On various Ramanujan equations: mathematical connections with some cosmological parameters and some sectors of Particle physics, in particular the masses of the two Pion mesons.

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Abstract

In this research thesis, we have analyzed various Ramanujan equations and described the new possible mathematical connections with some cosmological parameters and some sectors of Particle physics, in particular the masses of the two Pion mesons.

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https://twitter.com/royalsociety/status/1076386910845710337

https://www.insidescience.org/news/every-black-hole-contains-new-universe

Now, we have that:

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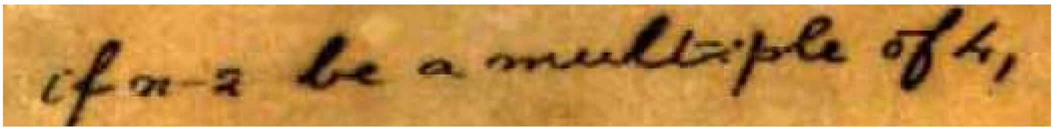
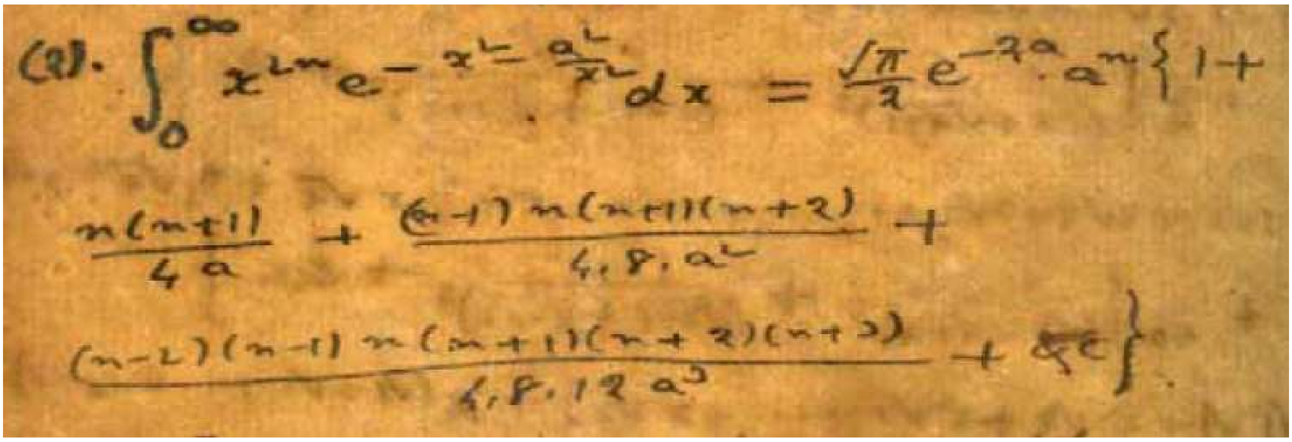


if n-2 be a multiple of 4,

We take n – 2 = 24; n = 26



(2). $\int_0^\infty x^{2n} e^{-x^2-\frac{a^2}{x^2}}dx = \frac{\sqrt{\pi}}{2} e^{-2a} a^n \left\{ 1 + \frac{n(n+1)}{4a} + \frac{(n-1)n(n+1)(n+2)}{4.8.a^2} + \frac{(n-2)(n-1)n(n+1)(n+2)(n+3)}{4.8.12\,a^3} + \&c \right\}$.

Thence: a = 1, b = 2, p = 6, q = 3 and r = – 3 ; n = 26; x = 2

(((1/2* sqrt(Pi) 1/e^(2)))) * ((((26*27)/4+(25*26(27*28))/32+(24*25*26(27*28*29))/(32*12))))

Input:

$$\left(\frac{1}{2}\sqrt{\pi}\times\frac{1}{e^2}\right)\left(\frac{26\times 27}{4}+\frac{1}{32}(25\times 26(27\times 28))+\frac{24\times 25\times 26(27\times 28\times 29)}{32\times 12}\right)$$

Exact result:

$$\frac{3624777\sqrt{\pi}}{8e^2}$$

Decimal approximation:

108686.91931526846725159231157337787283534773768095111182260...

108686.9193…

(((1/2* sqrt(Pi) 1/e^(2)))) * ((((26*27)/4+(25*26(27*28))/32+(24*25*26(27*28*29))/(32*12))))/64+(18+11+2)

Input:

$$\left(\frac{1}{2}\sqrt{\pi}\times\frac{1}{e^2}\right)\left(\frac{1}{64}\left(\frac{26\times 27}{4}+\frac{1}{32}(25\times 26(27\times 28))+\frac{24\times 25\times 26(27\times 28\times 29)}{32\times 12}\right)\right)+(18+11+2)$$

Exact result:

$$31+\frac{3624777\sqrt{\pi}}{512e^2}$$

Decimal approximation:

1729.2331143010698008061298683340292630523084012648612222281...

1729.2331143…

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 form:

$$\frac{15872e^2+3624777\sqrt{\pi}}{512e^2}$$

Series representations:

$$\frac{\left(\frac{26\times 27}{4}+\frac{25}{32}\times 26(27\times 28)+\frac{24\times 27(28\times 29)25\times 26}{32\times 12}\right)\sqrt{\pi}}{64\times 2e^2}+(18+11+2)=$$

$$31+\frac{3624777\sqrt{-1+\pi}\sum_{k=0}^{\infty}(-1+\pi)^{-k}\binom{\frac{1}{2}}{k}}{512e^2}$$

$$\frac{\left(\frac{26\times 27}{4}+\frac{25}{32}\times 26\,(27\times 28)+\frac{24\times 27\,(28\times 29)\,25\times 26}{32\times 12}\right)\sqrt{\pi}}{64\times 2\,e^2}+(18+11+2)=$$
$$31+\frac{3\,624\,777\,\sqrt{-1+\pi}\,\sum_{k=0}^{\infty}\frac{(-1)^k\,(-1+\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}{512\,e^2}$$

$$\frac{\left(\frac{26\times 27}{4}+\frac{25}{32}\times 26\,(27\times 28)+\frac{24\times 27\,(28\times 29)\,25\times 26}{32\times 12}\right)\sqrt{\pi}}{64\times 2\,e^2}+(18+11+2)=$$
$$31+\frac{3\,624\,777\,\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\pi-z_0)^k\,z_0^{-k}}{k!}}{512\,e^2}\quad\text{for not }((z_0\in\mathbb{R}\text{ and }-\infty<z_0\leq 0))$$

(((1/2* sqrt(Pi) 1/e^(2)))) * ((((26*27)/4+(25*26(27*28))/32+(24*25*26(27*28*29))/(32*12))))-4096*8-(2048+512-128)

Input:

$$\left(\frac{1}{2}\sqrt{\pi}\times\frac{1}{e^2}\right)\left(\frac{26\times 27}{4}+\frac{1}{32}\,(25\times 26\,(27\times 28))+\frac{24\times 25\times 26\,(27\times 28\times 29)}{32\times 12}\right)-4096\times 8-(2048+512-128)$$

Exact result:

$$\frac{3\,624\,777\,\sqrt{\pi}}{8\,e^2}-35\,200$$

Decimal approximation:

73486.91931526846725159231157337787283534773768095111822603...

73486.91931…

Alternate forms:

$$-\frac{281\,600\,e^2-3\,624\,777\,\sqrt{\pi}}{8\,e^2}$$

$$\frac{3\,624\,777\,\sqrt{\pi}-281\,600\,e^2}{8\,e^2}$$

Series representations:

$$\frac{\left(\frac{26\times 27}{4}+\frac{25}{32}\times 26\,(27\times 28)+\frac{24\times 27\,(28\times 29)\,25\times 26}{32\times 12}\right)\sqrt{\pi}}{2\,e^2}-4096\times 8-(2048+512-128)=$$
$$-35\,200+\frac{3\,624\,777\,\sqrt{-1+\pi}\,\sum_{k=0}^{\infty}(-1+\pi)^{-k}\binom{\frac{1}{2}}{k}}{8\,e^2}$$

$$\frac{\left(\frac{26\times 27}{4}+\frac{25}{32}\times 26\,(27\times 28)+\frac{24\times 27\,(28\times 29)\,25\times 26}{32\times 12}\right)\sqrt{\pi}}{2\,e^2}-4096\times 8-(2048+512-128)=$$

$$-35\,200+\frac{3\,624\,777\sqrt{-1+\pi}\,\sum_{k=0}^{\infty}\frac{(-1)^k(-1+\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}{8\,e^2}$$

$$\frac{\left(\frac{26\times 27}{4}+\frac{25}{32}\times 26\,(27\times 28)+\frac{24\times 27\,(28\times 29)\,25\times 26}{32\times 12}\right)\sqrt{\pi}}{2\,e^2}-4096\times 8-(2048+512-128)=$$

$$-35\,200+\frac{3\,624\,777\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\pi-z_0)^k z_0^{-k}}{k!}}{8\,e^2}$$

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

Thence, we have the following mathematical connection:

$$\left(\left(\frac{1}{2}\sqrt{\pi}\times\frac{1}{e^2}\right)\left(\frac{26\times 27}{4}+\frac{1}{32}\,(25\times 26\,(27\times 28))+\frac{24\times 25\times 26\,(27\times 28\times 29)}{32\times 12}\right)-4096\times 8-(2048+512-128)\right)=73486.919\Rightarrow$$

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

$$-3927+2\sqrt[13]{2.2983717437\times 10^{59}+2.0823329825883\times 10^{59}}$$

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

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

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

$$= 73491.788325481187105491595720422205480251957265634133987\,00\ldots$$

$$= 73491.7883254\ldots \Rightarrow$$

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

$$/(26\times 4)^2 - 24 = \left(\frac{7.9313976505275\times 10^8}{(26\times 4)^2-24}\right) = 73493.30662\ldots$$

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

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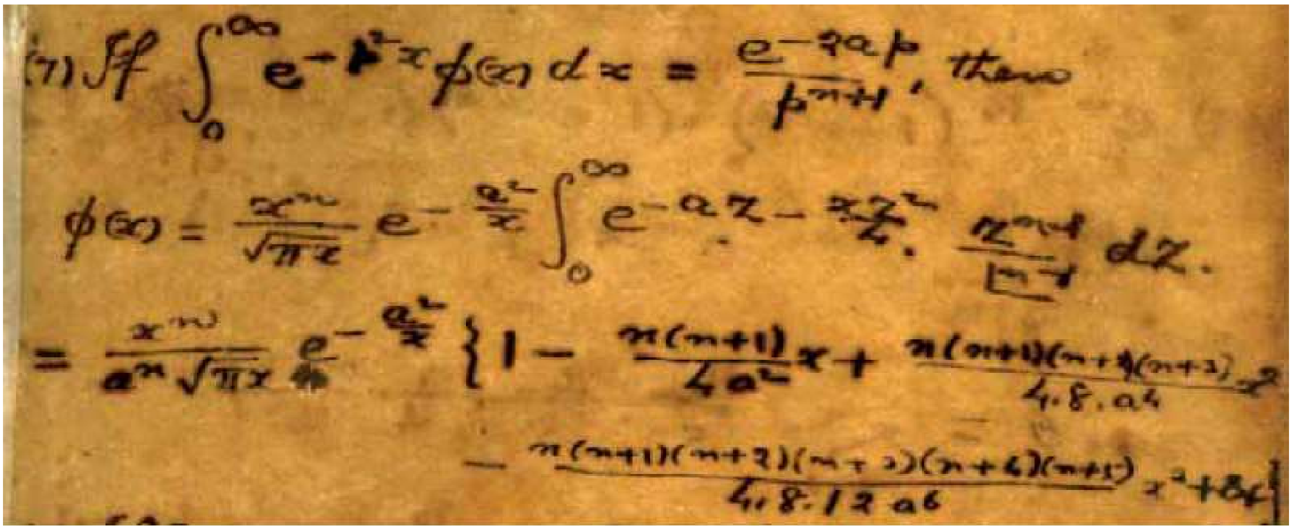
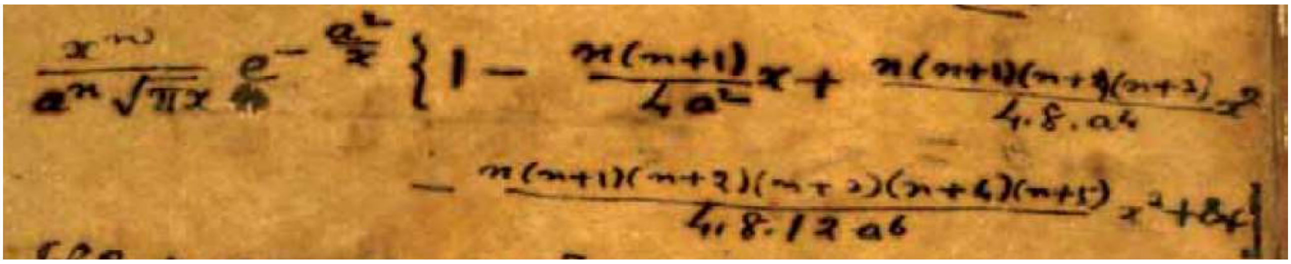


(7) If $\int_0^\infty e^{-p^2 x}\phi(x)\,dx = \frac{e^{-2ap}}{p^{n+1}}$, then

$$\phi(x) = \frac{x^n}{\sqrt{\pi x}}e^{-\frac{a^2}{x}}\int_0^\infty e^{-az-\frac{xz^2}{4}}\,\frac{z^{n-1}}{\lfloor n-1}\,dz.$$

$$= \frac{x^n}{a^n\sqrt{\pi x}}e^{-\frac{a^2}{x}}\left\{1-\frac{n(n+1)}{4a^2}x+\frac{n(n+1)(n+2)(n+3)}{4.8.a^4}x^2 - \frac{n(n+1)(n+2)(n+3)(n+4)(n+5)}{4.8.12\,a^6}x^3+\&c\right\}$$

Thence: a = 1, b = 2, p = 6, q = 3 and r = – 3 ; n = 10; x = 2



(2^10)/(sqrt(2Pi)) exp(-1/2) [1-(10*2*(11))/4+(10*4*(11*12*13))/32-(10*8*(11*12*13*14*15))/(4*8*12)]

Input:

$$\frac{2^{10}}{\sqrt{2\pi}} \exp\left(-\frac{1}{2}\right) \left(1 - \frac{1}{4}(10\times 2\times 11) + \frac{1}{32}(10\times 4(11\times 12\times 13)) - \frac{10\times 8(11\times 12\times 13\times 14\times 15)}{4\times 8\times 12}\right)$$

Exact result:

$$-37\,367\,808\sqrt{\frac{2}{e\pi}}$$

Decimal approximation:

$$-1.808383115090448203944431493243797384398417419499618\ldots\times 10^{7}$$

-18083831.150904482

$$-1.8083831150904482\times 10^{7}$$

Series representations:

$$\frac{\left(\exp\left(-\frac{1}{2}\right)\right)\left(1 - \frac{10\times 2\times 11}{4} + \frac{10}{32}\times 4(11\times 12\times 13) - \frac{10\times 8(11\times 12\times 13\times 14\times 15)}{4\times 8\times 12}\right)2^{10}}{\sqrt{2\pi}} = -\frac{74\,735\,616\exp\left(-\frac{1}{2}\right)}{\sqrt{-1+2\pi}\sum_{k=0}^{\infty}(-1+2\pi)^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{\left(\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4\,(11\times12\times13)-\frac{10\times8\,(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)2^{10}}{\sqrt{2\pi}} =$$

$$-\frac{74\,735\,616\exp\left(-\frac{1}{2}\right)}{\sqrt{-1+2\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+2\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{\left(\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4\,(11\times12\times13)-\frac{10\times8\,(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)2^{10}}{\sqrt{2\pi}} =$$

$$-\frac{74\,735\,616\exp\left(-\frac{1}{2}\right)}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2\pi-z_0)^k z_0^{-k}}{k!}} \quad \text{for not } ((z_0\in\mathbb{R} \text{ and } -\infty<z_0\leq 0))$$

And:

sqrt(((((-(2^10)/(sqrt(2Pi)) exp(-1/2) [1-(10*2*(11))/4+(10*4*(11*12*13))/32-(10*8*(11*12*13*14*15))/(4*8*12)]))))) -144-12

Input:

$$\sqrt{\left(-\frac{2^{10}}{\sqrt{2\pi}}\exp\left(-\frac{1}{2}\right)\left(1-\frac{1}{4}(10\times2\times11)+\frac{1}{32}(10\times4\,(11\times12\times13))-\frac{10\times8\,(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)}-144-12$$

Exact result:

$$64\sqrt{9123}\,\sqrt[4]{\frac{2}{e\pi}}-156$$

Decimal approximation:

4096.5088066815901703484620335107576906619652445916105960 46...

4096.5088…..

Alternate form:

$$4\left(16\sqrt{9123}\,\sqrt[4]{\frac{2}{e\pi}}-39\right)$$

Series representations:

$$\sqrt{\frac{\left(\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4\,(11\times12\times13)-\frac{10\times8\,(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)(-2^{10})}{\sqrt{2\pi}}}-144-12=-156+\sqrt{-1+\frac{74\,735\,616\exp\left(-\frac{1}{2}\right)}{\sqrt{2\pi}}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+\frac{74\,735\,616\exp\left(-\frac{1}{2}\right)}{\sqrt{2\pi}}\right)^{-k}$$

$$\sqrt{\frac{\left(\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4\,(11\times12\times13)-\frac{10\times8\,(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)(-2^{10})}{\sqrt{2\pi}}}-144-12=-156+\sqrt{-1+\frac{74\,735\,616\exp\left(-\frac{1}{2}\right)}{\sqrt{2\pi}}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-1+\frac{74\,735\,616\exp\left(-\frac{1}{2}\right)}{\sqrt{2\pi}}\right)^{-k}}{k!}$$

$$\sqrt{\frac{\left(\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4\,(11\times12\times13)-\frac{10\times8\,(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)(-2^{10})}{\sqrt{2\pi}}}-144-12=-156+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{74\,735\,616\exp\left(-\frac{1}{2}\right)}{\sqrt{2\pi}}-z_0\right)^k z_0^{-k}}{k!}$$

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

And:

((sqrt(((((-(2^10)/(sqrt(2Pi)) exp(-1/2) [1-(10*2*(11))/4+(10*4*(11*12*13))/32-(10*8*(11*12*13*14*15))/(4*8*12)]))))))+24*5

Input:

$$\sqrt{\left(-\frac{2^{10}}{\sqrt{2\pi}}\exp\left(-\frac{1}{2}\right)\left(1-\frac{1}{4}(10\times2\times11)+\frac{1}{32}(10\times4\,(11\times12\times13))-\frac{10\times8\,(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)}+24\times5$$

Exact result:

$$120+64\sqrt{9123}\sqrt[4]{\frac{2}{e\,\pi}}$$

Decimal approximation:

4372.508806681590170348462033510757690661965244591610596046...

4372.5088….

