frac{1}{\sqrt[4]{\frac{1}{752130625}+\frac{1}{1600000000\left(\int_0^{1}\frac{1}{\sqrt{1-t^2}}\,dt\right)^2}}}$$

((((((((((1/(4Pi^2*10000^2) + 2^2/(4*27425^2))))))^(-1/4))))))^1/10

Input:

$$\sqrt[10]{\left(\frac{1}{4\pi^2\times 10000^2}+\frac{2^2}{4\times 27425^2}\right)^{-1/4}}$$

Exact result:

$$\frac{1}{\sqrt[40]{\frac{1}{752130625}+\frac{1}{400000000\,\pi^2}}}$$

Decimal approximation:

1.659640187608830980543571261457548446309752987838044355571...

1.6596401876….

Property:

$$\frac{1}{\sqrt[40]{\frac{1}{752\,130\,625}+\frac{1}{400\,000\,000\,\pi^2}}}$$ is a transcendental number

- **Alternate form:**

$$\frac{\sqrt[4]{2}\ \sqrt[5]{5}\ \sqrt[20]{1097\,\pi}}{\sqrt[40]{1\,203\,409+640\,000\,\pi^2}}$$

All 10th roots of 1/(1/752130625 + 1/(400000000 π^2))^(1/4):

- Polar form

$$\frac{e^0}{\sqrt[40]{\frac{1}{752\,130\,625}+\frac{1}{400\,000\,000\,\pi^2}}}\approx 1.659640$$ (real, principal root)

- $$\frac{e^{(i\pi)/5}}{\sqrt[40]{\frac{1}{752\,130\,625}+\frac{1}{400\,000\,000\,\pi^2}}}\approx 1.3427+0.9755\,i$$

- $$\frac{e^{(2i\pi)/5}}{\sqrt[40]{\frac{1}{752\,130\,625}+\frac{1}{400\,000\,000\,\pi^2}}}\approx 0.5129+1.5784\,i$$

- $$\frac{e^{(3i\pi)/5}}{\sqrt[40]{\frac{1}{752\,130\,625}+\frac{1}{400\,000\,000\,\pi^2}}}\approx -0.5129+1.5784\,i$$

- $$\frac{e^{(4i\pi)/5}}{\sqrt[40]{\frac{1}{752\,130\,625}+\frac{1}{400\,000\,000\,\pi^2}}}\approx -1.3427+0.9755\,i$$

Alternative representations:

$$\sqrt[10]{\left(\frac{1}{4\pi^2\ 10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4}}=\sqrt[10]{\left(\frac{4}{4\times 27\,425^2}+\frac{1}{4\times 10\,000^2\ (180\,°)^2}\right)^{-1/4}}$$

- $$\sqrt[10]{\left(\frac{1}{4\pi^2\,10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4}} = \sqrt[10]{\left(\frac{4}{4\times 27\,425^2}+\frac{1}{24\times 10\,000^2\,\zeta(2)}\right)^{-1/4}}$$

- $$\sqrt[10]{\left(\frac{1}{4\pi^2\,10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4}} = \sqrt[10]{\left(\frac{4}{4\times 27\,425^2}+\frac{1}{4\times 10\,000^2\cos^{-1}(-1)^2}\right)^{-1/4}}$$

$\zeta(s)$ is the Riemann zeta function

$\cos^{-1}(x)$ is the inverse cosine function

Series representations:

$$\sqrt[10]{\left(\frac{1}{4\pi^2\,10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4}} = \frac{1}{\sqrt[40]{\frac{1}{752\,130\,625}+\frac{1}{6\,400\,000\,000\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^2}}}$$

- $$\sqrt[10]{\left(\frac{1}{4\pi^2\,10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4}} = \frac{1}{\sqrt[40]{\frac{1}{752\,130\,625}+\frac{1}{400\,000\,000\left(\sum_{k=0}^{\infty}-\frac{4(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^2}}}$$

- $$\sqrt[10]{\left(\frac{1}{4\pi^2\,10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4}} = \frac{1}{\sqrt[40]{\frac{1}{752\,130\,625}+\frac{1}{400\,000\,000\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{2}{1+4k}+\frac{2}{2+4k}+\frac{1}{3+4k}\right)\right)^2}}}$$

Integral representations:

$$\sqrt[10]{\left(\frac{1}{4\pi^2\ 10\,000^2} + \frac{2^2}{4\times 27425^2}\right)^{-1/4}} = \frac{1}{\sqrt[40]{\frac{1}{752\,130\,625} + \frac{1}{1\,600\,000\,000\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^2}}}$$