Alternate form:

$$8\left(15+8\sqrt{9123}\sqrt[4]{\frac{2}{e\pi}}\right)$$

Series representations:

$$\sqrt{\frac{\left(\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4\left(11\times12\times13\right)-\frac{10\times8\left(11\times12\times13\times14\times15\right)}{4\times8\times12}\right)\right)\left(-2^{10}\right)}{\sqrt{2\pi}}}+24\times5=120+\sqrt{-1+\frac{74735616\exp\left(-\frac{1}{2}\right)}{\sqrt{2\pi}}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+\frac{74735616\exp\left(-\frac{1}{2}\right)}{\sqrt{2\pi}}\right)^{-k}$$

$$\sqrt{\frac{\left(\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4\left(11\times12\times13\right)-\frac{10\times8\left(11\times12\times13\times14\times15\right)}{4\times8\times12}\right)\right)\left(-2^{10}\right)}{\sqrt{2\pi}}}+24\times5=120+\sqrt{-1+\frac{74735616\exp\left(-\frac{1}{2}\right)}{\sqrt{2\pi}}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-1+\frac{74735616\exp\left(-\frac{1}{2}\right)}{\sqrt{2\pi}}\right)^{-k}}{k!}$$

$$\sqrt{\frac{\left(\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4\left(11\times12\times13\right)-\frac{10\times8\left(11\times12\times13\times14\times15\right)}{4\times8\times12}\right)\right)\left(-2^{10}\right)}{\sqrt{2\pi}}}+24\times5=120+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{74735616\exp\left(-\frac{1}{2}\right)}{\sqrt{2\pi}}-z_0\right)^k z_0^{-k}}{k!}$$

for not $((z_0\in\mathbb{R}$ and $-\infty<z_0\leq0))$

1/(((1+ 1/ (((((sqrt(((((-(2^10)/(sqrt(2Pi)) exp(-1/2) [1-(10*2*(11))/4+(10*4*(11*12*13))/32-(10*8*(11*12*13*14*15))/(4*8*12)])))))))))

Input:

$$\frac{1}{1+\frac{1}{\sqrt{-\frac{2^{10}}{\sqrt{2\pi}}\exp\left(-\frac{1}{2}\right)\left(1-\frac{1}{4}\left(10\times2\times11\right)+\frac{1}{32}\left(10\times4\left(11\times12\times13\right)\right)-\frac{10\times8\left(11\times12\times13\times14\times15\right)}{4\times8\times12}\right)}}}$$

Exact result:

$$\frac{1}{1+\frac{\sqrt[4]{\frac{e\pi}{2}}}{64\sqrt{9123}}}$$

Decimal approximation:

0.99976489998129799143098236449977470811503163502558219598 5...

0.9997648999812979…… result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value **0.989117352243 = ϕ**

Alternate forms:

$$\frac{1167744}{1167744+2^{3/4}\sqrt{9123}\sqrt[4]{e\pi}}$$

$$\frac{64\sqrt[4]{2}\sqrt{9123}}{64\sqrt[4]{2}\sqrt{9123}+\sqrt[4]{e\pi}}$$

Series representations:

$$\frac{1}{1+\frac{1}{\sqrt{\frac{\left(\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4(11\times12\times13)-\frac{10\times8(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)\left(-2^{10}\right)}{\sqrt{2\pi}}}}}=$$

$$\frac{1}{1+\frac{1}{\sqrt{-1+\frac{74735616\exp\left(-\frac{1}{2}\right)}{\sqrt{2\pi}}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+\frac{74735616\exp\left(-\frac{1}{2}\right)}{\sqrt{2\pi}}\right)^{-k}}}$$

$$\frac{1}{1+\frac{1}{\sqrt{\frac{\left(\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4\,(11\times12\times13)-\frac{10\times8\,(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)\left(-2^{10}\right)}{\sqrt{2\pi}}}}} = \frac{1}{1+\frac{1}{\sqrt{-1+\frac{74\,735\,616\exp\left(-\frac{1}{2}\right)}{\sqrt{2\pi}}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-1+\frac{74\,735\,616\exp\left(-\frac{1}{2}\right)}{\sqrt{2\pi}}\right)^{-k}}{k!}}}$$

$$\frac{1}{1+\frac{1}{\sqrt{\frac{\left(\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4\,(11\times12\times13)-\frac{10\times8\,(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)\left(-2^{10}\right)}{\sqrt{2\pi}}}}} = \frac{1}{1+\frac{1}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{74\,735\,616\exp\left(-\frac{1}{2}\right)}{\sqrt{2\pi}}-z_0\right)^k z_0^{-k}}{k!}}} \quad \text{for not } ((z_0\in\mathbb{R} \text{ and } -\infty < z_0 \le 0))$$

((((1/4((((sqrt(((((-(2^10)/(sqrt(2Pi)) exp(-1/2) [1-(10*2*(11))/4+(10*4*(11*12*13))/32-(10*8*(11*12*13*14*15))/(4*8*12)]))))))))))))^1/14

Input:

$$\left(\frac{1}{4}\sqrt{\left(-\frac{2^{10}}{\sqrt{2\pi}}\exp\left(-\frac{1}{2}\right)\right)\left(1-\frac{1}{4}\,(10\times2\times11)+\frac{1}{32}\,(10\times4\,(11\times12\times13))-\frac{10\times8\,(11\times12\times13\times14\times15)}{4\times8\times12}\right)}\right)^\wedge(1/14)$$

Exact result:

$$\frac{2^{17/56}\sqrt[28]{9123}}{\sqrt[56]{e\,\pi}}$$

Decimal approximation:

1.645071048502345545475653905732866906056802385803957545462...

$1.645071048\ldots. \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

All 14th roots of 16 sqrt(9123) (2/(e π))^(1/4):

$$\frac{2^{17/56}\sqrt[28]{9123}\,e^0}{\sqrt[56]{e\,\pi}} \approx 1.64507 \quad \text{(real, principal root)}$$

$$\frac{2^{17/56}\sqrt[28]{9123}\ e^{(i\pi)/7}}{\sqrt[56]{e\pi}} \approx 1.4822 + 0.7138\,i$$

$$\frac{2^{17/56}\sqrt[28]{9123}\ e^{(2i\pi)/7}}{\sqrt[56]{e\pi}} \approx 1.0257 + 1.2862\,i$$

$$\frac{2^{17/56}\sqrt[28]{9123}\ e^{(3i\pi)/7}}{\sqrt[56]{e\pi}} \approx 0.36606 + 1.60383\,i$$

$$\frac{2^{17/56}\sqrt[28]{9123}\ e^{(4i\pi)/7}}{\sqrt[56]{e\pi}} \approx -0.3661 + 1.60383\,i$$

Series representations:

$$\sqrt[14]{\frac{1}{4}\sqrt{-\frac{2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times 2\times 11}{4}+\frac{10}{32}\times 4\,(11\times 12\times 13)-\frac{10\times 8\,(11\times 12\times 13\times 14\times 15)}{4\times 8\times 12}\right)}{\sqrt{2\pi}}}} = \frac{2^{15/56}\sqrt[28]{9123}}{\sqrt[56]{e}\ \sqrt[56]{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}}$$

$$\sqrt[14]{\frac{1}{4}\sqrt{-\frac{2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times 2\times 11}{4}+\frac{10}{32}\times 4\,(11\times 12\times 13)-\frac{10\times 8\,(11\times 12\times 13\times 14\times 15)}{4\times 8\times 12}\right)}{\sqrt{2\pi}}}} = \frac{2^{17/56}\sqrt[28]{9123}}{\sqrt[56]{\pi}\ \sqrt[56]{\sum_{k=0}^{\infty}\frac{1}{k!}}}$$

$$\sqrt[14]{\frac{1}{4}\sqrt{-\frac{2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times 2\times 11}{4}+\frac{10}{32}\times 4\,(11\times 12\times 13)-\frac{10\times 8\,(11\times 12\times 13\times 14\times 15)}{4\times 8\times 12}\right)}{\sqrt{2\pi}}}} = \frac{2^{17/56}\sqrt[28]{9123}}{\sqrt[56]{\pi}\ \sqrt[56]{\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}}}$$

Integral representations:

$$\sqrt[14]{\frac{1}{4}\sqrt{-\frac{2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times 2\times 11}{4}+\frac{10}{32}\times 4\,(11\times 12\times 13)-\frac{10\times 8\,(11\times 12\times 13\times 14\times 15)}{4\times 8\times 12}\right)}{\sqrt{2\pi}}}} = \frac{2^{15/56}\sqrt[28]{9123}}{\sqrt[56]{e}\sqrt[56]{\int_0^1\sqrt{1-t^2}\,dt}}$$

$$\sqrt[14]{\frac{1}{4}\sqrt{-\frac{2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times 2\times 11}{4}+\frac{10}{32}\times 4\,(11\times 12\times 13)-\frac{10\times 8\,(11\times 12\times 13\times 14\times 15)}{4\times 8\times 12}\right)}{\sqrt{2\pi}}}} = \frac{2^{2/7}\sqrt[28]{9123}}{\sqrt[56]{e}\sqrt[56]{\int_0^\infty\frac{1}{1+t^2}\,dt}}$$

$$\sqrt[14]{\frac{1}{4}\sqrt{-\frac{2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times 2\times 11}{4}+\frac{10}{32}\times 4\,(11\times 12\times 13)-\frac{10\times 8\,(11\times 12\times 13\times 14\times 15)}{4\times 8\times 12}\right)}{\sqrt{2\pi}}}} = \frac{2^{2/7}\sqrt[28]{9123}}{\sqrt[56]{e}\sqrt[56]{\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt}}$$

1/10^27 * (((((21+5)/10^3+((((1/4((((sqrt(((((-(2^10)/(sqrt(2Pi)) exp(-1/2) [1-(10*2*(11))/4+(10*4*(11*12*13))/32-(10*8*(11*12*13*14*15))/(4*8*12)]))))))))))))^1/14))))

Input:

$$\frac{1}{10^{27}}\left(\frac{21+5}{10^3}+\left(\frac{1}{4}\sqrt{\left(-\frac{2^{10}}{\sqrt{2\pi}}\exp\left(-\frac{1}{2}\right)\left(1-\frac{1}{4}(10\times 2\times 11)+\frac{1}{32}(10\times 4\,(11\times 12\times 13))-\frac{10\times 8\,(11\times 12\times 13\times 14\times 15)}{4\times 8\times 12}\right)\right)}\right)\hat{}\,(1/14)\right)$$

Exact result:

$$\frac{\frac{13}{500}+\frac{2^{17/56}\sqrt[28]{9123}}{\sqrt[56]{e\pi}}}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

Decimal approximation:

$1.671071048502345545475653905732866906056802385803957 5\ldots \times 10^{-27}$

$1.6710710485\ldots*10^{-27}$

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 (N. Haramein)

Alternate forms:

$$\frac{13}{500\,000\,000\,000\,000\,000\,000\,000\,000\,000} + \frac{\sqrt[28]{9123}}{500\,000\,000\,000\,000\,000\,000\,000\,000 \times 2^{39/56} \sqrt[56]{e\,\pi}}$$

$$\frac{500 \times 2^{17/56} \sqrt[28]{9123} + 13 \sqrt[56]{e\,\pi}}{500\,000\,000\,000\,000\,000\,000\,000\,000\,000 \sqrt[56]{e\,\pi}}$$

Series representations:

$$\frac{\frac{21+5}{10^3} + \sqrt[14]{\frac{1}{4}\sqrt{-\frac{2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times 2\times 11}{4}+\frac{10}{32}\times 4(11\times 12\times 13)-\frac{10\times 8(11\times 12\times 13\times 14\times 15)}{4\times 8\times 12}\right)}{\sqrt{2\pi}}}}}{10^{27}} = \frac{13}{500\,000\,000\,000\,000\,000\,000\,000\,000\,000} + \frac{\sqrt[28]{9123}}{500\,000\,000\,000\,000\,000\,000\,000\,000 \times 2^{41/56} \sqrt[56]{e} \sqrt[56]{\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}}}$$

$$\frac{\frac{21+5}{10^3} + \sqrt[14]{\frac{1}{4}\sqrt{-\frac{2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times 2\times 11}{4}+\frac{10}{32}\times 4(11\times 12\times 13)-\frac{10\times 8(11\times 12\times 13\times 14\times 15)}{4\times 8\times 12}\right)}{\sqrt{2\pi}}}}}{10^{27}} = \frac{13}{500\,000\,000\,000\,000\,000\,000\,000\,000\,000} + \frac{\sqrt[28]{9123}}{500\,000\,000\,000\,000\,000\,000\,000\,000 \times 2^{39/56} \sqrt[56]{\pi} \sqrt[56]{\sum_{k=0}^{\infty} \frac{1}{k!}}}$$

$$\frac{\frac{21+5}{10^3}+\sqrt[14]{\frac{1}{4}\sqrt{-\frac{2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4\,(11\times12\times13)-\frac{10\times8\,(11\times12\times13\times14\times15)}{4\times8\times12}\right)}{\sqrt{2\pi}}}}}{10^{27}}=$$

$$\frac{13}{500\,000\,000\,000\,000\,000\,000\,000\,000\,000}+\frac{\sqrt[28]{9123}}{500\,000\,000\,000\,000\,000\,000\,000\,000\times2^{39/56}\sqrt[56]{\pi}\sqrt[56]{\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}}}$$

Integral representations:

$$\frac{\frac{21+5}{10^3}+\sqrt[14]{\frac{1}{4}\sqrt{-\frac{2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4\,(11\times12\times13)-\frac{10\times8\,(11\times12\times13\times14\times15)}{4\times8\times12}\right)}{\sqrt{2\pi}}}}}{10^{27}}=$$

$$\frac{13}{500\,000\,000\,000\,000\,000\,000\,000\,000\,000}+\frac{\sqrt[28]{9123}}{500\,000\,000\,000\,000\,000\,000\,000\,000\times2^{5/7}\sqrt[56]{e}\sqrt[56]{\int_0^{\infty}\frac{1}{1+t^2}\,dt}}$$

$$\frac{\frac{21+5}{10^3}+\sqrt[14]{\frac{1}{4}\sqrt{-\frac{2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4\,(11\times12\times13)-\frac{10\times8\,(11\times12\times13\times14\times15)}{4\times8\times12}\right)}{\sqrt{2\pi}}}}}{10^{27}}=$$

$$\frac{13}{500\,000\,000\,000\,000\,000\,000\,000\,000\,000}+\frac{\sqrt[28]{9123}}{500\,000\,000\,000\,000\,000\,000\,000\,000\times2^{5/7}\sqrt[56]{e}\sqrt[56]{\int_0^{1}\frac{1}{\sqrt{1-t^2}}\,dt}}$$

$$\frac{\frac{21+5}{10^3}+\sqrt[14]{\frac{1}{4}\sqrt{-\frac{2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4\,(11\times12\times13)-\frac{10\times8\,(11\times12\times13\times14\times15)}{4\times8\times12}\right)}{\sqrt{2\pi}}}}}{10^{27}}=$$

$$\frac{13}{500\,000\,000\,000\,000\,000\,000\,000\,000\,000}+\frac{\sqrt[28]{9123}}{500\,000\,000\,000\,000\,000\,000\,000\,000\times2^{41/56}\sqrt[56]{e}\sqrt[56]{\int_0^{1}\sqrt{1-t^2}\,dt}}$$

((((-(29-2)/10^3+((((1/4((((sqrt(((((-(2^10)/(sqrt(2Pi)) exp(-1/2) [1-(10*2*(11))/4+(10*4*(11*12*13))/32-(10*8*(11*12*13*14*15))/(4*8*12)]))))))))))))^1/14))))

Input:

$$-\frac{29-2}{10^3}+\left(\frac{1}{4}\sqrt{\left(-\frac{2^{10}}{\sqrt{2\pi}}\exp\left(-\frac{1}{2}\right)\left(1-\frac{1}{4}(10\times 2\times 11)+\frac{1}{32}(10\times 4(11\times 12\times 13))-\frac{10\times 8(11\times 12\times 13\times 14\times 15)}{4\times 8\times 12}\right)\right)}\right)\hat{}\,(1/14)$$

Exact result:

$$\frac{2^{17/56}\sqrt[28]{9123}}{\sqrt[56]{e\pi}}-\frac{27}{1000}$$

Decimal approximation:

1.618071048502345545475653905732866906056802385803957545462...

1.6180710485…..

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

Alternate forms:

$$\frac{1000\times 2^{17/56}\sqrt[28]{9123}-27\sqrt[56]{e\pi}}{1000\sqrt[56]{e\pi}}$$

$$-\frac{27\sqrt[56]{e\pi}-1000\times 2^{17/56}\sqrt[28]{9123}}{1000\sqrt[56]{e\pi}}$$

Continued fraction:

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{113+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

$$-\frac{29-2}{10^3}+\left(\frac{1}{4}\sqrt{\left(-\frac{1}{\sqrt{2\pi}}2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times 2\times 11}{4}+\frac{10}{32}\times 4\,(11\times 12\times 13)-\frac{10\times 8\,(11\times 12\times 13\times 14\times 15)}{4\times 8\times 12}\right)\right)}\right)^{\wedge}(1/14)=-\frac{27}{1000}+\frac{2^{15/56}\sqrt[28]{9123}}{\sqrt[56]{e}\sqrt[56]{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}}$$

$$-\frac{29-2}{10^3}+\left(\frac{1}{4}\sqrt{\left(-\frac{1}{\sqrt{2\pi}}2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times 2\times 11}{4}+\frac{10}{32}\times 4\,(11\times 12\times 13)-\frac{10\times 8\,(11\times 12\times 13\times 14\times 15)}{4\times 8\times 12}\right)\right)}\right)^{\wedge}(1/14)=-\frac{27}{1000}+\frac{2^{17/56}\sqrt[28]{9123}}{\sqrt[56]{\pi}\sqrt[56]{\sum_{k=0}^{\infty}\frac{1}{k!}}}$$

$$-\frac{29-2}{10^3}+\left(\frac{1}{4}\sqrt{\left(-\frac{1}{\sqrt{2\pi}}2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times 2\times 11}{4}+\frac{10}{32}\times 4\,(11\times 12\times 13)-\frac{10\times 8\,(11\times 12\times 13\times 14\times 15)}{4\times 8\times 12}\right)\right)}\right)^{\wedge}(1/14)=-\frac{27}{1000}+\frac{2^{17/56}\sqrt[28]{9123}}{\sqrt[56]{\pi}\sqrt[56]{\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}}}$$

$$-\frac{29-2}{10^3}+\left(\frac{1}{4}\sqrt{\left(-\frac{1}{\sqrt{2\pi}}2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4(11\times12\times13)-\frac{10\times8(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)}\right)^\wedge(1/14)=$$

$$\frac{-27\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}+1000\times2^{15/56}\sqrt[28]{9123}\left(\frac{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{55/56}\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}{1000\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}$$

$$-\frac{29-2}{10^3}+\left(\frac{1}{4}\sqrt{\left(-\frac{1}{\sqrt{2\pi}}2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4(11\times12\times13)-\frac{10\times8(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)}\right)^\wedge(1/14)=$$

$$\frac{1000\times2^{15/56}\sqrt[28]{9123}\left(\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}}{k_2!(1+2k_1)}\right)^{55/56}-27\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}}{k_2!(1+2k_1)}}{1000\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)\sum_{k=0}^{\infty}\frac{1}{k!}}$$

Integral representations:

$$-\frac{29-2}{10^3}+\left(\frac{1}{4}\sqrt{\left(-\frac{1}{\sqrt{2\pi}}2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4(11\times12\times13)-\frac{10\times8(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)}\right)^\wedge(1/14)=-\frac{27}{1000}+\frac{2^{15/56}\sqrt[28]{9123}}{\sqrt[56]{e}\sqrt[56]{\int_0^1\sqrt{1-t^2}\,dt}}$$

$$-\frac{29-2}{10^3}+\left(\frac{1}{4}\sqrt{\left(-\frac{1}{\sqrt{2\pi}}2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4(11\times12\times13)-\frac{10\times8(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)}\right)^\wedge(1/14)=-\frac{27}{1000}+\frac{2^{2/7}\sqrt[28]{9123}}{\sqrt[56]{e}\sqrt[56]{\int_0^\infty\frac{1}{1+t^2}\,dt}}$$

$$-\frac{29-2}{10^3}+\left(\frac{1}{4}\sqrt{\left(-\frac{1}{\sqrt{2\pi}}2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4(11\times12\times13)-\frac{10\times8(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)}\right)^\wedge(1/14)=-\frac{27}{1000}+\frac{2^{2/7}\sqrt[28]{9123}}{\sqrt[56]{e}\sqrt[56]{\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt}}$$

$$-\frac{29-2}{10^3}+\left(\frac{1}{4}\sqrt{\left(-\frac{1}{\sqrt{2\pi}}2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4(11\times12\times13)-\frac{10\times8(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)}\right)^{\wedge}(1/14)=-\frac{27}{1000}+\frac{2^{2/7}\sqrt[28]{9123}}{\sqrt[56]{e}\sqrt[56]{\int_0^\infty\frac{\sin(t)}{t}\,dt}}$$

$$-\frac{29-2}{10^3}+\left(\frac{1}{4}\sqrt{\left(-\frac{1}{\sqrt{2\pi}}2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4(11\times12\times13)-\frac{10\times8(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)}\right)^{\wedge}(1/14)=-\frac{27}{1000}+\frac{2^{2/7}\sqrt[28]{9123}}{\sqrt[56]{e}\sqrt[56]{\int_0^\infty\frac{\sin^2(t)}{t^2}\,dt}}$$

$$-\frac{29-2}{10^3}+\left(\frac{1}{4}\sqrt{\left(-\frac{1}{\sqrt{2\pi}}2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4(11\times12\times13)-\frac{10\times8(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)}\right)^{\wedge}(1/14)=-\frac{27}{1000}+\frac{\sqrt[4]{2}\,3^{3/56}\sqrt[28]{3041}}{\sqrt[56]{e}\sqrt[56]{\int_0^\infty\frac{\sin^3(t)}{t^3}\,dt}}$$

$$-\frac{29-2}{10^3}+\left(\frac{1}{4}\sqrt{\left(-\frac{1}{\sqrt{2\pi}}2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4(11\times12\times13)-\frac{10\times8(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)}\right)^{\wedge}(1/14)=-\frac{27}{1000}+\frac{2^{17/56}\sqrt[28]{3041}\sqrt[56]{\frac{3}{e}}}{\sqrt[56]{\int_0^\infty\frac{\sin^4(t)}{t^4}\,dt}}$$

$$-\frac{29-2}{10^3}+\left(\frac{1}{4}\sqrt{\left(-\frac{1}{\sqrt{2\pi}}2^{10}\exp\left(-\frac{1}{2}\right)\left(1-\frac{10\times2\times11}{4}+\frac{10}{32}\times4(11\times12\times13)-\frac{10\times8(11\times12\times13\times14\times15)}{4\times8\times12}\right)\right)}\right)^{\wedge}(1/14)=-\frac{27}{1000}+\frac{2^{17/56}\sqrt[28]{9123}}{\sqrt[56]{e}\sqrt[56]{\frac{3\sqrt{3}}{4}+24\int_0^{\frac{1}{4}}\sqrt{t-t^2}\,dt}}$$

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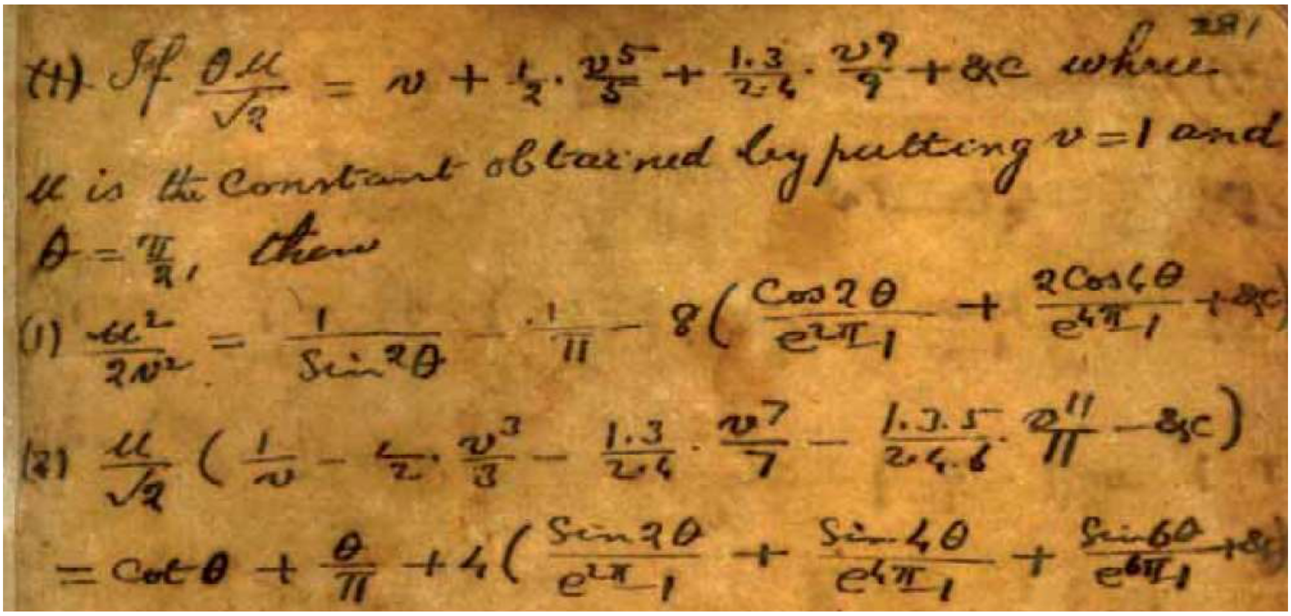
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(4) If $\frac{\theta u}{\sqrt{2}} = v + \frac{1}{2}\cdot\frac{v^5}{5} + \frac{1.3}{2.4}\cdot\frac{v^9}{9} + \&c$ where u is the constant obtained by putting $v = 1$ and $\theta = \frac{\pi}{2}$, then

(1) $\frac{u^2}{2v^2} = \frac{1}{\sin^2\theta} - \frac{1}{\pi} - 8\left(\frac{\cos 2\theta}{e^{2\pi}-1} + \frac{2\cos 4\theta}{e^{4\pi}-1} + \&c\right)$

(2) $\frac{u}{\sqrt{2}}\left(\frac{1}{v} - \frac{1}{2}\cdot\frac{v^3}{3} - \frac{1.3}{2.4}\cdot\frac{v^7}{7} - \frac{1.3.5}{2.4.6}\cdot\frac{v^{11}}{11} - \&c\right)$

$= \cot\theta + \frac{\theta}{\pi} + 4\left(\frac{\sin 2\theta}{e^{2\pi}-1} + \frac{\sin 4\theta}{e^{4\pi}-1} + \frac{\sin 6\theta}{e^{6\pi}-1} + \&c\right)$

cot(Pi/2)+(Pi/2*1/Pi)+4(((((sin(2*Pi/2))/(e^(2Pi) -1)+(sin(4*Pi/2))/(e^(4Pi) -1)+(sin(6*Pi/2))/(e^(6Pi) -1)))))

Input:

$$\cot\left(\frac{\pi}{2}\right) + \frac{\pi}{2} \times \frac{1}{\pi} + 4\left(\frac{\sin\left(2 \times \frac{\pi}{2}\right)}{e^{2\pi}-1} + \frac{\sin\left(4 \times \frac{\pi}{2}\right)}{e^{4\pi}-1} + \frac{\sin\left(6 \times \frac{\pi}{2}\right)}{e^{6\pi}-1}\right)$$

$\cot(x)$ is the cotangent function

Exact result:

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

1/2

Decimal form:

0.5

Alternative representations:

$$\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi\,2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)=$$
$$i+\frac{\pi}{2\pi}+4\left(-\frac{\cos\left(\frac{3\pi}{2}\right)}{-1+e^{2\pi}}-\frac{\cos\left(\frac{5\pi}{2}\right)}{-1+e^{4\pi}}-\frac{\cos\left(\frac{7\pi}{2}\right)}{-1+e^{6\pi}}\right)+\frac{2i}{-1+e^{i\pi}}$$

$$\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi\,2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)=$$
$$i+\frac{\pi}{2\pi}+4\left(\frac{\cos\left(-\frac{\pi}{2}\right)}{-1+e^{2\pi}}+\frac{\cos\left(-\frac{3\pi}{2}\right)}{-1+e^{4\pi}}+\frac{\cos\left(-\frac{5\pi}{2}\right)}{-1+e^{6\pi}}\right)+\frac{2i}{-1+e^{i\pi}}$$

$$\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi\,2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)=$$
$$-i\coth\left(-\frac{i\pi}{2}\right)+\frac{\pi}{2\pi}+4\left(\frac{\cos\left(-\frac{\pi}{2}\right)}{-1+e^{2\pi}}+\frac{\cos\left(-\frac{3\pi}{2}\right)}{-1+e^{4\pi}}+\frac{\cos\left(-\frac{5\pi}{2}\right)}{-1+e^{6\pi}}\right)$$

Series representations:

$$\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi\,2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)=$$
$$\frac{1}{2}\left(1-2i-4i\sum_{k=1}^{\infty}q^{2k}+2\sum_{k=0}^{\infty}\frac{4(-1)^k\left(\frac{1}{-1+e^{2\pi}}+\frac{2^{1+2k}}{-1+e^{4\pi}}+\frac{3^{1+2k}}{-1+e^{6\pi}}\right)\pi^{1+2k}}{(1+2k)!}\right)\text{ for } q=i$$

$$\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi\,2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)=$$
$$\frac{1}{2}\left(1+2\sum_{k=0}^{\infty}\left(\frac{(-1)^k\,2^{2-2k}\,\pi^{2k}}{\left(-1+e^{2\pi}\right)(2k)!}+\frac{(-1)^k\,2^{2-2k}\times 3^{2k}\,\pi^{2k}}{\left(-1+e^{4\pi}\right)(2k)!}+\frac{(-1)^k\,2^{2-2k}\times 5^{2k}\,\pi^{2k}}{\left(-1+e^{6\pi}\right)(2k)!}\right)-2i\sum_{k=-\infty}^{\infty}\mathcal{A}^{ik\pi}\operatorname{sgn}(k)\right)$$

$$\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi\,2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)=$$
$$\frac{1}{2}\left(1+2\sum_{k=0}^{\infty}\left(\frac{4(-1)^k\,\pi^{1+2k}}{\left(-1+e^{2\pi}\right)(1+2k)!}+\frac{(-1)^k\,2^{3+2k}\,\pi^{1+2k}}{\left(-1+e^{4\pi}\right)(1+2k)!}+\frac{4(-1)^k\,3^{1+2k}\,\pi^{1+2k}}{\left(-1+e^{6\pi}\right)(1+2k)!}\right)-2i\sum_{k=-\infty}^{\infty}\mathcal{A}^{ik\pi}\operatorname{sgn}(k)\right)$$

Integral representations:

$$\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)=\frac{1}{2}+\int_0^1 4\pi\left(\frac{\cos(\pi t)}{-1+e^{2\pi}}+\frac{2\cos(2\pi t)}{-1+e^{4\pi}}+\frac{3\cos(3\pi t)}{-1+e^{6\pi}}\right)dt$$

$$\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)=\frac{1}{2}\left(1-2\int_{\frac{\pi}{2}}^{\frac{\pi}{2}}\csc^2(t)\,dt+2\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(\frac{3\mathcal{A}^{-(9\pi^2)/(4s)+s}\sqrt{\pi}}{(-1+e^{6\pi})\,i\,s^{3/2}}+\frac{2\mathcal{A}^{-\pi^2/s+s}\sqrt{\pi}}{(-1+e^{4\pi})\,i\,s^{3/2}}+\frac{\mathcal{A}^{-\pi^2/(4s)+s}\sqrt{\pi}}{(-1+e^{2\pi})\,i\,s^{3/2}}\right)ds\right)\quad\text{for }\gamma>0$$

$$\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)=\frac{1}{2}\left(1-2\int_{\frac{\pi}{2}}^{\frac{\pi}{2}}\csc^2(t)\,dt+2\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(\frac{2^{2s}\pi^{-2s}\Gamma(s)\sqrt{\pi}}{(-1+e^{2\pi})\,i\,\Gamma\left(\frac{3}{2}-s\right)}+\frac{2\pi^{-2s}\Gamma(s)\sqrt{\pi}}{(-1+e^{4\pi})\,i\,\Gamma\left(\frac{3}{2}-s\right)}+\frac{2^{2s}\times 3^{1-2s}\pi^{-2s}\Gamma(s)\sqrt{\pi}}{(-1+e^{6\pi})\,i\,\Gamma\left(\frac{3}{2}-s\right)}\right)ds\right)\quad\text{for }0<\gamma<1$$

Multiple-argument formulas:

$$\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)=\frac{1}{2}+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{U_1(\cos(\pi))\sin(\pi)}{-1+e^{4\pi}}+\frac{U_2(\cos(\pi))\sin(\pi)}{-1+e^{6\pi}}\right)+\frac{1}{2}\left(\cot\left(\frac{\pi}{4}\right)-\tan\left(\frac{\pi}{4}\right)\right)$$

$$\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)=\frac{1}{2}+4\left(\frac{3\sin\left(\frac{\pi}{3}\right)-4\sin^3\left(\frac{\pi}{3}\right)}{-1+e^{2\pi}}+\frac{3\sin\left(\frac{2\pi}{3}\right)-4\sin^3\left(\frac{2\pi}{3}\right)}{-1+e^{4\pi}}+\frac{3\sin(\pi)-4\sin^3(\pi)}{-1+e^{6\pi}}\right)+\frac{1}{2}\left(\cot\left(\frac{\pi}{4}\right)-\tan\left(\frac{\pi}{4}\right)\right)$$

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

And we obtain also:

sqrt((((((cot(Pi/2)+(Pi/2*1/Pi)+4(((((sin(2*Pi/2))/(e^(2Pi) -1)+(sin(4*Pi/2))/(e^(4Pi) -1)+ (sin(6*Pi/2))/(e^(6Pi) -1)))))))))))

Input:

$$\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{2}\times\frac{1}{\pi}+4\left(\frac{\sin\left(2\times\frac{\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(4\times\frac{\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(6\times\frac{\pi}{2}\right)}{e^{6\pi}-1}\right)}$$

$\cot(x)$ is the cotangent function

Exact result:

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

Decimal approximation:

0.7071067811865475244008443621048490392848359376884740365883...

0.707106781….

Alternate form:

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

All 2nd roots of 1/2:

$$\frac{e^0}{\sqrt{2}}\approx 0.70711 \text{ (real, principal root)}$$

$$\frac{e^{i\pi}}{\sqrt{2}}\approx -0.7071 \text{ (real root)}$$

Alternative representations:

$$\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)} = \sqrt{i+\frac{\pi}{2\pi}+4\left(-\frac{\cos\left(\frac{3\pi}{2}\right)}{-1+e^{2\pi}}-\frac{\cos\left(\frac{5\pi}{2}\right)}{-1+e^{4\pi}}-\frac{\cos\left(\frac{7\pi}{2}\right)}{-1+e^{6\pi}}\right)+\frac{2i}{-1+e^{i\pi}}}$$

$$\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)} = \sqrt{i+\frac{\pi}{2\pi}+4\left(\frac{\cos\left(-\frac{\pi}{2}\right)}{-1+e^{2\pi}}+\frac{\cos\left(-\frac{3\pi}{2}\right)}{-1+e^{4\pi}}+\frac{\cos\left(-\frac{5\pi}{2}\right)}{-1+e^{6\pi}}\right)+\frac{2i}{-1+e^{i\pi}}}$$

$$\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)} = \sqrt{-i\coth\left(-\frac{i\pi}{2}\right)+\frac{\pi}{2\pi}+4\left(\frac{\cos\left(-\frac{\pi}{2}\right)}{-1+e^{2\pi}}+\frac{\cos\left(-\frac{3\pi}{2}\right)}{-1+e^{4\pi}}+\frac{\cos\left(-\frac{5\pi}{2}\right)}{-1+e^{6\pi}}\right)}$$

Series representations:

$$\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)} = \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{2}+\cot\left(\frac{\pi}{2}\right)+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{\sin(2\pi)}{-1+e^{4\pi}}+\frac{\sin(3\pi)}{-1+e^{6\pi}}\right)\right)^k}{k!}$$

$$\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)} = \exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1}{2}-x+\cot\left(\frac{\pi}{2}\right)+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{\sin(2\pi)}{-1+e^{4\pi}}+\frac{\sin(3\pi)}{-1+e^{6\pi}}\right)\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k x^{-k}\left(-\frac{1}{2}\right)_k\left(\frac{1}{2}-x+\cot\left(\frac{\pi}{2}\right)+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{\sin(2\pi)}{-1+e^{4\pi}}+\frac{\sin(3\pi)}{-1+e^{6\pi}}\right)\right)^k}{k!}$$

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

$$\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)} = \left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{1}{2}+\cot\left(\frac{\pi}{2}\right)+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{\sin(2\pi)}{-1+e^{4\pi}}+\frac{\sin(3\pi)}{-1+e^{6\pi}}\right)-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{1}{2}+\cot\left(\frac{\pi}{2}\right)+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{\sin(2\pi)}{-1+e^{4\pi}}+\frac{\sin(3\pi)}{-1+e^{6\pi}}\right)-z_0\right)/(2\pi)\right\rfloor\right)} \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1}{2}+\cot\left(\frac{\pi}{2}\right)+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{\sin(2\pi)}{-1+e^{4\pi}}+\frac{\sin(3\pi)}{-1+e^{6\pi}}\right)-z_0\right)^k z_0^{-k}}{k!}$$

Integral representations:

$$\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)} = \sqrt{\frac{1}{2}+\int_0^1 4\pi\left(\frac{\cos(\pi t)}{-1+e^{2\pi}}+\frac{2\cos(2\pi t)}{-1+e^{4\pi}}+\frac{3\cos(3\pi t)}{-1+e^{6\pi}}\right)dt}$$

$$\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi\,2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)} =$$

$$\sqrt{\left(\frac{1}{2}-\int_{\frac{\pi}{2}}^{\frac{\pi}{2}}\csc^2(t)\,dt+4\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\left(\frac{2^{-2+2s}\,\pi^{-2s}\,\Gamma(s)\sqrt{\pi}}{(-1+e^{2\pi})\,i\,\Gamma\left(\frac{3}{2}-s\right)}+\frac{\pi^{-2s}\,\Gamma(s)\sqrt{\pi}}{2\,(-1+e^{4\pi})\,i\,\Gamma\left(\frac{3}{2}-s\right)}+\frac{2^{-2+2s}\times 3^{1-2s}\,\pi^{-2s}\,\Gamma(s)\sqrt{\pi}}{(-1+e^{6\pi})\,i\,\Gamma\left(\frac{3}{2}-s\right)}\right)ds\right)} \text{ for } 0<\gamma<1$$

$$\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi\,2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)} =$$

$$\sqrt{\left(\frac{1}{2}-\int_{\frac{\pi}{2}}^{\frac{\pi}{2}}\csc^2(t)\,dt+4\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\left(\frac{3\,\mathcal{A}^{-(9\pi^2)/(4s)+s}\sqrt{\pi}}{4\,(-1+e^{6\pi})\,i\,s^{3/2}}+\frac{\mathcal{A}^{-\pi^2/s+s}\sqrt{\pi}}{2\,(-1+e^{4\pi})\,i\,s^{3/2}}+\frac{\mathcal{A}^{-\pi^2/(4s)+s}\sqrt{\pi}}{4\,(-1+e^{2\pi})\,i\,s^{3/2}}\right)ds\right)} \text{ for } \gamma>0$$

Thence, with regard this solution, we can to obtain the following interesting mathematical connection:

We know that (From: Anomaly Inflow and the **η**-Invariant - Edward Witten, Kazuya Yonekura *(Submitted on 19 Sep 2019 (v1), last revised 7 Oct 2019 (this version, v2)*see previous paper part III):

From:

$$\cos\theta_a \to \lambda_a/(2|m|)$$

$$\prod_a \left(\frac{\lambda_a}{2|m|}\right)_{\text{reg}} = |\mathrm{Det}(\mathcal{D}_W^+)|$$

$$\cos\theta_a \to 1/\sqrt{2},$$

and

$$Z(Y,\mathrm{L}) = |\mathrm{Det}(\mathcal{D}_W^+)|\exp(-\pi i\eta_D)$$

we obtain:

1/sqrt(2) * exp(-Pi*i*0.004827949)

$$\frac{1}{\sqrt{2}}\exp(-\pi(i \times 0.004827949))$$

Result:

0.707025447... –
0.0107245949... i

Polar coordinates:

$r = 0.707107$ (radius), $\theta = -0.869031°$ (angle)

0.707107

And:

$$\exp(-i\pi\eta_{\overline{Y}}/2) = \exp\left(-i\int_{\overline{Y}}\Phi\right),$$

$$\exp\left(-i\pi\eta_{\overline{Y}}/2\right) \neq 1.$$

sqrt(2)/2 * exp(-(-i*Pi*0.00482794999383144)*1/2)

$$\frac{1}{\sqrt{2}}\exp\left(-(-i(\pi \times 0.00482794999383144)) \times \frac{1}{2}\right)$$

Result:

0.70708644740256586... +
0.0053624527614207895... i

Polar coordinates:

$r = 0.70710678118654752440$ (radius), $\theta = 0.434515499444830°$ (angle)

0.7071067811865475244

Or:

Input interpretation:

$$\frac{\sqrt{2}}{2}\exp(-(-i(\pi \times 0.00482794999383144)))$$

Result:

0.70702544722007017... +
0.010724597114100597... i

Polar coordinates:

$r = 0.70710678118654752440$ (radius), $\theta = 0.869030998889659°$ (angle)

0.7071067811865475244

Thence, we have the following mathematical connection:

$$\left(\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{2}\times\frac{1}{\pi}+4\left(\frac{\sin\left(2\times\frac{\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(4\times\frac{\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(6\times\frac{\pi}{2}\right)}{e^{6\pi}-1}\right)}\right) = 0.707106781\ldots \Rightarrow$$

$$\Rightarrow \left(\frac{1}{\sqrt{2}}\exp\left(-(-i(\pi\times 0.004827949993831 44))\times\frac{1}{2}\right)\right) = 0.70710678118654 75244$$

= 1/√2

We have also:

(((((sqrt((((((cot(Pi/2)+(Pi/2*1/Pi)+4(((((sin(2*Pi/2))/(e^(2Pi) -1)+(sin(4*Pi/2))/(e^(4Pi) -1)+ (sin(6*Pi/2))/(e^(6Pi) -1)))))))))))))))^1/32

Input:

$$\sqrt[32]{\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{2}\times\frac{1}{\pi}+4\left(\frac{\sin\left(2\times\frac{\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(4\times\frac{\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(6\times\frac{\pi}{2}\right)}{e^{6\pi}-1}\right)}}$$

$\cot(x)$ is the cotangent function

Exact result:

$$\frac{1}{\sqrt[64]{2}}$$

Decimal approximation:

0.989228013193975484129124959065583667746743353849851647 16...