- $$\sqrt[10]{\left(\frac{1}{4\pi^2\ 10\,000^2} + \frac{2^2}{4\times 27425^2}\right)^{-1/4}} = \frac{1}{\sqrt[40]{\frac{1}{752\,130\,625} + \frac{1}{6\,400\,000\,000\left(\int_0^1 \sqrt{1-t^2}\,dt\right)^2}}}$$

- $$\sqrt[10]{\left(\frac{1}{4\pi^2\ 10\,000^2} + \frac{2^2}{4\times 27425^2}\right)^{-1/4}} = \frac{1}{\sqrt[40]{\frac{1}{752\,130\,625} + \frac{1}{1\,600\,000\,000\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt\right)^2}}}$$

13/10^3+(((((((((1/(4Pi^2*10000^2) + 2^2/(4*27425^2))))))^(-1/4))))))^1/10

Input:

$$\frac{13}{10^3} + \sqrt[10]{\left(\frac{1}{4\pi^2\times 10\,000^2} + \frac{2^2}{4\times 27\,425^2}\right)^{-1/4}}$$

Exact result:

$$\frac{13}{1000} + \frac{1}{\sqrt[40]{\frac{1}{752\,130\,625} + \frac{1}{400\,000\,000\,\pi^2}}}$$

Decimal approximation:

1.672640187608830980543571261457548446309752987838044355571...

1.6726401876…. result very near to the value of the proton mass

Property:

$$\frac{13}{1000} + \frac{1}{\sqrt[40]{\frac{1}{752\,130\,625} + \frac{1}{400\,000\,000\,\pi^2}}} \text{ is a transcendental number}$$

-

Alternate forms:

$$\frac{13}{1000}+\frac{\sqrt[4]{2}\ \sqrt[5]{5}\ \sqrt[20]{1097\,\pi}}{\sqrt[40]{1\,203\,409+640\,000\,\pi^2}}$$

$$\frac{1000\,\sqrt[4]{2}\ \sqrt[5]{5}\ \sqrt[20]{1097\,\pi}\ +13\,\sqrt[40]{1\,203\,409+640\,000\,\pi^2}}{1000\,\sqrt[40]{1\,203\,409+640\,000\,\pi^2}}$$

-

$$\frac{\sqrt[20]{\pi}\left(1000\,\sqrt[4]{2}\ \sqrt[5]{5}\ \sqrt[20]{1097}+\frac{13\,\sqrt[40]{1\,203\,409+640\,000\,\pi^2}}{\sqrt[20]{\pi}}\right)}{1000\,\sqrt[40]{1\,203\,409+640\,000\,\pi^2}}$$

Alternative representations:

$$\frac{13}{10^3}+\sqrt[10]{\left(\frac{1}{4\,\pi^2\,10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4}}=\frac{13}{10^3}+\sqrt[10]{\left(\frac{4}{4\times 27\,425^2}+\frac{1}{4\times 10\,000^2\,(180\,°)^2}\right)^{-1/4}}$$

-

$$\frac{13}{10^3}+\sqrt[10]{\left(\frac{1}{4\,\pi^2\,10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4}}=\frac{13}{10^3}+\sqrt[10]{\left(\frac{4}{4\times 27\,425^2}+\frac{1}{24\times 10\,000^2\,\zeta(2)}\right)^{-1/4}}$$

-

$$\frac{13}{10^3}+\sqrt[10]{\left(\frac{1}{4\,\pi^2\,10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4}}=\frac{13}{10^3}+\sqrt[10]{\left(\frac{4}{4\times 27\,425^2}+\frac{1}{4\times 10\,000^2\,\cos^{-1}(-1)^2}\right)^{-1/4}}$$

$\zeta(s)$ is the Riemann zeta function

$\cos^{-1}(x)$ is the inverse cosine function

Series representations:

$$\frac{13}{10^3}+\sqrt[10]{\left(\frac{1}{4\pi^2\ 10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4}}=\frac{13}{1000}+\frac{1}{\sqrt[40]{\frac{1}{752\,130\,625}+\frac{1}{6400\,000\,000\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^2}}}$$

- $$\frac{13}{10^3}+\sqrt[10]{\left(\frac{1}{4\pi^2\ 10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4}}=\frac{13}{1000}+\frac{1}{\sqrt[40]{\frac{1}{752\,130\,625}+\frac{1}{400\,000\,000\left(\sum_{k=0}^{\infty}-\frac{4(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^2}}}$$