0.9892280131939….. result very near to the dilaton value **0.989117352243 = ϕ**

Alternate form:

$$\frac{2^{63/64}}{2}$$

All 32nd roots of 1/sqrt(2):

$\frac{e^0}{\sqrt[64]{2}} \approx 0.989228$ (real, principal root)

$\frac{e^{(i\pi)/16}}{\sqrt[64]{2}} \approx 0.970220 + 0.19299\, i$

$\frac{e^{(i\pi)/8}}{\sqrt[64]{2}} \approx 0.91393 + 0.37856\, i$

$$\frac{e^{(3 i \pi)/16}}{\sqrt[64]{2}} \approx 0.82251 + 0.54959 i$$

$$\frac{e^{(i \pi)/4}}{\sqrt[64]{2}} \approx 0.69949 + 0.69949 i$$

Alternative representations:

$$\sqrt[32]{\sqrt{\cot\left(\frac{\pi}{2}\right) + \frac{\pi}{\pi 2} + 4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi} - 1} + \frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi} - 1} + \frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi} - 1}\right)}} = \sqrt[32]{\sqrt{-i \coth\left(-\frac{i\pi}{2}\right) + \frac{\pi}{2\pi} + 4\left(\frac{\cos\left(-\frac{\pi}{2}\right)}{-1 + e^{2\pi}} + \frac{\cos\left(-\frac{3\pi}{2}\right)}{-1 + e^{4\pi}} + \frac{\cos\left(-\frac{5\pi}{2}\right)}{-1 + e^{6\pi}}\right)}}$$

$$\sqrt[32]{\sqrt{\cot\left(\frac{\pi}{2}\right) + \frac{\pi}{\pi 2} + 4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi} - 1} + \frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi} - 1} + \frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi} - 1}\right)}} = \sqrt[32]{\sqrt{i + \frac{\pi}{2\pi} + 4\left(\frac{\cos\left(-\frac{\pi}{2}\right)}{-1 + e^{2\pi}} + \frac{\cos\left(-\frac{3\pi}{2}\right)}{-1 + e^{4\pi}} + \frac{\cos\left(-\frac{5\pi}{2}\right)}{-1 + e^{6\pi}}\right) + \frac{2i}{-1 + e^{i\pi}}}}$$

$$\sqrt[32]{\sqrt{\cot\left(\frac{\pi}{2}\right) + \frac{\pi}{\pi 2} + 4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi} - 1} + \frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi} - 1} + \frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi} - 1}\right)}} = \sqrt[32]{\sqrt{i + \frac{\pi}{2\pi} + 4\left(-\frac{\cos\left(\frac{3\pi}{2}\right)}{-1 + e^{2\pi}} - \frac{\cos\left(\frac{5\pi}{2}\right)}{-1 + e^{4\pi}} - \frac{\cos\left(\frac{7\pi}{2}\right)}{-1 + e^{6\pi}}\right) + \frac{2i}{-1 + e^{i\pi}}}}$$

Series representations:

$$\sqrt[32]{\sqrt{\cot\left(\frac{\pi}{2}\right) + \frac{\pi}{\pi 2} + 4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi} - 1} + \frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi} - 1} + \frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi} - 1}\right)}} = \sqrt[32]{\sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(-\frac{1}{2} + \cot\left(\frac{\pi}{2}\right) + 4\left(\frac{\sin(\pi)}{-1+e^{2\pi}} + \frac{\sin(2\pi)}{-1+e^{4\pi}} + \frac{\sin(3\pi)}{-1+e^{6\pi}}\right)\right)^k}{k!}}$$

$$\sqrt[32]{\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi\, 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)}} =$$

$$\left(\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1}{2}-x+\cot\left(\frac{\pi}{2}\right)+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{\sin(2\pi)}{-1+e^{4\pi}}+\frac{\sin(3\pi)}{-1+e^{6\pi}}\right)\right)}{2\pi}\right\rfloor\right)\sqrt{x}\right.$$

$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k x^{-k}\left(-\frac{1}{2}\right)_k\left(\frac{1}{2}-x+\cot\left(\frac{\pi}{2}\right)+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{\sin(2\pi)}{-1+e^{4\pi}}+\frac{\sin(3\pi)}{-1+e^{6\pi}}\right)\right)^k}{k!}\right)^\wedge$$

$(1/32)$ for ($x \in \mathbb{R}$ and $x < 0$)

$$\sqrt[32]{\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi\, 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)}} =$$

$$\left(\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{1}{2}+\cot\left(\frac{\pi}{2}\right)+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{\sin(2\pi)}{-1+e^{4\pi}}+\frac{\sin(3\pi)}{-1+e^{6\pi}}\right)-z_0\right)/(2\pi)\right\rfloor}\right.$$

$$z_0^{1/2+1/2\left\lfloor\arg\left(\frac{1}{2}+\cot\left(\frac{\pi}{2}\right)+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{\sin(2\pi)}{-1+e^{4\pi}}+\frac{\sin(3\pi)}{-1+e^{6\pi}}\right)-z_0\right)/(2\pi)\right\rfloor}$$

$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1}{2}+\cot\left(\frac{\pi}{2}\right)+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{\sin(2\pi)}{-1+e^{4\pi}}+\frac{\sin(3\pi)}{-1+e^{6\pi}}\right)-z_0\right)^k z_0^{-k}}{k!}\right)^\wedge(1/32)$$

Integral representations:

$$\sqrt[32]{\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi\, 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)}} =$$

$$\sqrt[32]{\sqrt{\frac{1}{2}+\int_0^1 4\pi\left(\frac{\cos(\pi t)}{-1+e^{2\pi}}+\frac{2\cos(2\pi t)}{-1+e^{4\pi}}+\frac{3\cos(3\pi t)}{-1+e^{6\pi}}\right)dt}}$$

$$\sqrt[32]{\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi\, 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)}} =$$

$$\left(\sqrt{\left(\frac{1}{2}-\int_{\frac{\pi}{2}}^{\frac{\pi}{2}}\csc^2(t)\,dt+4\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(\frac{3\,\mathcal{A}^{-(9\pi^2)/(4s)+s}\sqrt{\pi}}{4\left(-1+e^{6\pi}\right)i\,s^{3/2}}+\frac{\mathcal{A}^{-\pi^2/s+s}\sqrt{\pi}}{2\left(-1+e^{4\pi}\right)i\,s^{3/2}}+\right.\right.}\right.$$

$$\left.\left.\left.\frac{\mathcal{A}^{-\pi^2/(4s)+s}\sqrt{\pi}}{4\left(-1+e^{2\pi}\right)i\,s^{3/2}}\right)ds\right)\right)^\wedge(1/32)\text{ for }\gamma>0$$

$$\sqrt[32]{\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi\,2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)}} =$$

$$\left(\sqrt{\left(\frac{1}{2}-\int_{\frac{\pi}{2}}^{\frac{\pi}{2}}\csc^2(t)\,dt+4\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(\frac{2^{-2+2s}\,\pi^{-2s}\,\Gamma(s)\sqrt{\pi}}{(-1+e^{2\pi})\,i\,\Gamma\left(\frac{3}{2}-s\right)}+\frac{\pi^{-2s}\,\Gamma(s)\sqrt{\pi}}{2(-1+e^{4\pi})\,i\,\Gamma\left(\frac{3}{2}-s\right)}+\frac{2^{-2+2s}\times 3^{1-2s}\,\pi^{-2s}\,\Gamma(s)\sqrt{\pi}}{(-1+e^{6\pi})\,i\,\Gamma\left(\frac{3}{2}-s\right)}\right)ds\right)}\right)^{(1/32)} \text{ for } 0<\gamma<1$$

And:

(((((sqrt((((((cot(Pi/2)+(Pi/2*1/Pi)+4(((((sin(2*Pi/2))/(e^(2Pi) -1)+(sin(4*Pi/2))/(e^(4Pi) -1)+ (sin(6*Pi/2))/(e^(6Pi) -1))))))))))))))))^1/1024

Input:

$$\sqrt[1024]{\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{2}\times\frac{1}{\pi}+4\left(\frac{\sin\left(2\times\frac{\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(4\times\frac{\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(6\times\frac{\pi}{2}\right)}{e^{6\pi}-1}\right)}}$$

$\cot(x)$ is the cotangent function

Exact result:

$$\frac{1}{\sqrt[2048]{2}}$$

Decimal approximation:

0.999661606496243683942196868762815655612113089806646993243...

0.9996616064962...... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value $\mathbf{0.989117352243} = \boldsymbol{\phi}$

All 1024th roots of 1/sqrt(2):

$$\frac{e^{0}}{\sqrt[2048]{2}} \approx 0.99966161 \text{ (real, principal root)}$$

$$\frac{e^{(i\pi)/512}}{\sqrt[2048]{2}} \approx 0.99964279 + 0.006134\, i$$

$$\frac{e^{(i\pi)/256}}{\sqrt[2048]{2}} \approx 0.99958633 + 0.012267\, i$$

$$\frac{e^{(3i\pi)/512}}{\sqrt[2048]{2}} \approx 0.9994922 + 0.018401\, i$$

$$\frac{e^{(i\pi)/128}}{\sqrt[2048]{2}} \approx 0.9993605 + 0.024533\, i$$

Alternative representations:

$$\sqrt[1024]{\sqrt{\cot\left(\frac{\pi}{2}\right) + \frac{\pi}{\pi\, 2} + 4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1} + \frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1} + \frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)}} = \sqrt[1024]{\sqrt{-i\coth\left(-\frac{i\pi}{2}\right) + \frac{\pi}{2\pi} + 4\left(\frac{\cos\left(-\frac{\pi}{2}\right)}{-1+e^{2\pi}} + \frac{\cos\left(-\frac{3\pi}{2}\right)}{-1+e^{4\pi}} + \frac{\cos\left(-\frac{5\pi}{2}\right)}{-1+e^{6\pi}}\right)}}$$

$$\sqrt[1024]{\sqrt{\cot\left(\frac{\pi}{2}\right) + \frac{\pi}{\pi\, 2} + 4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1} + \frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1} + \frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)}} = \sqrt[1024]{\sqrt{i + \frac{\pi}{2\pi} + 4\left(\frac{\cos\left(-\frac{\pi}{2}\right)}{-1+e^{2\pi}} + \frac{\cos\left(-\frac{3\pi}{2}\right)}{-1+e^{4\pi}} + \frac{\cos\left(-\frac{5\pi}{2}\right)}{-1+e^{6\pi}}\right) + \frac{2i}{-1+e^{i\pi}}}}$$

$$\sqrt[1024]{\sqrt{\cot\left(\frac{\pi}{2}\right) + \frac{\pi}{\pi\, 2} + 4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1} + \frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1} + \frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)}} = \sqrt[1024]{\sqrt{i + \frac{\pi}{2\pi} + 4\left(-\frac{\cos\left(\frac{3\pi}{2}\right)}{-1+e^{2\pi}} - \frac{\cos\left(\frac{5\pi}{2}\right)}{-1+e^{4\pi}} - \frac{\cos\left(\frac{7\pi}{2}\right)}{-1+e^{6\pi}}\right) + \frac{2i}{-1+e^{i\pi}}}}$$

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

i is the imaginary unit

Series representations:

$$\sqrt[1024]{\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)}} =$$

$$\sqrt[1024]{\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{2}+\cot\left(\frac{\pi}{2}\right)+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{\sin(2\pi)}{-1+e^{4\pi}}+\frac{\sin(3\pi)}{-1+e^{6\pi}}\right)\right)^k}{k!}}$$

$$\sqrt[1024]{\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)}} =$$

$$\left(\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1}{2}-x+\cot\left(\frac{\pi}{2}\right)+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{\sin(2\pi)}{-1+e^{4\pi}}+\frac{\sin(3\pi)}{-1+e^{6\pi}}\right)\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k x^{-k}\left(-\frac{1}{2}\right)_k\left(\frac{1}{2}-x+\cot\left(\frac{\pi}{2}\right)+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{\sin(2\pi)}{-1+e^{4\pi}}+\frac{\sin(3\pi)}{-1+e^{6\pi}}\right)\right)^k}{k!}\right)^{\wedge}(1/1024) \text{ for } (x \in \mathbb{R} \text{ and } x < 0)$$

$$\sqrt[1024]{\sqrt{\cot\left(\frac{\pi}{2}\right)+\frac{\pi}{\pi 2}+4\left(\frac{\sin\left(\frac{2\pi}{2}\right)}{e^{2\pi}-1}+\frac{\sin\left(\frac{4\pi}{2}\right)}{e^{4\pi}-1}+\frac{\sin\left(\frac{6\pi}{2}\right)}{e^{6\pi}-1}\right)}} =$$

$$\left(\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{1}{2}+\cot\left(\frac{\pi}{2}\right)+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{\sin(2\pi)}{-1+e^{4\pi}}+\frac{\sin(3\pi)}{-1+e^{6\pi}}\right)-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2+1/2\left\lfloor\arg\left(\frac{1}{2}+\cot\left(\frac{\pi}{2}\right)+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{\sin(2\pi)}{-1+e^{4\pi}}+\frac{\sin(3\pi)}{-1+e^{6\pi}}\right)-z_0\right)/(2\pi)\right\rfloor} \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1}{2}+\cot\left(\frac{\pi}{2}\right)+4\left(\frac{\sin(\pi)}{-1+e^{2\pi}}+\frac{\sin(2\pi)}{-1+e^{4\pi}}+\frac{\sin(3\pi)}{-1+e^{6\pi}}\right)-z_0\right)^k z_0^{-k}}{k!}\right)^{\wedge}(1/1024)$$

Now, we have that:

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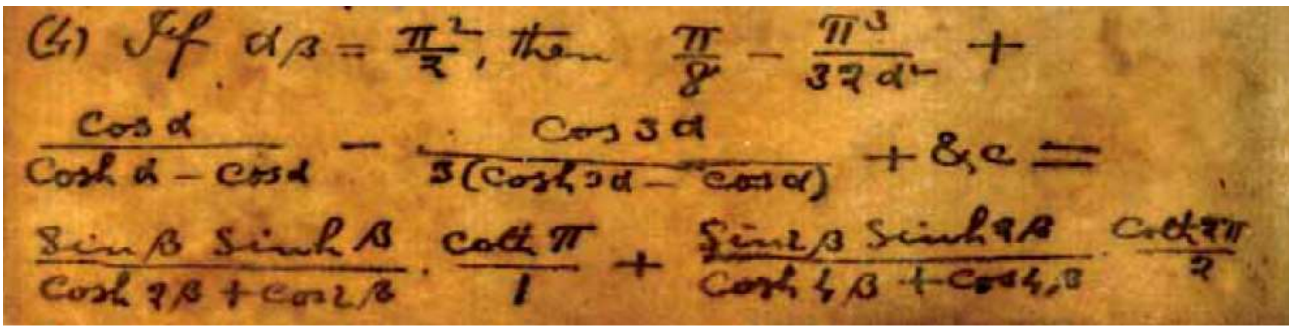
(4) If $\alpha\beta = \frac{\pi^2}{2}$, then $\frac{\pi}{8} - \frac{\pi^3}{32\alpha^2} + \frac{\cos\alpha}{\cosh\alpha - \cos\alpha} - \frac{\cos 3\alpha}{3(\cosh 3\alpha - \cos\alpha)} + \&c = \frac{\sin\beta \sinh\beta}{\cosh 2\beta + \cos 2\beta}\cdot\frac{\coth\pi}{1} + \frac{\sin 2\beta \sinh 2\beta}{\cosh 4\beta + \cos 4\beta}\cdot\frac{\coth 2\pi}{2}$

If:

$\pi \times \frac{\pi}{2} = \frac{\pi^2}{2}$ True

Therefore: $\alpha = \pi$; $\beta = \frac{\pi}{2}$

[(((sin(Pi/2) sinh(Pi/2))))/(((cosh(2*Pi/2)+cos(2*Pi/2))))] * coth(Pi)/1 + [(((sin(2*Pi/2) sinh(2*Pi/2))))/(((cosh(4*Pi/2)+cos(4*Pi/2))))] * coth(2Pi)/2

Input:

$$\frac{\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)}{\cosh\left(2\times\frac{\pi}{2}\right)+\cos\left(2\times\frac{\pi}{2}\right)}\times\frac{\coth(\pi)}{1}+\frac{\sin\left(2\times\frac{\pi}{2}\right)\sinh\left(2\times\frac{\pi}{2}\right)}{\cosh\left(4\times\frac{\pi}{2}\right)+\cos\left(4\times\frac{\pi}{2}\right)}\left(\frac{1}{2}\coth(2\pi)\right)$$

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

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

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

Exact result:

$$\frac{\sinh\left(\frac{\pi}{2}\right)\coth(\pi)}{\cosh(\pi)-1}$$

Decimal approximation:

0.218081595613452079842917651766652016864922914746107422727...

0.218081595613….

Property:

$\frac{\coth(\pi)\sinh\left(\frac{\pi}{2}\right)}{-1+\cosh(\pi)}$ is a transcendental number

Alternate forms:

$$\frac{e^{\pi/2}\coth(\pi)}{e^{\pi}-1}$$

$$\frac{\cosh(\pi)\sinh\left(\frac{\pi}{2}\right)}{(-1+\cosh(\pi))\sinh(\pi)}$$

$$\frac{1}{4}\operatorname{sech}\left(\frac{\pi}{2}\right)+\frac{1}{4}\coth\left(\frac{\pi}{2}\right)\operatorname{csch}\left(\frac{\pi}{2}\right)$$

$\operatorname{csch}(x)$ is the hyperbolic cosecant function

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

Alternative representations:

$$\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}=$$
$$\frac{\cos(0)\left(-e^{-\pi/2}+e^{\pi/2}\right)\left(1+\frac{2}{-1+e^{2\pi}}\right)}{2\left(\frac{1}{2}\left(e^{-\pi}+e^{\pi}\right)+\frac{1}{2}\left(e^{-i\pi}+e^{i\pi}\right)\right)}+\frac{\cos\left(-\frac{\pi}{2}\right)\left(-e^{-\pi}+e^{\pi}\right)\left(1+\frac{2}{-1+e^{4\pi}}\right)}{4\left(\frac{1}{2}\left(e^{-2\pi}+e^{2\pi}\right)+\frac{1}{2}\left(e^{-2i\pi}+e^{2i\pi}\right)\right)}$$

$$\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}=$$
$$\frac{\left(-e^{-\pi/2}+e^{\pi/2}\right)\left(-e^{-(i\pi)/2}+e^{(i\pi)/2}\right)\left(1+\frac{2}{-1+e^{2\pi}}\right)}{2(2i)\left(\cosh(-i\pi)+\frac{1}{2}\left(e^{-\pi}+e^{\pi}\right)\right)}+\frac{\left(-e^{-\pi}+e^{\pi}\right)\left(-e^{-i\pi}+e^{i\pi}\right)\left(1+\frac{2}{-1+e^{4\pi}}\right)}{4(2i)\left(\cosh(-2i\pi)+\frac{1}{2}\left(e^{-2\pi}+e^{2\pi}\right)\right)}$$

$$\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}=$$
$$-\frac{i\left(\cos(0)\cos\left(\frac{\pi}{2}-\frac{i\pi}{2}\right)\left(1+\frac{2}{-1+e^{2\pi}}\right)\right)}{\frac{1}{2}\left(e^{-\pi}+e^{\pi}\right)+\frac{1}{2}\left(e^{-i\pi}+e^{i\pi}\right)}-\frac{i\cos\left(-\frac{\pi}{2}\right)\cos\left(\frac{\pi}{2}-i\pi\right)\left(1+\frac{2}{-1+e^{4\pi}}\right)}{2\left(\frac{1}{2}\left(e^{-2\pi}+e^{2\pi}\right)+\frac{1}{2}\left(e^{-2i\pi}+e^{2i\pi}\right)\right)}$$

Series representations:

$$\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}=$$
$$-\frac{\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)\sum_{k=0}^{\infty}\frac{\left(\frac{2}{\pi}\right)^{-1-2k}}{(1+2k)!}}{-1+\sum_{k=0}^{\infty}\frac{\pi^{2k}}{(2k)!}} \quad \text{for } q=e^{\pi}$$

$$\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}=$$
$$\frac{\pi^{3/2}\sum_{k_1=-\infty}^{\infty}\sum_{k_2=0}^{\infty}\frac{\operatorname{Res}_{s=-k_2}\frac{\left(-\frac{1}{16}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}}{\pi+\pi k_1^2}}{4\left(-1+\sum_{k=0}^{\infty}\frac{\pi^{2k}}{(2k)!}\right)}$$

$$\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}=$$
$$-\frac{\pi^{3/2}\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{16}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}}{4\left(-1+\sum_{k=0}^{\infty}\frac{\pi^{2k}}{(2k)!}\right)} \quad \text{for } q=e^{\pi}$$

$$\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}=$$

$$\frac{\sum_{k_1=-\infty}^{\infty}\sum_{k_2=0}^{\infty}\frac{\left(\frac{2}{\pi}\right)^{-1-2k_2}}{(1+2k_2)!\,(\pi+\pi k_1^2)}}{-1+\sqrt{\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{4}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}}$$

$$\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}=$$

$$-\frac{\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)\sum_{k=0}^{\infty}\frac{\left(\frac{2}{\pi}\right)^{-1-2k}}{(1+2k)!}}{-1+\sqrt{\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{4}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}}\quad \text{for } q=e^{\pi}$$

$$\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}=$$

$$\frac{i\,\pi^{3/2}\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{16}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}}{4\left(i+\sum_{k=0}^{\infty}\frac{\left(\left(1-\frac{i}{2}\right)\pi\right)^{1+2k}}{(1+2k)!}\right)}\quad \text{for } q=e^{\pi}$$

$$\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}=$$

$$\frac{\pi^{3/2}\sum_{k_1=-\infty}^{\infty}\sum_{k_2=0}^{\infty}\frac{\operatorname{Res}_{s=-k_2}\frac{\left(-\frac{1}{16}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}}{\pi+\pi k_1^2}}{4\left(-1+\sqrt{\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{4}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\right)}$$

$$\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}=$$

$$-\frac{\pi^{3/2}\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{16}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}}{4\left(-1+\sqrt{\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{4}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\right)}\quad \text{for } q=e^{\pi}$$

Integral representations:

$$\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}= -\int_0^1\int_0^1\cosh\left(\frac{\pi t_1}{2}\right)\sec^2\left(\left(\frac{1}{2}+i\right)\pi t_2\right)dt_2\,dt_1$$

$$\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}= -\int_0^1\int_0^1\cosh\left(\frac{\pi t_1}{2}\right)\sec^2\left(\left(\frac{1}{2}+i\right)\pi t_2\right)dt_2\,dt_1 \quad \text{for } \gamma>0$$

$$\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}= \frac{i\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(16s)+s}}{s^{3/2}}\,ds\right)\int_{\frac{i\pi}{2}}^{\pi}\operatorname{csch}^2(t)\,dt}{8\sqrt{\pi}\int_0^1\sinh(\pi t)\,dt} \quad \text{for } \gamma>0$$

$$\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}= \frac{i\sqrt{\pi}\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(16s)+s}}{s^{3/2}}\,ds\right)\int_{\frac{i\pi}{2}}^{\pi}\operatorname{csch}^2(t)\,dt}{8\left(-1+\int_{\frac{i\pi}{2}}^{\pi}\sinh(t)\,dt\right)} \quad \text{for } \gamma>0$$

$$\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}= \frac{\pi\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(16s)+s}}{s^{3/2}}\,ds\right)\int_{\frac{i\pi}{2}}^{\pi}\operatorname{csch}^2(t)\,dt}{4\left(2i\sqrt{\pi}-\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(4s)+s}}{\sqrt{s}}\,ds\right)} \quad \text{for } \gamma>0$$

((((((([(((sin(Pi/2) sinh(Pi/2))))/(((cosh(2*Pi/2)+cos(2*Pi/2))))] * coth(Pi)/1 + [(((sin(2*Pi/2) sinh(2*Pi/2))))/(((cosh(4*Pi/2)+cos(4*Pi/2))))] * coth(2Pi)/2))))))^1/64

Input:

$$\sqrt[64]{\frac{\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)}{\cosh\left(2\times\frac{\pi}{2}\right)+\cos\left(2\times\frac{\pi}{2}\right)}\times\frac{\coth(\pi)}{1}+\frac{\sin\left(2\times\frac{\pi}{2}\right)\sinh\left(2\times\frac{\pi}{2}\right)}{\cosh\left(4\times\frac{\pi}{2}\right)+\cos\left(4\times\frac{\pi}{2}\right)}\left(\frac{1}{2}\coth(2\pi)\right)}$$

sinh(x) is the hyperbolic sine function

cosh(x) is the hyperbolic cosine function

coth(x) is the hyperbolic cotangent function

Exact result:

$$\sqrt[64]{\frac{\sinh\left(\frac{\pi}{2}\right)\coth(\pi)}{\cosh(\pi)-1}}$$

Decimal approximation:

0.9764857773836381257947305807849908744316363422390551653 23...

0.976485777383638…. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and very near to the spectral index n_s and to the mesonic Regge slope (see Appendix) and to the inflaton value at the end of the inflation 0.9402

Property:

$$\sqrt[64]{\frac{\coth(\pi)\sinh\left(\frac{\pi}{2}\right)}{-1+\cosh(\pi)}}$$ is a transcendental number

Alternate forms:

$$e^{\pi/128}\sqrt[64]{\frac{\coth(\pi)}{e^{\pi}-1}}$$

$$\sqrt[64]{\frac{\cosh(\pi)}{\cosh\left(\frac{3\pi}{2}\right)-\cosh\left(\frac{\pi}{2}\right)}}$$

$$\sqrt[64]{\frac{\cosh(\pi)\sinh\left(\frac{\pi}{2}\right)}{(-1+\cosh(\pi))\sinh(\pi)}}$$

All 64th roots of (sinh(π/2) coth(π))/(cosh(π) - 1):

$$e^{0}\sqrt[64]{\frac{\sinh\left(\frac{\pi}{2}\right)\coth(\pi)}{\cosh(\pi)-1}}\approx 0.97649$$ (real, principal root)

$$e^{(i\pi)/32}\sqrt[64]{\frac{\sinh\left(\frac{\pi}{2}\right)\coth(\pi)}{\cosh(\pi)-1}}\approx 0.97178+0.09571\,i$$

$$e^{(i\pi)/16}\sqrt[64]{\frac{\sinh\left(\frac{\pi}{2}\right)\coth(\pi)}{\cosh(\pi)-1}}\approx 0.95772+0.19050\,i$$

$$e^{(3i\pi)/32}\sqrt[64]{\frac{\sinh\left(\frac{\pi}{2}\right)\coth(\pi)}{\cosh(\pi)-1}}\approx 0.93444+0.28346\,i$$

$$e^{(i\pi)/8}\sqrt[64]{\frac{\sinh\left(\frac{\pi}{2}\right)\coth(\pi)}{\cosh(\pi)-1}}\approx 0.90216+0.37368\,i$$

Alternative representations:

$$\sqrt[64]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}}=$$
$$\sqrt[64]{\frac{\cos(0)\left(-e^{-\pi/2}+e^{\pi/2}\right)\left(1+\frac{2}{-1+e^{2\pi}}\right)}{2\left(\frac{1}{2}\left(e^{-\pi}+e^{\pi}\right)+\frac{1}{2}\left(e^{-i\pi}+e^{i\pi}\right)\right)}+\frac{\cos\left(-\frac{\pi}{2}\right)\left(-e^{-\pi}+e^{\pi}\right)\left(1+\frac{2}{-1+e^{4\pi}}\right)}{4\left(\frac{1}{2}\left(e^{-2\pi}+e^{2\pi}\right)+\frac{1}{2}\left(e^{-2i\pi}+e^{2i\pi}\right)\right)}}$$

$$\sqrt[64]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}}=$$
$$\sqrt[64]{-\frac{i\left(\cos(0)\cos\left(\frac{\pi}{2}-\frac{i\pi}{2}\right)\left(1+\frac{2}{-1+e^{2\pi}}\right)\right)}{\frac{1}{2}\left(e^{-\pi}+e^{\pi}\right)+\frac{1}{2}\left(e^{-i\pi}+e^{i\pi}\right)}-\frac{i\cos\left(-\frac{\pi}{2}\right)\cos\left(\frac{\pi}{2}-i\pi\right)\left(1+\frac{2}{-1+e^{4\pi}}\right)}{2\left(\frac{1}{2}\left(e^{-2\pi}+e^{2\pi}\right)+\frac{1}{2}\left(e^{-2i\pi}+e^{2i\pi}\right)\right)}}$$

$$\sqrt[64]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}}=$$
$$\left(\frac{\left(-e^{-\pi/2}+e^{\pi/2}\right)\left(-e^{-(i\pi)/2}+e^{(i\pi)/2}\right)\left(1+\frac{2}{-1+e^{2\pi}}\right)}{2(2i)\left(\cosh(-i\pi)+\frac{1}{2}\left(e^{-\pi}+e^{\pi}\right)\right)}+\frac{\left(-e^{-\pi}+e^{\pi}\right)\left(-e^{-i\pi}+e^{i\pi}\right)\left(1+\frac{2}{-1+e^{4\pi}}\right)}{4(2i)\left(\cosh(-2i\pi)+\frac{1}{2}\left(e^{-2\pi}+e^{2\pi}\right)\right)}\right)\char`^(1/64)$$

Series representations:

$$\sqrt[64]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}}=$$
$$\sqrt[64]{-\frac{\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)\sum_{k=0}^{\infty}\frac{\left(\frac{2}{\pi}\right)^{-1-2k}}{(1+2k)!}}{-1+\sum_{k=0}^{\infty}\frac{\pi^{2k}}{(2k)!}}}\quad \text{for } q=e^{\pi}$$

$$\sqrt[64]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \frac{\pi^{3/128}\sqrt[64]{\frac{\sum_{k_1=-\infty}^{\infty}\sum_{k_2=0}^{\infty}\frac{\operatorname{Res}_{s=-k_2}\frac{\left(-\frac{1}{16}\right)^{-s}\pi^{-2s}\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}}{\pi+\pi k_1^2}}{-1+\sum_{k=0}^{\infty}\frac{\pi^{2k}}{(2k)!}}}}{\sqrt[32]{2}}$$

$$\sqrt[64]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \frac{\pi^{3/128}\sqrt[64]{-\frac{\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{16}\right)^{-s}\pi^{-2s}\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}}{-1+\sum_{k=0}^{\infty}\frac{\pi^{2k}}{(2k)!}}}}{\sqrt[32]{2}} \quad \text{for } q=e^{\pi}$$

$$\sqrt[64]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \sqrt[64]{-\frac{\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)\sum_{k=0}^{\infty}\frac{\left(\frac{2}{\pi}\right)^{-1-2k}}{(1+2k)!}}{-1+\sqrt{\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{4}\right)^{-s}\pi^{-2s}\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}}} \quad \text{for } q=e^{\pi}$$

$$\sqrt[64]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \sqrt[64]{\frac{\sum_{k_1=-\infty}^{\infty}\sum_{k_2=0}^{\infty}\frac{\left(\frac{2}{\pi}\right)^{-1-2k_2}}{(1+2k_2)!\left(\pi+\pi k_1^2\right)}}{-1+\sqrt{\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{4}\right)^{-s}\pi^{-2s}\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}}}$$

$$\sqrt[64]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \frac{\pi^{3/128}\sqrt[64]{\frac{i\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{16}\right)^{-s}\pi^{-2s}\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}}{i+\sum_{k=0}^{\infty}\frac{\left(\left(1-\frac{i}{2}\right)\pi\right)^{1+2k}}{(1+2k)!}}}}{\sqrt[32]{2}} \quad \text{for } q=e^{\pi}$$

$$\sqrt[64]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} =$$

$$\frac{\pi^{3/128}\sqrt[64]{\frac{\sum_{k_1=-\infty}^{\infty}\sum_{k_2=0}^{\infty}\frac{\operatorname{Res}_{s=-k_2}\frac{\left(-\frac{1}{16}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}}{\pi+\pi k_1^2}}{-1+\sqrt{\pi}\,\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{4}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}}}}{\sqrt[32]{2}}$$

$$\sqrt[64]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} =$$

$$\frac{\pi^{3/128}\sqrt[64]{-\frac{\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{16}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}}{-1+\sqrt{\pi}\,\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{4}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}}}}{\sqrt[32]{2}} \quad \text{for } q=e^{\pi}$$

Integral representations:

$$\sqrt[64]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \frac{\sqrt[64]{-\int_0^1\int_0^1\cosh\left(\frac{\pi t_1}{2}\right)\sec^2\left(\left(\frac{1}{2}+i\right)\pi t_2\right)dt_2\,dt_1}}{\sqrt[64]{2}}$$

$$\sqrt[64]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \pi^{3/128}\sqrt[64]{-\int_0^1\int_0^1\cosh\left(\frac{\pi t_1}{2}\right)\sec^2\left(\left(\frac{1}{2}+i\right)\pi t_2\right)dt_2\,dt_1} \quad \text{for } \gamma>0$$

$$\sqrt[64]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \sqrt[64]{\frac{\pi}{2}}\sqrt[64]{-\int_0^1\int_0^1\cosh\left(\frac{\pi t_1}{2}\right)\sec^2\left(\left(\frac{1}{2}+i\right)\pi t_2\right)dt_2\,dt_1}$$

$$\sqrt[64]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \frac{\sqrt[64]{\frac{i\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(16s)+s}}{s^{3/2}}\,ds\right)\int_{\frac{i\pi}{2}}^{\pi}\operatorname{csch}^2(t)\,dt}{\int_0^1\sinh(\pi t)\,dt}}}{2^{3/64}\sqrt[128]{\pi}} \quad \text{for } \gamma>0$$

$$\sqrt[64]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \frac{\sqrt[128]{\pi}\,\sqrt[64]{\frac{i\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(16s)+s}}{s^{3/2}}\,ds\right)\int_{\frac{i\pi}{2}}^{\pi}\operatorname{csch}^2(t)\,dt}{-1+\int_{\frac{i\pi}{2}}^{\pi}\sinh(t)\,dt}}}{2^{3/64}} \quad \text{for } \gamma>0$$

$$\sqrt[64]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \frac{\sqrt[64]{\pi}\,\sqrt[64]{-\frac{i\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(16s)+s}}{s^{3/2}}\,ds\right)\int_{\frac{i\pi}{2}}^{\pi}\operatorname{csch}^2(t)\,dt}{2\sqrt{\pi}+i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(4s)+s}}{\sqrt{s}}\,ds}}}{\sqrt[32]{2}} \quad \text{for } \gamma>0$$

And:

((((((([(((sin(Pi/2) sinh(Pi/2))))/(((cosh(2*Pi/2)+cos(2*Pi/2))))] * coth(Pi)/1 + [(((sin(2*Pi/2) sinh(2*Pi/2))))/(((cosh(4*Pi/2)+cos(4*Pi/2))))] * coth(2Pi)/2))))))^1/128

Input:

$$\sqrt[128]{\frac{\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)}{\cosh\left(2\times\frac{\pi}{2}\right)+\cos\left(2\times\frac{\pi}{2}\right)}\times\frac{\coth(\pi)}{1}+\frac{\sin\left(2\times\frac{\pi}{2}\right)\sinh\left(2\times\frac{\pi}{2}\right)}{\cosh\left(4\times\frac{\pi}{2}\right)+\cos\left(4\times\frac{\pi}{2}\right)}\left(\frac{1}{2}\coth(2\pi)\right)}$$

Exact result:

$$\sqrt[128]{\frac{\sinh\left(\frac{\pi}{2}\right)\coth(\pi)}{\cosh(\pi)-1}}$$

Decimal approximation:

0.9881729491256265540511919789975012838573578488648868891665...