- $$\frac{13}{10^3}+\sqrt[10]{\left(\frac{1}{4\pi^2\ 10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4}}=\frac{13}{1000}+\frac{1}{\sqrt[40]{\frac{1}{752\,130\,625}+\frac{1}{400\,000\,000\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{2}{1+4k}+\frac{2}{2+4k}+\frac{1}{3+4k}\right)\right)^2}}}$$

Integral representations:

$$\frac{13}{10^3}+\sqrt[10]{\left(\frac{1}{4\pi^2\ 10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4}}=\frac{13}{1000}+\frac{1}{\sqrt[40]{\frac{1}{752\,130\,625}+\frac{1}{1600\,000\,000\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^2}}}$$

- $$\frac{13}{10^3}+\sqrt[10]{\left(\frac{1}{4\pi^2\ 10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4}}=\frac{13}{1000}+\frac{1}{\sqrt[40]{\frac{1}{752\,130\,625}+\frac{1}{6400\,000\,000\left(\int_0^{1}\sqrt{1-t^2}\,dt\right)^2}}}$$

-

$$\frac{13}{10^3}+\sqrt[10]{\left(\frac{1}{4\pi^2\ 10\,000^2}+\frac{2^2}{4\times 27\,425^2}\right)^{-1/4}}=$$

$$\frac{13}{1000}+\frac{1}{\sqrt[40]{\frac{1}{752\,130\,625}+\frac{1}{1\,600\,000\,000\left(\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt\right)^2}}}$$

Appendix I

We have the following interesting formula:

(((((1+ 2Pi*(((e*Pi/(ln(1729+18)*ln(729+18))*1/golden ratio)))))))) * 10^-27

Input:

$$\frac{1+2\pi\left(e\times\frac{\pi}{\log(1729+18)\log(729+18)}\times\frac{1}{\phi}\right)}{10^{27}}$$

$\log(x)$ is the natural logarithm

ϕ is the golden ratio

Exact result:

$$\frac{\frac{2e\pi^2}{\phi\log(747)\log(1747)}+1}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

Decimal approximation:

$1.6713807309818907681339467132218058053037242604411014... \times 10^{-27}$

Alternate forms:

$$\frac{e\pi^2}{500\,000\,000\,000\,000\,000\,000\,000\,000\,\phi\log(747)\log(1747)}+\frac{1}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

- $$\frac{1+\frac{\left(\sqrt{5}-1\right)e\pi^2}{\log(747)\log(1747)}}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

- $$\frac{1}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000} + \frac{e\,\pi^2}{250\,000\,000\,000\,000\,000\,000\,000\,000\,(1+\sqrt{5})\log(747)\log(1747)}$$

Alternative representations:

$$\frac{1+\frac{(2\pi)e\pi}{(\log(1729+18)\log(729+18))\phi}}{10^{27}} = \frac{1+\frac{2e\pi^2}{\phi(\log_e(747)\log_e(1747))}}{10^{27}}$$

- $$\frac{1+\frac{(2\pi)e\pi}{(\log(1729+18)\log(729+18))\phi}}{10^{27}} = \frac{1+\frac{2e\pi^2}{\phi\left(\log^2(a)\log_a(747)\log_a(1747)\right)}}{10^{27}}$$

- $$\frac{1+\frac{(2\pi)e\pi}{(\log(1729+18)\log(729+18))\phi}}{10^{27}} = \frac{1+\frac{2e\pi^2}{\phi(\mathrm{Li}_1(-1746)\,\mathrm{Li}_1(-746))}}{10^{27}}$$

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

$\mathrm{Li}_n(x)$ is the polylogarithm function

Series representations:

$$\frac{1+\frac{(2\pi)e\pi}{(\log(1729+18)\log(729+18))\phi}}{10^{27}} = \frac{1}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000} + \left(e\,\pi^2\right)\Big/\left(500\,000\,000\,000\,000\,000\,000\,000\,000\,\phi \left(\log(746) - \sum_{k=1}^{\infty}\frac{\left(-\frac{1}{746}\right)^k}{k}\right)\left(\log(1746) - \sum_{k=1}^{\infty}\frac{\left(-\frac{1}{1746}\right)^k}{k}\right)\right)$$

-

$$\frac{1+\frac{(2\pi)e\pi}{(\log(1729+18)\log(729+18))\phi}}{10^{27}} = \frac{1}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000} + (e\pi^2)\Big/\left(500\,000\,000\,000\,000\,000\,000\,000\,000\,\phi \left(2 i \pi \left\lfloor \frac{\arg(747-x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (747-x)^k x^{-k}}{k}\right) \left(2 i \pi \left\lfloor \frac{\arg(1747-x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (1747-x)^k x^{-k}}{k}\right)\right) \text{ for } x < 0$$