0.9881729491256265….. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value $\mathbf{0.989117352243 = \phi}$

Property:

$$\sqrt[128]{\frac{\coth(\pi)\sinh\left(\frac{\pi}{2}\right)}{-1+\cosh(\pi)}}$$ is a transcendental number

Alternate forms:

$$e^{\pi/256}\sqrt[128]{\frac{\coth(\pi)}{e^{\pi}-1}}$$

$$\sqrt[128]{\frac{\cosh(\pi)}{\cosh\left(\frac{3\pi}{2}\right)-\cosh\left(\frac{\pi}{2}\right)}}$$

$$\sqrt[128]{\frac{\cosh(\pi)\sinh\left(\frac{\pi}{2}\right)}{(-1+\cosh(\pi))\sinh(\pi)}}$$

All 128th roots of (sinh(π/2) coth(π))/(cosh(π) - 1):

$$e^{0}\sqrt[128]{\frac{\sinh\left(\frac{\pi}{2}\right)\coth(\pi)}{\cosh(\pi)-1}}\approx 0.988173 \text{ (real, principal root)}$$

$$e^{(i\pi)/64}\sqrt[128]{\frac{\sinh\left(\frac{\pi}{2}\right)\coth(\pi)}{\cosh(\pi)-1}}\approx 0.986983+0.048487\,i$$

$$e^{(i\pi)/32}\sqrt[128]{\frac{\sinh\left(\frac{\pi}{2}\right)\coth(\pi)}{\cosh(\pi)-1}}\approx 0.983415+0.09686\,i$$

$$e^{(3i\pi)/64}\sqrt[128]{\frac{\sinh\left(\frac{\pi}{2}\right)\coth(\pi)}{\cosh(\pi)-1}}\approx 0.977477+0.14500\,i$$

$$e^{(i\pi)/16}\sqrt[128]{\frac{\sinh\left(\frac{\pi}{2}\right)\coth(\pi)}{\cosh(\pi)-1}}\approx 0.96919+0.19278\,i$$

Alternative representations:

$$\sqrt[128]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}}=$$
$$\sqrt[128]{\frac{\cos(0)\left(-e^{-\pi/2}+e^{\pi/2}\right)\left(1+\frac{2}{-1+e^{2\pi}}\right)}{2\left(\frac{1}{2}\left(e^{-\pi}+e^{\pi}\right)+\frac{1}{2}\left(e^{-i\pi}+e^{i\pi}\right)\right)}+\frac{\cos\left(-\frac{\pi}{2}\right)\left(-e^{-\pi}+e^{\pi}\right)\left(1+\frac{2}{-1+e^{4\pi}}\right)}{4\left(\frac{1}{2}\left(e^{-2\pi}+e^{2\pi}\right)+\frac{1}{2}\left(e^{-2i\pi}+e^{2i\pi}\right)\right)}}$$

$$\sqrt[128]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}}=$$
$$\sqrt[128]{-\frac{i\left(\cos(0)\cos\left(\frac{\pi}{2}-\frac{i\pi}{2}\right)\left(1+\frac{2}{-1+e^{2\pi}}\right)\right)}{\frac{1}{2}\left(e^{-\pi}+e^{\pi}\right)+\frac{1}{2}\left(e^{-i\pi}+e^{i\pi}\right)}-\frac{i\cos\left(-\frac{\pi}{2}\right)\cos\left(\frac{\pi}{2}-i\pi\right)\left(1+\frac{2}{-1+e^{4\pi}}\right)}{2\left(\frac{1}{2}\left(e^{-2\pi}+e^{2\pi}\right)+\frac{1}{2}\left(e^{-2i\pi}+e^{2i\pi}\right)\right)}}$$

$$\sqrt[128]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}}=$$
$$\left(\frac{\left(-e^{-\pi/2}+e^{\pi/2}\right)\left(-e^{-(i\pi)/2}+e^{(i\pi)/2}\right)\left(1+\frac{2}{-1+e^{2\pi}}\right)}{2(2i)\left(\cosh(-i\pi)+\frac{1}{2}\left(e^{-\pi}+e^{\pi}\right)\right)}+\frac{\left(-e^{-\pi}+e^{\pi}\right)\left(-e^{-i\pi}+e^{i\pi}\right)\left(1+\frac{2}{-1+e^{4\pi}}\right)}{4(2i)\left(\cosh(-2i\pi)+\frac{1}{2}\left(e^{-2\pi}+e^{2\pi}\right)\right)}\right)^{\wedge}(1/128)$$

Series representations:

$$\sqrt[128]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}}=$$
$$\sqrt[128]{-\frac{\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)\sum_{k=0}^{\infty}\frac{\left(\frac{2}{\pi}\right)^{-1-2k}}{(1+2k)!}}{-1+\sum_{k=0}^{\infty}\frac{\pi^{2k}}{(2k)!}}}\quad\text{for } q=e^{\pi}$$

$$\sqrt[128]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \frac{\pi^{3/256}\sqrt[128]{\frac{\sum_{k_1=-\infty}^{\infty}\sum_{k_2=0}^{\infty}\frac{\operatorname{Res}_{s=-k_2}\frac{\left(-\frac{1}{16}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}}{\pi+\pi k_1^2}}{-1+\sum_{k=0}^{\infty}\frac{\pi^{2k}}{(2k)!}}}}{\sqrt[64]{2}}$$

$$\sqrt[128]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \frac{\pi^{3/256}\sqrt[128]{-\frac{\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{16}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}}{-1+\sum_{k=0}^{\infty}\frac{\pi^{2k}}{(2k)!}}}}{\sqrt[64]{2}} \quad \text{for } q=e^{\pi}$$

$$\sqrt[128]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \sqrt[128]{-\frac{\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)\sum_{k=0}^{\infty}\frac{\left(\frac{2}{\pi}\right)^{-1-2k}}{(1+2k)!}}{-1+\sqrt{\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{4}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}}} \quad \text{for } q=e^{\pi}$$

$$\sqrt[128]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \sqrt[128]{\frac{\sum_{k_1=-\infty}^{\infty}\sum_{k_2=0}^{\infty}\frac{\left(\frac{2}{\pi}\right)^{-1-2k_2}}{(1+2k_2)!\left(\pi+\pi k_1^2\right)}}{-1+\sqrt{\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{4}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}}}$$

$$\sqrt[128]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \frac{\pi^{3/256}\sqrt[128]{\frac{i\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{16}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}}{i+\sum_{k=0}^{\infty}\frac{\left(\left(1-\frac{i}{2}\right)\pi\right)^{1+2k}}{(1+2k)!}}}}{\sqrt[64]{2}} \quad \text{for } q=e^{\pi}$$

$$\sqrt[128]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \frac{\pi^{3/256}\sqrt[128]{\frac{\sum_{k_1=-\infty}^{\infty}\sum_{k_2=0}^{\infty}\frac{\operatorname{Res}_{s=-k_2}\frac{\left(-\frac{1}{16}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}}{\pi+\pi k_1^2}}{-1+\sqrt{\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{4}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}}}}{\sqrt[64]{2}}$$

$$\sqrt[128]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \frac{\pi^{3/256}\sqrt[128]{-\frac{\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{16}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}}{-1+\sqrt{\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{1}{4}\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}}}}{\sqrt[64]{2}} \quad \text{for } q=e^{\pi}$$

Integral representations:

$$\sqrt[128]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \frac{\sqrt[128]{-\int_0^1\int_0^1\cosh\left(\frac{\pi t_1}{2}\right)\sec^2\left(\left(\frac{1}{2}+i\right)\pi t_2\right)dt_2\,dt_1}}{\sqrt[128]{2}}$$

$$\sqrt[128]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \pi^{3/256}\sqrt[128]{-\int_0^1\int_0^1\cosh\left(\frac{\pi t_1}{2}\right)\sec^2\left(\left(\frac{1}{2}+i\right)\pi t_2\right)dt_2\,dt_1} \quad \text{for } \gamma>0$$

$$\sqrt[128]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \sqrt[128]{\frac{\pi}{2}}\sqrt[128]{-\int_0^1\int_0^1\cosh\left(\frac{\pi t_1}{2}\right)\sec^2\left(\left(\frac{1}{2}+i\right)\pi t_2\right)dt_2\,dt_1}$$

$$\sqrt[128]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \frac{\sqrt[128]{\frac{i\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(16s)+s}}{s^{3/2}}\,ds\right)\int_{\frac{i\pi}{2}}^{\pi}\operatorname{csch}^2(t)\,dt}{\int_0^1\sinh(\pi t)\,dt}}}{2^{3/128}\,\sqrt[256]{\pi}} \quad \text{for } \gamma>0$$

$$\sqrt[128]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \frac{\sqrt[256]{\pi}\,\sqrt[128]{\frac{i\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(16s)+s}}{s^{3/2}}\,ds\right)\int_{\frac{i\pi}{2}}^{\pi}\operatorname{csch}^2(t)\,dt}{-1+\int_{\frac{i\pi}{2}}^{\pi}\sinh(t)\,dt}}}{2^{3/128}} \quad \text{for } \gamma>0$$

$$\sqrt[128]{\frac{\coth(\pi)\left(\sin\left(\frac{\pi}{2}\right)\sinh\left(\frac{\pi}{2}\right)\right)}{\cosh\left(\frac{2\pi}{2}\right)+\cos\left(\frac{2\pi}{2}\right)}+\frac{\coth(2\pi)\left(\sin\left(\frac{2\pi}{2}\right)\sinh\left(\frac{2\pi}{2}\right)\right)}{2\left(\cosh\left(\frac{4\pi}{2}\right)+\cos\left(\frac{4\pi}{2}\right)\right)}} = \frac{\sqrt[128]{\pi}\,\sqrt[128]{-\frac{i\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(16s)+s}}{s^{3/2}}\,ds\right)\int_{\frac{i\pi}{2}}^{\pi}\operatorname{csch}^2(t)\,dt}{2\sqrt{\pi}+i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^2/(4s)+s}}{\sqrt{s}}\,ds}}}{\sqrt[64]{2}} \quad \text{for } \gamma>0$$

We have that:

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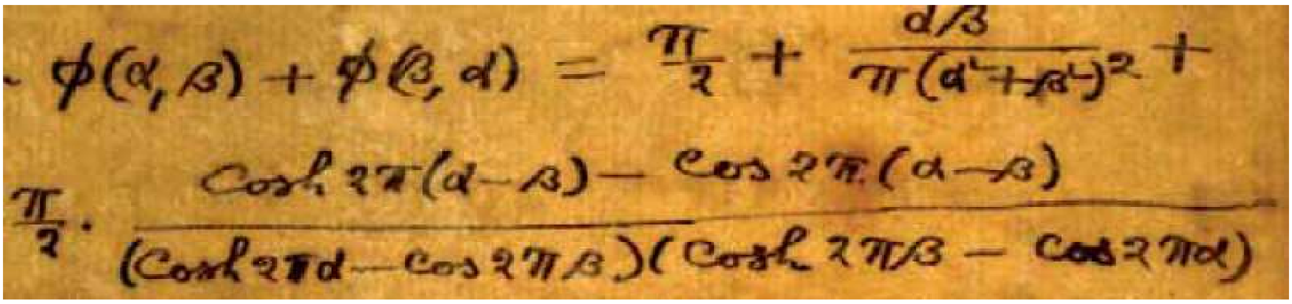


$$\phi(\alpha,\beta)+\phi(\beta,\alpha) = \frac{\pi}{2} + \frac{\alpha\beta}{\pi(\alpha^2+\beta^2)^2} + \frac{\pi}{2}\cdot\frac{\cosh 2\pi(\alpha-\beta)-\cos 2\pi(\alpha-\beta)}{(\cosh 2\pi\alpha-\cos 2\pi\beta)(\cosh 2\pi\beta-\cos 2\pi\alpha)}$$

For : $\alpha = \pi$; $\beta = \frac{\pi}{2}$, we obtain:

Pi/2+((Pi^2)/2)/((Pi(Pi^2+(Pi/2)^2)^2))+Pi/2

Input:

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

Result:

$$\frac{8}{25\pi^3}+\pi$$

Decimal approximation:

3.151913144608417075001658440139843264546949666942298805530...

3.15191314…. partial result

Property:

$\frac{8}{25\pi^3}+\pi$ is a transcendental number

Alternate form:

$$\frac{8+25\pi^4}{25\pi^3}$$

Alternative representations:

$$\frac{\pi}{2}+\frac{\pi^2}{\left(\pi\left(\pi^2+\left(\frac{\pi}{2}\right)^2\right)^2\right)2}+\frac{\pi}{2}=2E(0)+\frac{(2E(0))^2}{2\left(2E(0)\left(E(0)^2+(2E(0))^2\right)^2\right)}$$

$$\frac{\pi}{2}+\frac{\pi^2}{\left(\pi\left(\pi^2+\left(\frac{\pi}{2}\right)^2\right)^2\right)2}+\frac{\pi}{2}=2K(0)+\frac{(2K(0))^2}{2\left(2K(0)\left(K(0)^2+(2K(0))^2\right)^2\right)}$$

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

Series representations:

$$\frac{\pi}{2}+\frac{\pi^2}{\left(\pi\left(\pi^2+\left(\frac{\pi}{2}\right)^2\right)^2\right)2}+\frac{\pi}{2}=\frac{1+800\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^4}{200\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^3}$$

$$\frac{\pi}{2}+\frac{\pi^2}{\left(\pi\left(\pi^2+\left(\frac{\pi}{2}\right)^2\right)^2\right)2}+\frac{\pi}{2}=\frac{8+25\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^4}{25\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^3}$$

$$\frac{\pi}{2}+\frac{\pi^2}{\left(\pi\left(\pi^2+\left(\frac{\pi}{2}\right)^2\right)^2\right)2}+\frac{\pi}{2}=\frac{8+25\left(\sum_{k=0}^{\infty}-\frac{4(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times239^{1+2k}\right)}{1+2k}\right)^4}{25\left(\sum_{k=0}^{\infty}-\frac{4(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times239^{1+2k}\right)}{1+2k}\right)^3}$$

Integral representations:

$$\frac{\pi}{2}+\frac{\pi^2}{\left(\pi\left(\pi^2+\left(\frac{\pi}{2}\right)^2\right)^2\right)2}+\frac{\pi}{2}=\frac{1+50\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^4}{25\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^3}$$

$$\frac{\pi}{2}+\frac{\pi^2}{\left(\pi\left(\pi^2+\left(\frac{\pi}{2}\right)^2\right)^2\right)2}+\frac{\pi}{2}=\frac{1+50\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^4}{25\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^3}$$

$$\frac{\pi}{2}+\frac{\pi^2}{\left(\pi\left(\pi^2+\left(\frac{\pi}{2}\right)^2\right)^2\right)2}+\frac{\pi}{2}=\frac{1+50\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt\right)^4}{25\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt\right)^3}$$

3.151913144608417075* (((cosh(2Pi(Pi-Pi/2)))-cos(2Pi(Pi-Pi/2))))/(((cosh(2Pi*Pi)-cos(2Pi*Pi/2)))(((cosh(2Pi*Pi/2)-cos(2Pi*Pi)))))

Input interpretation:

$$3.151913144608417075\times\frac{\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(2\pi\times\frac{\pi}{2}\right)\right)\left(\cosh\left(2\pi\times\frac{\pi}{2}\right)-\cos(2\pi\pi)\right)}$$

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

Result:

$1.686722419379558613\ldots\times10^{-8}$

$1.686722419379\ldots*10^{-8}$ final result

Alternative representations:

$$\frac{3.1519131446084170750000\left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)}=\frac{3.1519131446084170750000\left(-\cosh\left(-i\pi^2\right)+\cos\left(-i\pi^2\right)\right)}{\left(-\cosh\left(-2i\pi^2\right)+\cos\left(-i\pi^2\right)\right)\left(-\cosh\left(-i\pi^2\right)+\cos\left(-2i\pi^2\right)\right)}$$

$$\frac{3.1519131446084170750000\left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)}=\frac{3.1519131446084170750000\left(-\cosh\left(i\pi^2\right)+\cos\left(-i\pi^2\right)\right)}{\left(-\cosh\left(2i\pi^2\right)+\cos\left(-i\pi^2\right)\right)\left(-\cosh\left(i\pi^2\right)+\cos\left(-2i\pi^2\right)\right)}$$

$$\frac{3.1519131446084170750000 \left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)} = \frac{3.1519131446084170750000 \left(-\cosh\left(-i\pi^2\right)+\cos\left(i\pi^2\right)\right)}{\left(-\cosh\left(-2i\pi^2\right)+\cos\left(i\pi^2\right)\right)\left(-\cosh\left(-i\pi^2\right)+\cos\left(2i\pi^2\right)\right)}$$

Series representations:

$$\frac{3.1519131446084170750000 \left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)} = \left(\sum_{k=0}^{\infty}\frac{\left(-3.1519131446084170750+3.1519131446084170750\,(-1)^k\right)\left(\pi^2\right)^{2k}}{(2k)!}\right) \Bigg/ \left(\left(\sum_{k=0}^{\infty}\frac{\left(1.0000000000000000000-1.0000000000000000000\,(-4)^k\right)\left(\pi^2\right)^{2k}}{(2k)!}\right)\sum_{k=0}^{\infty}\frac{\left((-1)^k-1.0000000000000000000000\times 4^k\right)\left(\pi^2\right)^{2k}}{(2k)!}\right)$$

$$\frac{3.1519131446084170750000 \left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)} = \left(\sum_{k=0}^{\infty}\left(-\frac{3.15191314460841707500\,(-1)^k\left(\pi^2\right)^{2k}}{(2k)!}+\frac{3.1519131446084170750000\,i\left(-\frac{i\pi}{2}+\pi^2\right)^{1+2k}}{(1+2k)!}\right)\right) \Bigg/ \left(\left(\sum_{k=0}^{\infty}\left(-\frac{1.0000000000000000000000\,(-4)^k\left(\pi^2\right)^{2k}}{(2k)!}+\frac{i\left(-\frac{i\pi}{2}+\pi^2\right)^{1+2k}}{(1+2k)!}\right)\right)\sum_{k=0}^{\infty}\left(-\frac{1.0000000000000000000000\,(-1)^k\left(\pi^2\right)^{2k}}{(2k)!}+\frac{i\left(-\frac{i\pi}{2}+2\pi^2\right)^{1+2k}}{(1+2k)!}\right)\right)$$

$$\frac{3.15191314460841707500000\left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)} = \left(3.15191314460841707500 \left(1.000000000000000000000\, I_0(\pi^2) + 2.000000000000000000000 \sum_{k=1}^{\infty} I_{2k}(\pi^2) - 1.000000000000000000000 \sum_{k=0}^{\infty} \frac{(-1)^k (\pi^2)^{2k}}{(2k)!}\right)\right) \Big/ \left(\left(1.000000000000000000000\, I_0(\pi^2) + 2.000000000000000000000 \sum_{k=1}^{\infty} I_{2k}(\pi^2) - 1.000000000000000000000 \sum_{k=0}^{\infty} \frac{(-4)^k (\pi^2)^{2k}}{(2k)!}\right) \left(1.000000000000000000000\, I_0(2\pi^2) + 2.00000000000000000000 \sum_{k=1}^{\infty} I_{2k}(2\pi^2) - 1.000000000000000000000 \sum_{k=0}^{\infty} \frac{(-1)^k (\pi^2)^{2k}}{(2k)!}\right)\right)$$

Integral representations:

$$\frac{3.15191314460841707500000\left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)} = \left(3.15191314460841707500000 \int_0^1 (\sinh(\pi^2 t) + \sin(\pi^2 t))\, dt\right) \Big/ \left(\pi^2 \left(\int_0^1 (2.000000000000000000000 \sinh(2\pi^2 t) + \sin(\pi^2 t))\, dt\right) \int_0^1 (\sinh(\pi^2 t) + 2.000000000000000000000 \sin(2\pi^2 t))\, dt\right)$$

$$\frac{3.15191314460841707500000\left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)} = \left(3.15191314460841707500 0\left(1.000000000000000000000 \int_{\frac{i\pi}{2}}^{\pi^2} \sinh(t)\, dt + 1.000000000000000000000 \int_{\frac{\pi}{2}}^{\pi^2} \sin(t)\, dt\right)\right) \Big/ \left(\left(\int_{\frac{i\pi}{2}}^{\pi^2} \left(\sinh(t) + \frac{(1-4\pi)\sin\left(\frac{(-1+2i)\pi^2 + t - 4\pi t}{i-2\pi}\right)}{i-2\pi}\right) dt\right) \int_{\frac{i\pi}{2}}^{2\pi^2} \left(\sinh(t) + \frac{(1-2\pi)\sin\left(\frac{(-2+i)\pi^2 + t - 2\pi t}{i-4\pi}\right)}{i-4\pi}\right) dt\right)$$

$$\frac{3.15191314460841707500000\left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)} =$$

$$\left(3.1519131446084170750 0 i\left(1.000000000000000000000\, i\pi^2\int_{\frac{\pi}{2}}^{\pi^2}\sin(t)\,dt + 0.5000000000000000000000\,\pi\sqrt{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^4/(4s)+s}}{\sqrt{s}}\,ds\right)\right)\Big/$$
$$\left(\left(1.000000000000000000000\, i\pi\int_{\frac{\pi}{2}}^{2\pi^2}\sin(t)\,dt + 0.5000000000000000000000\sqrt{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^4/(4s)+s}}{\sqrt{s}}\,ds\right)\left(1.000000000000000000000\, i\pi\int_{\frac{\pi}{2}}^{\pi^2}\sin(t)\,dt + 0.5000000000000000000000\sqrt{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^4/s+s}}{\sqrt{s}}\,ds\right)\right) \text{ for } \gamma > 0$$

(((((3.151913144608417075* (((cosh(2Pi(Pi-Pi/2))-cos(2Pi(Pi-Pi/2))))/(((cosh(2Pi*Pi)-cos(2Pi*Pi/2)))(((cosh(2Pi*Pi/2)-cos(2Pi*Pi))))))))))^1/4096

Input interpretation:

$$\sqrt[4096]{3.151913144608417075\times\frac{\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(2\pi\times\frac{\pi}{2}\right)\right)\left(\cosh\left(2\pi\times\frac{\pi}{2}\right)-\cos(2\pi\pi)\right)}}$$

cosh(x) is the hyperbolic cosine function

Result:

0.99563992992080046794012...

0.995639929…. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value **0.989117352243 = ϕ**

64^2+76+18+9/(((((3.1519131446084170 75* (((cosh(2Pi(Pi-Pi/2))-cos(2Pi(Pi-Pi/2))))/(((cosh(2Pi*Pi)-cos(2Pi*Pi/2)))(((cosh(2Pi*Pi/2)-cos(2Pi*Pi)))))))))))^1/2

Input interpretation:

$$64^2+76+18+\frac{9}{\sqrt{3.151913144608417075\times\frac{\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(2\pi\times\frac{\pi}{2}\right)\right)\left(\cosh\left(2\pi\times\frac{\pi}{2}\right)-\cos(2\pi\pi)\right)}}}$$

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

Result:

73488.00000368573772...

73488.0000036…

Alternative representations:

$$64^2+76+18+\frac{9}{\sqrt{\frac{3.1519131446084170750000\left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)}}}=$$

$$94+64^2+\frac{9}{\sqrt{\frac{3.1519131446084170750000\left(-\cosh\left(-i\pi^2\right)+\cos\left(-i\pi^2\right)\right)}{\left(-\cosh\left(-2i\pi^2\right)+\cos\left(-i\pi^2\right)\right)\left(-\cosh\left(-i\pi^2\right)+\cos\left(-2i\pi^2\right)\right)}}}$$

$$64^2+76+18+\frac{9}{\sqrt{\frac{3.1519131446084170750000\left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)}}}=$$

$$94+64^2+\frac{9}{\sqrt{\frac{3.1519131446084170750000\left(-\cosh\left(i\pi^2\right)+\cos\left(-i\pi^2\right)\right)}{\left(-\cosh\left(2i\pi^2\right)+\cos\left(-i\pi^2\right)\right)\left(-\cosh\left(i\pi^2\right)+\cos\left(-2i\pi^2\right)\right)}}}$$

$$64^2+76+18+\frac{9}{\sqrt{\frac{3.1519131446084170750000\left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)}}}=$$

$$94+64^2+\frac{9}{\sqrt{\frac{3.1519131446084170750000\left(-\cosh\left(-i\pi^2\right)+\cos\left(i\pi^2\right)\right)}{\left(-\cosh\left(-2i\pi^2\right)+\cos\left(i\pi^2\right)\right)\left(-\cosh\left(-i\pi^2\right)+\cos\left(2i\pi^2\right)\right)}}}$$

Series representations:

$$64^2+76+18+\frac{9}{\sqrt{\frac{3.15191314460841707500000\left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)}}}=$$

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

$$4190.000000000000000000\left(1.000000000000000000000\sum_{k=0}^{\infty}\frac{\left(-1+(-1)^k\right)\left(\pi^2\right)^{2k}}{(2k)!}+\right.$$

$$\frac{0.00120987740393852564207041}{\sqrt{\frac{\sum_{k=0}^{\infty}\frac{\left(-1+(-1)^k\right)\left(\pi^2\right)^{2k}}{(2k)!}}{\sum_{k=0}^{\infty}-\frac{\left(-1+(-4)^k\right)\left(\pi^2\right)^{2k}}{(2k)!}\sum_{k=0}^{\infty}\frac{\left((-1)^k-4^k\right)\left(\pi^2\right)^{2k}}{(2k)!}}}}$$

$$\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\left(\frac{\left(\pi^2\right)^{2k_1}}{(2k_1)!}-\frac{(-4)^{k_1}\left(\pi^2\right)^{2k_1}}{(2k_1)!}\right)\left(\frac{(-1)^{k_2}\left(\pi^2\right)^{2k_2}}{(2k_2)!}-\frac{4^{k_2}\left(\pi^2\right)^{2k_2}}{(2k_2)!}\right)\right)$$

$$64^2+76+18+\frac{9}{\sqrt{\frac{3.15191314460841707500000\left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)}}} =$$

$$\left(4190.000000000000000000 \left(1.0000000000000000000000 \sum_{k=0}^{\infty}\frac{\left(1+(-1)^{1+k}\right)\left(\pi^2\right)^{2k}}{(2k)!} + 0.0012098774039385256420704 \sqrt{\frac{\sum_{k=0}^{\infty}\frac{\left(1+(-1)^{1+k}\right)\left(\pi^2\right)^{2k}}{(2k)!}}{\sum_{k=0}^{\infty}-\frac{\left(-1+(-4)^k\right)\left(\pi^2\right)^{2k}}{(2k)!}\sum_{k=0}^{\infty}\frac{\left((-1)^{1+k}+4^k\right)\left(\pi^2\right)^{2k}}{(2k)!}}} \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\left(\frac{(-1)^{1+k_1}\left(\pi^2\right)^{2k_1}}{(2k_1)!}+\frac{2^{2k_1}\left(\pi^2\right)^{2k_1}}{(2k_1)!}\right)\left(\frac{\left(\pi^2\right)^{2k_2}}{(2k_2)!}+\frac{(-1)^{1+k_2}\,2^{2k_2}\left(\pi^2\right)^{2k_2}}{(2k_2)!}\right)\right)\right) \Bigg/ \left(\sum_{k=0}^{\infty}\frac{\left(1+(-1)^{1+k}\right)\left(\pi^2\right)^{2k}}{(2k)!}\right)$$

$$64^2+76+18+\frac{9}{\sqrt{\frac{3.15191314460841707500000\left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)}}} = 4190 + \frac{5.0693863225024224402750}{\sqrt{\frac{I_0(\pi^2)+2\sum_{k=1}^{\infty}I_{2k}(\pi^2)-\sum_{k=0}^{\infty}\frac{(-1)^k\left(\pi^2\right)^{2k}}{(2k)!}}{\left(I_0(2\pi^2)+2\sum_{k=1}^{\infty}I_{2k}(2\pi^2)-\sum_{k=0}^{\infty}\frac{(-1)^k\left(\pi^2\right)^{2k}}{(2k)!}\right)\left(I_0(\pi^2)+2\sum_{k=1}^{\infty}I_{2k}(\pi^2)-\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{2k}\left(\pi^2\right)^{2k}}{(2k)!}\right)}}}$$

Integral representations:

$$64^2+76+18+\frac{9}{\sqrt{\frac{3.15191314460841707500000\left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)}}} =$$

$$\left(4190.000000000000000000 \left(1.0000000000000000000000\,\pi^2\int_0^1\left(\sinh(\pi^2 t)+\sin(\pi^2 t)\right)dt+\pi^4 \int_0^1\int_0^1\left(2\sinh(2\pi^2 t_1)+\sin(\pi^2 t_1)\right)\left(\sinh(\pi^2 t_2)+2\sin(2\pi^2 t_2)\right)dt_2\,dt_1\right)\right)\Big/ \left(\pi^2\int_0^1\left(\sinh(\pi^2 t)+\sin(\pi^2 t)\right)dt\right)$$

$$64^2+76+18+\frac{9}{\sqrt{\frac{3.15191314460841707500000\left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)}}}=$$

$$\Bigg(4190.000000000000000000$$

$$\left(1.0000000000000000000000\int_{\frac{i\pi}{2}}^{\pi^2}\left(\sinh(t)+\frac{(1-2\pi)\sin\left(\frac{(-1+i)\pi^2+t-2\pi t}{i-2\pi}\right)}{i-2\pi}\right)dt+\right.$$

$$\frac{1}{i^2-6i\pi+8\pi^2}\int_0^1\int_0^1\left((i-2\pi)\sinh\left(\frac{1}{2}\pi(i-(i-2\pi)t_1)\right)+(1-4\pi)\sin\left(\frac{1}{2}\pi\right.\right.$$

$$\left.\left.(1+(-1+4\pi)t_1)\right)\right)\left((i-4\pi)\sinh\left(\frac{1}{2}\pi(i-(i-4\pi)t_2)\right)+\right.$$

$$\left.\left.\left.(1-2\pi)\sin\left(\frac{1}{2}\pi(1+(-1+2\pi)t_2)\right)\right)dt_2\,dt_1\right)\right)\Bigg/$$

$$\left(\int_{\frac{i\pi}{2}}^{\pi^2}\left(\sinh(t)+\frac{(1-2\pi)\sin\left(\frac{(-1+i)\pi^2+t-2\pi t}{i-2\pi}\right)}{i-2\pi}\right)dt\right)$$

$$64^2+76+18+\frac{9}{\sqrt{\frac{3.15191314460841707500000\left(\cosh\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(2\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)}{\left(\cosh(2\pi\pi)-\cos\left(\frac{2\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{2\pi\pi}{2}\right)-\cos(2\pi\pi)\right)}}}=$$

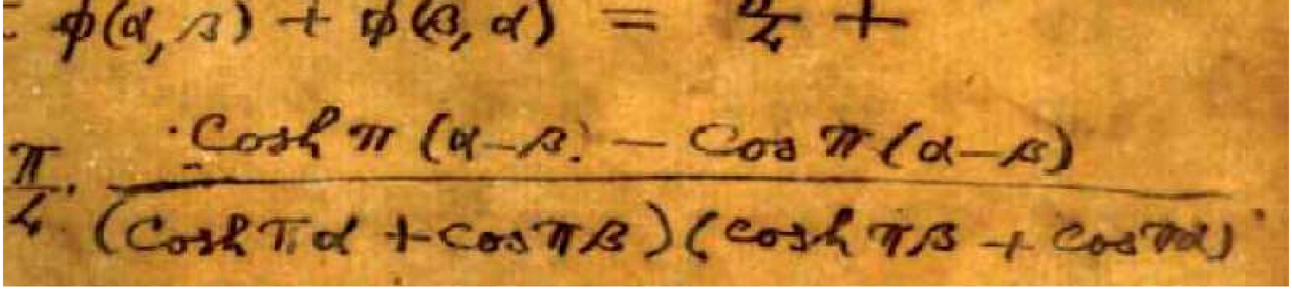
$$4190+5.06938632250242244027500\Big/$$

$$\left(\sqrt{\left(\left(1+\int_0^1\left(\pi^2\sinh(\pi^2 t)+\frac{1}{2}\pi(-1+2\pi)\sin\left(\frac{1}{2}(\pi+\pi(-1+2\pi)t)\right)\right)dt\right)\Big/\right.}\right.$$

$$\left(\left(1+\int_0^1\frac{1}{2}\pi\left(4\pi\sinh(2\pi^2 t)+(-1+2\pi)\sin\left(\frac{1}{2}(\pi+\pi(-1+2\pi)t)\right)\right)dt\right)\right.$$

$$\left.\left.\left.\left(1+\int_0^1\left(\pi^2\sinh(\pi^2 t)+\frac{1}{2}\pi(-1+4\pi)\sin\left(\frac{1}{2}(\pi+\pi(-1+4\pi)t)\right)\right)dt\right)\right)\right)\right)$$

sinh(x) is the hyperbolic sine function



$$\phi(\alpha,\beta)+\phi(\beta,\alpha)=\frac{\pi}{4}+\frac{\pi}{4}\cdot\frac{\cosh\pi(\alpha-\beta)-\cos\pi(\alpha-\beta)}{(\cosh\pi\alpha+\cos\pi\beta)(\cosh\pi\beta+\cos\pi\alpha)}$$

For : $\alpha = \pi$; $\beta = \frac{\pi}{2}$, we obtain:

Pi/4+Pi/4*(((cosh(Pi(Pi-Pi/2))-cos(Pi(Pi-Pi/2))))))/(((((cosh(Pi*Pi)+cos(Pi*Pi/2)))(((cosh(Pi*Pi/2)+cos(Pi*Pi)))))

Input:

$$\frac{\pi}{4}+\frac{\pi}{4}\times\frac{\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)}{\left(\cosh(\pi\,\pi)+\cos\left(\pi\times\frac{\pi}{2}\right)\right)\left(\cosh\left(\pi\times\frac{\pi}{2}\right)+\cos(\pi\,\pi)\right)}$$

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

Decimal approximation:

0.785480215684966279740922468565947904069734740341881411023...

0.785480215…

Alternate forms:

$$\frac{1}{4}\pi\left(1+\frac{\cosh\left(\frac{\pi^2}{2}\right)-\cos\left(\frac{\pi^2}{2}\right)}{\left(\cos(\pi^2)+\cosh\left(\frac{\pi^2}{2}\right)\right)\left(\cos\left(\frac{\pi^2}{2}\right)+\cosh(\pi^2)\right)}\right)$$

$$\frac{\pi}{4}-\frac{\pi\cos\left(\frac{\pi^2}{2}\right)}{4\left(\cos(\pi^2)+\cosh\left(\frac{\pi^2}{2}\right)\right)\left(\cos\left(\frac{\pi^2}{2}\right)+\cosh(\pi^2)\right)}+\frac{\pi\cosh\left(\frac{\pi^2}{2}\right)}{4\left(\cos(\pi^2)+\cosh\left(\frac{\pi^2}{2}\right)\right)\left(\cos\left(\frac{\pi^2}{2}\right)+\cosh(\pi^2)\right)}$$

$$\left(\pi\left(-\cos\left(\frac{\pi^2}{2}\right)+\cos\left(\frac{\pi^2}{2}\right)\cos(\pi^2)+\cosh\left(\frac{\pi^2}{2}\right)+\cosh\left(\frac{\pi^2}{2}\right)\cosh(\pi^2)+\cos\left(\frac{\pi^2}{2}\right)\cosh\left(\frac{\pi^2}{2}\right)+\cos(\pi^2)\cosh(\pi^2)\right)\right)/\left(4\left(\cos(\pi^2)+\cosh\left(\frac{\pi^2}{2}\right)\right)\left(\cos\left(\frac{\pi^2}{2}\right)+\cosh(\pi^2)\right)\right)$$

Alternative representations:

$$\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}=\frac{\pi}{4}+\frac{\pi\left(-\cosh\left(-\frac{i\,\pi^2}{2}\right)+\cos\left(-\frac{i\,\pi^2}{2}\right)\right)}{4\left(\left(\cosh(-i\,\pi^2)+\cos\left(-\frac{i\,\pi^2}{2}\right)\right)\left(\cosh\left(-\frac{i\,\pi^2}{2}\right)+\cos(-i\,\pi^2)\right)\right)}$$

$$\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}=$$

$$\frac{\pi}{4}+\frac{\pi\left(-\cosh\left(\frac{i\,\pi^2}{2}\right)+\cos\left(-\frac{i\,\pi^2}{2}\right)\right)}{4\left(\left(\cosh(i\,\pi^2)+\cos\left(-\frac{i\,\pi^2}{2}\right)\right)\left(\cosh\left(\frac{i\,\pi^2}{2}\right)+\cos(-i\,\pi^2)\right)\right)}$$

$$\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}=$$

$$\frac{\pi}{4}+\frac{\pi\left(-\cosh\left(-\frac{i\,\pi^2}{2}\right)+\cos\left(\frac{i\,\pi^2}{2}\right)\right)}{4\left(\left(\cosh(-i\,\pi^2)+\cos\left(\frac{i\,\pi^2}{2}\right)\right)\left(\cosh\left(-\frac{i\,\pi^2}{2}\right)+\cos(i\,\pi^2)\right)\right)}$$

Series representations:

$$\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}=$$

$$\frac{\pi\left(\sum_{k=0}^{\infty}\frac{4^{-k}\left(1+(-1)^{1+k}\right)\pi^{4k}}{(2k)!}+\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\left(\frac{\pi^{4k_1}}{(2k_1)!}+\frac{\left(-\frac{1}{4}\right)^{k_1}\pi^{4k_1}}{(2k_1)!}\right)\left(\frac{(-1)^{k_2}\pi^{4k_2}}{(2k_2)!}+\frac{4^{-k_2}\pi^{4k_2}}{(2k_2)!}\right)\right)}{4\left(\sum_{k=0}^{\infty}\frac{4^{-k}\left(1+(-4)^{k}\right)\pi^{4k}}{(2k)!}\right)\sum_{k=0}^{\infty}\frac{\left(1+\left(-\frac{1}{4}\right)^{k}\right)\pi^{4k}}{(2k)!}}$$

$$\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}=$$

$$\left(\pi\left(\sum_{k=0}^{\infty}\left(\frac{2^{-2k}\pi^{4k}}{(2k)!}+\frac{(-1)^k\left(-\frac{\pi}{2}+\frac{\pi^2}{2}\right)^{1+2k}}{(1+2k)!}\right)+\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\left(\frac{\pi^{4k_1}}{(2k_1)!}+\frac{(-1)^{-1+k_1}\left(-\frac{\pi}{2}+\frac{\pi^2}{2}\right)^{1+2k_1}}{(1+2k_1)!}\right)\left(\frac{2^{-2k_2}\pi^{4k_2}}{(2k_2)!}+\frac{(-1)^{-1+k_2}\left(-\frac{\pi}{2}+\pi^2\right)^{1+2k_2}}{(1+2k_2)!}\right)\right)\right)\Big/$$

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

$$\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}=$$

$$\left(\pi\left(\sum_{k=0}^{\infty}\left(\frac{(-1)^{1+k}\,2^{-2k}\,\pi^{4k}}{(2k)!}+\frac{i\left(-\frac{i\pi}{2}+\frac{\pi^2}{2}\right)^{1+2k}}{(1+2k)!}\right)+\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\left(\frac{(-1)^{k_1}\,\pi^{4k_1}}{(2k_1)!}+\frac{i\left(-\frac{i\pi}{2}+\frac{\pi^2}{2}\right)^{1+2k_1}}{(1+2k_1)!}\right)\left(\frac{(-1)^{k_2}\,2^{-2k_2}\,\pi^{4k_2}}{(2k_2)!}+\frac{i\left(-\frac{i\pi}{2}+\pi^2\right)^{1+2k_2}}{(1+2k_2)!}\right)\right)\right)\Bigg/\left(4\left(\sum_{k=0}^{\infty}\left(\frac{(-1)^{k}\,\pi^{4k}}{(2k)!}+\frac{i\left(-\frac{i\pi}{2}+\frac{\pi^2}{2}\right)^{1+2k}}{(1+2k)!}\right)\right)\sum_{k=0}^{\infty}\left(\frac{(-1)^{k}\,2^{-2k}\,\pi^{4k}}{(2k)!}+\frac{i\left(-\frac{i\pi}{2}+\pi^2\right)^{1+2k}}{(1+2k)!}\right)\right)$$

Integral representations:

$$\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}=$$

$$-\left(\left(\pi\left(\left(-\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-\pi^4/(4s)+s}\left(1+e^{(5\pi^4)/(16s)}\right)}{\sqrt{s}}\,ds\right)\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-\pi^4/(16s)+s}\left(1+e^{(5\pi^4)/(16s)}\right)}{\sqrt{s}}\,ds+4\pi\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}-\frac{i\,e^{-\pi^4/(16s)+s}\left(-1+e^{\pi^4/(8s)}\right)}{2\sqrt{\pi}\,\sqrt{s}}\,ds\right)\right)\Bigg/\left(4\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-\pi^4/(4s)+s}\left(1+e^{(5\pi^4)/(16s)}\right)}{\sqrt{s}}\,ds\right)\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-\pi^4/(16s)+s}\left(1+e^{(5\pi^4)/(16s)}\right)}{\sqrt{s}}\,ds\right)\right)\quad\text{for }\gamma>0$$

$$\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}=$$

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

$$\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}=$$

$$\left(\pi\left(-2\,i\sqrt{\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{\pi^4/(16\,s)+s}}{\sqrt{s}}\,ds-\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{\pi^4/(16\,s)+s}}{\sqrt{s}}\,ds\right)\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{\pi^4/(4\,s)+s}}{\sqrt{s}}\,ds+4\pi\int_{\frac{\pi}{2}}^{\frac{\pi^2}{2}}\sin(t)\,dt+2\,i\sqrt{\pi}\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{\pi^4/(16\,s)+s}}{\sqrt{s}}\,ds\right)\int_{\frac{\pi}{2}}^{\frac{\pi^2}{2}}\sin(t)\,dt+2\,i\sqrt{\pi}\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{\pi^4/(4\,s)+s}}{\sqrt{s}}\,ds\right)\int_{\frac{\pi}{2}}^{\pi^2}\sin(t)\,dt+\int_0^1\int_0^1\cos\left(\frac{1}{2}(-1+\pi)\,\pi\,t_1\right)\cos\left(\frac{1}{2}(1-2\,\pi)\,\pi\,t_2\right)dt_2\,dt_1\right)\right)\Bigg/\left(4\left(i\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{\pi^4/(4\,s)+s}}{\sqrt{s}}\,ds+2\sqrt{\pi}\int_{\frac{\pi}{2}}^{\frac{\pi^2}{2}}\sin(t)\,dt\right)\left(i\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{\pi^4/(16\,s)+s}}{\sqrt{s}}\,ds+2\sqrt{\pi}\int_{\frac{\pi}{2}}^{\pi^2}\sin(t)\,dt\right)\right)\quad\text{for } \gamma>0$$

(((((Pi/4+Pi/4*(((cosh(Pi(Pi-Pi/2))-cos(Pi(Pi-Pi/2)))))/(((((cosh(Pi*Pi)+cos(Pi*Pi/2)))(((cosh(Pi*Pi/2)+cos(Pi*Pi)))))))))))^1/32

Input:

$$\sqrt[32]{\frac{\pi}{4}+\frac{\pi}{4}\times\frac{\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)}{\left(\cosh(\pi\,\pi)+\cos\left(\pi\times\frac{\pi}{2}\right)\right)\left(\cosh\left(\pi\times\frac{\pi}{2}\right)+\cos(\pi\,\pi)\right)}}$$

cosh(x) is the hyperbolic cosine function

Decimal approximation:

0.992482771495722580773982919439809428599128982969658968594...