- $$\frac{1+\frac{(2\pi)e\pi}{(\log(1729+18)\log(729+18))\phi}}{10^{27}} = \frac{1}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000} + (e\pi^2)\Big/\left(500\,000\,000\,000\,000\,000\,000\,000\,000\,\phi \left(\log(z_0) + \left\lfloor \frac{\arg(747-z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k (747-z_0)^k z_0^{-k}}{k}\right) \left(\log(z_0) + \left\lfloor \frac{\arg(1747-z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k (1747-z_0)^k z_0^{-k}}{k}\right)\right)$$

$\arg(z)$ is the complex argument

$\lfloor x \rfloor$ is the floor function

Integral representations:

$$\frac{1+\frac{(2\pi)e\pi}{(\log(1729+18)\log(729+18))\phi}}{10^{27}} = \frac{4 e \pi^2 + 2 \int_0^1 \int_0^1 \frac{1}{(1+746 t_1)(1+1746 t_2)} \, dt_2 \, dt_1}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000 (1+\sqrt{5}) \left(\int_1^{747} \frac{1}{t} \, dt\right) \int_1^{1747} \frac{1}{t} \, dt}$$

-

$$\frac{1 + \frac{(2\pi) e \pi}{(\log(1729+18)\log(729+18))\phi}}{10^{27}} = \left(-16 e \pi^4 + \left(\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{746^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right) \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{1746^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds + \sqrt{5}\left(\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{746^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right) \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{1746^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right) \Bigg/ \left(1\,000\,000\,000\,000\,000\,000\,000\,000\,000 \left(1+\sqrt{5}\right) \left(\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{746^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right) \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{1746^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right) \quad \text{for } -1 < \gamma < 0$$

$\Gamma(x)$ is the gamma function

The result of this equation is practically equal to the value of the formula:

$$m_{p'} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24} \text{ gm}$$

that is the holographic proton mass

The beauty of this formula is that there are $e, \pi, \phi, 18, 729$ and 1729, i.e.:

e = Euler number = 2.71828...
$\pi = 3.14159265...$
ϕ = golden ratio = 1.61803398...
18 = Lucas number
729 = 9^3 (Ramanujan cube)
1729 = 12^3 + 1 (Hardy-Ramanujan number)

With regard the Ramanujan continued fractions, in this paper, we have utilized the following:

From:
http://www.bitman.name/math/article/102/109/

Frazioni continue
(Mauro Fiorentini)

$$4\int_0^\infty \frac{t\,dt}{e^{\sqrt{5}t}\cosh t} = \cfrac{1}{1+\cfrac{1^2}{1+\cfrac{1^2}{1+\cfrac{2^2}{1+\cfrac{2^2}{1+\cfrac{3^2}{1+\cfrac{3^2}{1+\ldots}}}}}}} \approx 0.5683000031$$

$$2\int_0^\infty \frac{t^2\,dt}{e^{\sqrt{3}t}\sinh t} = \cfrac{1}{1+\cfrac{1^3}{1+\cfrac{1^3}{3+\cfrac{2^3}{1+\cfrac{2^3}{5+\cfrac{3^3}{1+\cfrac{3^3}{7+\ldots}}}}}}} \approx 0.5269391135$$

Rogers-Ramanujan continued fractions:

$$\frac{e^{-\frac{2\pi}{5}}}{\sqrt{\varphi\sqrt{5}-\varphi}} = 1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-4\pi}}{1+\cfrac{e^{-6\pi}}{1+\cfrac{e^{-8\pi}}{1+\ldots}}}} \approx 1.0018674362$$

$$\frac{e^{-\frac{2\pi}{\sqrt{5}}}}{\dfrac{\sqrt{5}}{1+\sqrt[5]{\sqrt{(\varphi-1)^5\sqrt[4]{5^3}}-1}}-\varphi} = 1+\cfrac{e^{-2\pi\sqrt{5}}}{1+\cfrac{e^{-4\pi\sqrt{5}}}{1+\cfrac{e^{-6\pi\sqrt{5}}}{1+\cfrac{e^{-8\pi\sqrt{5}}}{1+\ldots}}}} \approx 1.0000007913$$

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

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

$$\sqrt{\frac{e\pi}{2}}=\sum_{n=0}^{\infty}\frac{1}{(2n+1)!!}+\cfrac{1}{1+\cfrac{1}{1+\cfrac{2}{1+\cfrac{3}{1+\cfrac{4}{1+\ldots}}}}}\approx 2.0663656771$$

$$\sqrt{\frac{e\pi}{2}}erfc\left(\frac{\sqrt{2}}{2}\right)\approx 0.6556795424$$

From the sum of the results of above continued fractions

1,0018674362 + 1,0000007913 + 0,9568666373 + 0,9991104684 + 2,0663656771 =

= 6,0242110103 we obtain:

(6.0242110103/5)^e

Input interpretation:

$$\left(\frac{6.0242110103}{5}\right)^e$$

Result:

1.659552568...

1.659552568…. is very near to the 14th root of the following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3$ = 1164,2696 i.e. 1,65578...

Alternative representation:

$$\left(\frac{6.02421101030000}{5}\right)^e = \left(\frac{6.02421101030000}{5}\right)^{\exp(z)} \quad \text{for } z = 1$$

Series representations:

$$\left(\frac{6.02421101030000}{5}\right)^e = 1.20484220206000^{\sum_{k=0}^{\infty} 1/k!}$$

- $$\left(\frac{6.02421101030000}{5}\right)^e = 1.20484220206000^{\sum_{k=0}^{\infty} (-1+k)^2/k!}$$

- $$\left(\frac{6.02421101030000}{5}\right)^e = 1.20484220206000^{\left(\sum_{k=0}^{\infty} \frac{-1+k+z}{k!}\right)/z}$$

$n!$ is the factorial function

Integral representation:

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,ds}{(2\,\pi\,i)\,\Gamma(-a)} \quad \text{for } (0 < \gamma < -\mathrm{Re}(a) \text{ and } |\arg(z)| < \pi)$$

$\Gamma(x)$ is the gamma function

$\mathrm{Re}(z)$ is the real part of z

$\arg(z)$ is the complex argument

$|z|$ is the absolute value of z

i is the imaginary unit

13/10^3+(6.0242110103/5)^e

Input interpretation:

$$\frac{13}{10^3} + \left(\frac{6.0242110103}{5}\right)^e$$

Result:

1.672552568...

1.672552568…. result very near to the value of proton mass

Alternative representation:

$$\frac{13}{10^3}+\left(\frac{6.02421101030000}{5}\right)^e=\frac{13}{10^3}+\left(\frac{6.02421101030000}{5}\right)^{\exp(z)} \text{ for } z=1$$

Series representations:

$$\frac{13}{10^3}+\left(\frac{6.02421101030000}{5}\right)^e=\frac{13}{1000}+1.20484220206000^{\sum_{k=0}^{\infty} 1/k!}$$

- $$\frac{13}{10^3}+\left(\frac{6.02421101030000}{5}\right)^e=\frac{13}{1000}+1.20484220206000^{\sum_{k=0}^{\infty}(-1+k)^2/k!}$$

- $$\frac{13}{10^3}+\left(\frac{6.02421101030000}{5}\right)^e=\frac{13}{1000}+1.20484220206000^{\left(\sum_{k=0}^{\infty}\frac{-1+k+z}{k!}\right)/z}$$

$n!$ is the factorial function

-34/10^3-7/10^3+(6.0242110103/5)^e

Input interpretation:

$$-\frac{34}{10^3}-\frac{7}{10^3}+\left(\frac{6.0242110103}{5}\right)^e$$

Result:

1.618552568...

1.618552568…

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

Alternative representation:

$$-\frac{34}{10^3}-\frac{7}{10^3}+\left(\frac{6.02421101030000}{5}\right)^e = -\frac{34}{10^3}-\frac{7}{10^3}+\left(\frac{6.02421101030000}{5}\right)^{\exp(z)} \text{ for } z=1$$

Series representations:

$$-\frac{34}{10^3}-\frac{7}{10^3}+\left(\frac{6.02421101030000}{5}\right)^e = -\frac{41}{1000}+1.20484220206000^{\sum_{k=0}^{\infty} 1/k!}$$

- $$-\frac{34}{10^3}-\frac{7}{10^3}+\left(\frac{6.02421101030000}{5}\right)^e = -\frac{41}{1000}+1.20484220206000^{\sum_{k=0}^{\infty} (-1+k)^2/k!}$$

- $$-\frac{34}{10^3}-\frac{7}{10^3}+\left(\frac{6.02421101030000}{5}\right)^e = -\frac{41}{1000}+1.20484220206000^{\left(\sum_{k=0}^{\infty} \frac{-1+k+z}{k!}\right)/z}$$

$n!$ is the factorial function

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