0.9924827714…. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value **0.989117352243 = ϕ**

Alternate forms:

$$\frac{\sqrt[32]{\frac{\pi\left(-\cos\left(\frac{\pi^2}{2}\right)+\cos\left(\frac{\pi^2}{2}\right)\cos(\pi^2)+\cosh\left(\frac{\pi^2}{2}\right)+\cosh\left(\frac{\pi^2}{2}\right)\cosh(\pi^2)+\cos\left(\frac{\pi^2}{2}\right)\cosh\left(\frac{\pi^2}{2}\right)+\cos(\pi^2)\cosh(\pi^2)\right)}{\left(\cos(\pi^2)+\cosh\left(\frac{\pi^2}{2}\right)\right)\left(\cos\left(\frac{\pi^2}{2}\right)+\cosh(\pi^2)\right)}}}{\sqrt[16]{2}}$$

$$\sqrt[32]{\frac{\pi}{4}+\frac{\left(\frac{1}{2}\left(e^{-\pi^2/2}+e^{\pi^2/2}\right)+\frac{1}{2}\left(-e^{-(i\pi^2)/2}-e^{(i\pi^2)/2}\right)\right)\pi}{4\left(\frac{1}{2}\left(e^{-\pi^2/2}+e^{\pi^2/2}\right)+\frac{1}{2}\left(e^{-i\pi^2}+e^{i\pi^2}\right)\right)\left(\frac{1}{2}\left(e^{-\pi^2}+e^{\pi^2}\right)+\frac{1}{2}\left(e^{-(i\pi^2)/2}+e^{(i\pi^2)/2}\right)\right)}}$$

$$\frac{1}{\sqrt[16]{2}}\left(\left(\left(\pi\left(e^{-(3\pi^2)/2}+e^{(3\pi^2)/2}+e^{-\pi^2/2}\left(3+2\cos\left(\frac{\pi^2}{2}\right)\right)+e^{\pi^2/2}\left(3+2\cos\left(\frac{\pi^2}{2}\right)\right)+ 4\cos\left(\frac{\pi^2}{2}\right)(\cos(\pi^2)-1)+2e^{-\pi^2}\cos(\pi^2)+2e^{\pi^2}\cos(\pi^2)\right)\right)\Big/ \left(\left(2\cos(\pi^2)+2\cosh\left(\frac{\pi^2}{2}\right)\right)\left(2\cos\left(\frac{\pi^2}{2}\right)+2\cosh(\pi^2)\right)\right)\right)\hat{}\,(1/32)\right)$$

All 32nd roots of π/4 + (π (cosh(π^2/2) - cos(π^2/2)))/(4 (cos(π^2) + cosh(π^2/2)) (cos(π^2/2) + cosh(π^2))):

$$e^0\sqrt[32]{\frac{\pi}{4}+\frac{\pi\left(\cosh\left(\frac{\pi^2}{2}\right)-\cos\left(\frac{\pi^2}{2}\right)\right)}{4\left(\cos(\pi^2)+\cosh\left(\frac{\pi^2}{2}\right)\right)\left(\cos\left(\frac{\pi^2}{2}\right)+\cosh(\pi^2)\right)}}\approx 0.992483 \text{ (real, principal root)}$$

$$e^{(i\pi)/16}\sqrt[32]{\frac{\pi}{4}+\frac{\pi\left(\cosh\left(\frac{\pi^2}{2}\right)-\cos\left(\frac{\pi^2}{2}\right)\right)}{4\left(\cos(\pi^2)+\cosh\left(\frac{\pi^2}{2}\right)\right)\left(\cos\left(\frac{\pi^2}{2}\right)+\cosh(\pi^2)\right)}}\approx 0.97341+0.19362\,i$$

$$e^{(i\pi)/8}\sqrt[32]{\frac{\pi}{4}+\frac{\pi\left(\cosh\left(\frac{\pi^2}{2}\right)-\cos\left(\frac{\pi^2}{2}\right)\right)}{4\left(\cos(\pi^2)+\cosh\left(\frac{\pi^2}{2}\right)\right)\left(\cos\left(\frac{\pi^2}{2}\right)+\cosh(\pi^2)\right)}}\approx 0.91693+0.37981\,i$$

$$e^{(3i\pi)/16}\sqrt[32]{\frac{\pi}{4}+\frac{\pi\left(\cosh\left(\frac{\pi^2}{2}\right)-\cos\left(\frac{\pi^2}{2}\right)\right)}{4\left(\cos(\pi^2)+\cosh\left(\frac{\pi^2}{2}\right)\right)\left(\cos\left(\frac{\pi^2}{2}\right)+\cosh(\pi^2)\right)}}\approx 0.82522+0.5514\,i$$

$$e^{(i\pi)/4}\sqrt[32]{\frac{\pi}{4}+\frac{\pi\left(\cosh\left(\frac{\pi^2}{2}\right)-\cos\left(\frac{\pi^2}{2}\right)\right)}{4\left(\cos(\pi^2)+\cosh\left(\frac{\pi^2}{2}\right)\right)\left(\cos\left(\frac{\pi^2}{2}\right)+\cosh(\pi^2)\right)}}\approx 0.70179+0.70179\,i$$

Alternative representations:

$$\sqrt[32]{\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}}=$$

$$\sqrt[32]{\frac{\pi}{4}+\frac{\pi\left(-\cosh\left(-\frac{i\pi^2}{2}\right)+\cos\left(-\frac{i\pi^2}{2}\right)\right)}{4\left(\left(\cosh(-i\pi^2)+\cos\left(-\frac{i\pi^2}{2}\right)\right)\left(\cosh\left(-\frac{i\pi^2}{2}\right)+\cos(-i\pi^2)\right)\right)}}$$

$$\sqrt[32]{\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}}=$$

$$\sqrt[32]{\frac{\pi}{4}+\frac{\pi\left(-\cosh\left(\frac{i\pi^2}{2}\right)+\cos\left(-\frac{i\pi^2}{2}\right)\right)}{4\left(\left(\cosh(i\pi^2)+\cos\left(-\frac{i\pi^2}{2}\right)\right)\left(\cosh\left(\frac{i\pi^2}{2}\right)+\cos(-i\pi^2)\right)\right)}}$$

$$\sqrt[32]{\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}}=$$

$$\sqrt[32]{\frac{\pi}{4}+\frac{\pi\left(-\cosh\left(-\frac{i\pi^2}{2}\right)+\cos\left(\frac{i\pi^2}{2}\right)\right)}{4\left(\left(\cosh(-i\pi^2)+\cos\left(\frac{i\pi^2}{2}\right)\right)\left(\cosh\left(-\frac{i\pi^2}{2}\right)+\cos(i\pi^2)\right)\right)}}$$

Series representations:

$$\sqrt[32]{\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}} =$$

$$\frac{1}{\sqrt[16]{2}}\sqrt[32]{\pi}\left(\left(\sum_{k=0}^{\infty}\frac{4^{-k}\left(1+(-1)^{1+k}\right)\pi^{4k}}{(2k)!}+\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\left(\frac{(-1)^{k_1}\,\pi^{4k_1}}{(2k_1)!}+\frac{2^{-2k_1}\,\pi^{4k_1}}{(2k_1)!}\right)\left(\frac{\pi^{4k_2}}{(2k_2)!}+\frac{(-1)^{k_2}\,2^{-2k_2}\,\pi^{4k_2}}{(2k_2)!}\right)\right)\Big/\left(\left(\sum_{k=0}^{\infty}\frac{4^{-k}\left(1+(-4)^{k}\right)\pi^{4k}}{(2k)!}\right)\sum_{k=0}^{\infty}\frac{4^{-k}\left((-1)^{k}+4^{k}\right)\pi^{4k}}{(2k)!}\right)\right)\hat{}\,(1/32)$$

$$\sqrt[32]{\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}} =$$

$$\frac{1}{\sqrt[16]{2}}\sqrt[32]{\pi}\left(\left(\sum_{k=0}^{\infty}\left(\frac{2^{-2k}\,\pi^{4k}}{(2k)!}+\frac{(-1)^{k}\left(-\frac{\pi}{2}+\frac{\pi^2}{2}\right)^{1+2k}}{(1+2k)!}\right)+\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\left(\frac{\pi^{4k_1}}{(2k_1)!}+\frac{(-1)^{-1+k_1}\left(-\frac{\pi}{2}+\frac{\pi^2}{2}\right)^{1+2k_1}}{(1+2k_1)!}\right)\left(\frac{2^{-2k_2}\,\pi^{4k_2}}{(2k_2)!}+\frac{(-1)^{-1+k_2}\left(-\frac{\pi}{2}+\pi^2\right)^{1+2k_2}}{(1+2k_2)!}\right)\right)\Big/\left(\left(\sum_{k=0}^{\infty}\left(\frac{\pi^{4k}}{(2k)!}+\frac{(-1)^{-1+k}\left(-\frac{\pi}{2}+\frac{\pi^2}{2}\right)^{1+2k}}{(1+2k)!}\right)\right)\sum_{k=0}^{\infty}\left(\frac{2^{-2k}\,\pi^{4k}}{(2k)!}+\frac{(-1)^{-1+k}\left(-\frac{\pi}{2}+\pi^2\right)^{1+2k}}{(1+2k)!}\right)\right)\right)\hat{}\,(1/32)$$

$$\sqrt[32]{\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}} =$$

$$\frac{1}{\sqrt[16]{2}}\sqrt[32]{\pi}\left(\left(\sum_{k=0}^{\infty}\left(\frac{(-1)^{1+k}\,2^{-2k}\,\pi^{4k}}{(2k)!}+\frac{i\left(-\frac{i\pi}{2}+\frac{\pi^2}{2}\right)^{1+2k}}{(1+2k)!}\right)+\right.\right.$$
$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\left(\frac{(-1)^{k_1}\,\pi^{4k_1}}{(2k_1)!}+\frac{i\left(-\frac{i\pi}{2}+\frac{\pi^2}{2}\right)^{1+2k_1}}{(1+2k_1)!}\right)\left(\frac{(-1)^{k_2}\,2^{-2k_2}\,\pi^{4k_2}}{(2k_2)!}+\right.$$
$$\left.\left.\frac{i\left(-\frac{i\pi}{2}+\pi^2\right)^{1+2k_2}}{(1+2k_2)!}\right)\right)\Bigg/\left(\left(\sum_{k=0}^{\infty}\left(\frac{(-1)^k\,\pi^{4k}}{(2k)!}+\frac{i\left(-\frac{i\pi}{2}+\frac{\pi^2}{2}\right)^{1+2k}}{(1+2k)!}\right)\right)\right.$$
$$\left.\left.\sum_{k=0}^{\infty}\left(\frac{(-1)^k\,2^{-2k}\,\pi^{4k}}{(2k)!}+\frac{i\left(-\frac{i\pi}{2}+\pi^2\right)^{1+2k}}{(1+2k)!}\right)\right)\right)\wedge(1/32)$$

Integral representations:

$$\sqrt[32]{\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}} = \frac{1}{\sqrt[16]{2}}\sqrt[32]{\pi}$$
$$\left(\left(\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-\pi^4/(4s)+s}\left(1+e^{(5\pi^4)/(16s)}\right)}{\sqrt{s}}\,ds\right)\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-\pi^4/(16s)+s}\left(1+e^{(5\pi^4)/(16s)}\right)}{\sqrt{s}}\,ds-\right.\right.$$
$$\left.4\pi\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}-\frac{i\,e^{-\pi^4/(16s)+s}\left(-1+e^{\pi^4/(8s)}\right)}{2\sqrt{\pi}\,\sqrt{s}}\,ds\right)\Bigg/$$
$$\left(\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-\pi^4/(4s)+s}\left(1+e^{(5\pi^4)/(16s)}\right)}{\sqrt{s}}\,ds\right)\right.$$
$$\left.\left.\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-\pi^4/(16s)+s}\left(1+e^{(5\pi^4)/(16s)}\right)}{\sqrt{s}}\,ds\right)\right)\wedge(1/32)\quad\text{for }\gamma>0$$

$$\sqrt[32]{\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}} = \frac{1}{\sqrt[16]{2}}\sqrt[32]{\pi}\left(\left(-4\pi\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(-\frac{i\,e^{\pi^4/(16s)+s}}{2\sqrt{\pi}\sqrt{s}}+\frac{i\,2^{-1+4s}\,\pi^{-1/2-4s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\right)ds+\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(\frac{e^{\pi^4/(16s)+s}}{\sqrt{s}}+\frac{4^s\,\pi^{-4s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\right)ds\right)\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(\frac{e^{\pi^4/(4s)+s}}{\sqrt{s}}+\frac{16^s\,\pi^{-4s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\right)ds\right)\Big/\left(\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(\frac{e^{\pi^4/(16s)+s}}{\sqrt{s}}+\frac{4^s\,\pi^{-4s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\right)ds\right)\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(\frac{e^{\pi^4/(4s)+s}}{\sqrt{s}}+\frac{16^s\,\pi^{-4s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\right)ds\right)\right)\text{^}(1/32) \quad \text{for } 0<\gamma<\frac{1}{2}$$

$$\sqrt[32]{\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}} = \frac{1}{\sqrt[16]{2}}\sqrt[32]{\pi}\left(-\left(\left(-2i\sqrt{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^4/(16s)+s}}{\sqrt{s}}\,ds-\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^4/(16s)+s}}{\sqrt{s}}\,ds\right)\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^4/(4s)+s}}{\sqrt{s}}\,ds+4\pi\int_{\frac{\pi}{2}}^{\frac{\pi^2}{2}}\sin(t)\,dt+2i\sqrt{\pi}\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^4/(16s)+s}}{\sqrt{s}}\,ds\right)\int_{\frac{\pi}{2}}^{\frac{\pi^2}{2}}\sin(t)\,dt+2i\sqrt{\pi}\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^4/(4s)+s}}{\sqrt{s}}\,ds\right)\int_{\frac{\pi}{2}}^{\pi^2}\sin(t)\,dt+\int_0^1\int_0^1\cos\left(\frac{1}{2}(-1+\pi)\pi\,t_1\right)\cos\left(\frac{1}{2}(1-2\pi)\pi\,t_2\right)dt_2\,dt_1\right)\Big/\left(\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^4/(4s)+s}}{\sqrt{s}}\,ds-2i\sqrt{\pi}\int_{\frac{\pi}{2}}^{\frac{\pi^2}{2}}\sin(t)\,dt\right)\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{\pi^4/(16s)+s}}{\sqrt{s}}\,ds-2i\sqrt{\pi}\int_{\frac{\pi}{2}}^{\pi^2}\sin(t)\,dt\right)\right)\right)\right)\text{^}(1/32) \quad \text{for } \gamma>0$$

1+((((((Pi/4+Pi/4*(((cosh(Pi(Pi-Pi/2))-cos(Pi(Pi-Pi/2)))))/(((cosh(Pi*Pi)+cos(Pi*Pi/2)))(((cosh(Pi*Pi/2)+cos(Pi*Pi))))))))))^2

Input:

$$1+\left(\frac{\pi}{4}+\frac{\pi}{4}\times\frac{\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)}{\left(\cosh(\pi\,\pi)+\cos\left(\pi\times\frac{\pi}{2}\right)\right)\left(\cosh\left(\pi\times\frac{\pi}{2}\right)+\cos(\pi\,\pi)\right)}\right)^2$$

cosh(x) is the hyperbolic cosine function

Decimal approximation:

1.616979169232501146826478654197142656926178946016268751694...

1.616979169….

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

Alternate forms:

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

$$1+\left(\frac{\pi}{4}+\left(\left(\frac{1}{2}\left(e^{-\pi^2/2}+e^{\pi^2/2}\right)+\frac{1}{2}\left(-e^{-(i\pi^2)/2}-e^{(i\pi^2)/2}\right)\right)\pi\right)\Big/\left(4\left(\frac{1}{2}\left(e^{-\pi^2/2}+e^{\pi^2/2}\right)+\frac{1}{2}\left(e^{-i\pi^2}+e^{i\pi^2}\right)\right)\left(\frac{1}{2}\left(e^{-\pi^2}+e^{\pi^2}\right)+\frac{1}{2}\left(e^{-(i\pi^2)/2}+e^{(i\pi^2)/2}\right)\right)\right)\right)^2$$

$$1+\left(\pi^2\left(1+e^{3\pi^2}+e^{\pi^2}\left(3+2\cos\left(\frac{\pi^2}{2}\right)\right)+e^{2\pi^2}\left(3+2\cos\left(\frac{\pi^2}{2}\right)\right)+2e^{\pi^2/2}\cos(\pi^2)+2e^{(5\pi^2)/2}\cos(\pi^2)-2e^{(3\pi^2)/2}\left(\cos\left(\frac{\pi^2}{2}\right)-\cos\left(\frac{3\pi^2}{2}\right)\right)\right)^2\right)\Big/\left(16\left(1+e^{2\pi^2}+2e^{\pi^2}\cos\left(\frac{\pi^2}{2}\right)\right)^2\left(1+e^{\pi^2}+2e^{\pi^2/2}\cos(\pi^2)\right)^2\right)$$

Alternative representations:

$$1+\left(\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\pi)+\cos\left(\frac{\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\pi}{2}\right)+\cos(\pi\pi)\right)\right)4}\right)^2=1+\left(\frac{\pi}{4}+\frac{\pi\left(-\cosh\left(-\frac{i\pi^2}{2}\right)+\cos\left(-\frac{i\pi^2}{2}\right)\right)}{4\left(\left(\cosh(-i\pi^2)+\cos\left(-\frac{i\pi^2}{2}\right)\right)\left(\cosh\left(-\frac{i\pi^2}{2}\right)+\cos(-i\pi^2)\right)\right)}\right)^2$$

$$1+\left(\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\pi)+\cos\left(\frac{\pi\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\pi}{2}\right)+\cos(\pi\pi)\right)\right)4}\right)^2=1+\left(\frac{\pi}{4}+\frac{\pi\left(-\cosh\left(\frac{i\pi^2}{2}\right)+\cos\left(-\frac{i\pi^2}{2}\right)\right)}{4\left(\left(\cosh(i\pi^2)+\cos\left(-\frac{i\pi^2}{2}\right)\right)\left(\cosh\left(\frac{i\pi^2}{2}\right)+\cos(-i\pi^2)\right)\right)}\right)^2$$

$$1+\left(\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}\right)^2 = 1+\left(\frac{\pi}{4}+\frac{\pi\left(-\cosh\left(-\frac{i\,\pi^2}{2}\right)+\cos\left(\frac{i\,\pi^2}{2}\right)\right)}{4\left(\left(\cosh(-i\,\pi^2)+\cos\left(\frac{i\,\pi^2}{2}\right)\right)\left(\cosh\left(-\frac{i\,\pi^2}{2}\right)+\cos(i\,\pi^2)\right)\right)}\right)^2$$

Series representations:

$$1+\left(\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}\right)^2 = \left(\pi^2\left(\sum_{k=0}^{\infty}\frac{4^{-k}\left(1+(-1)^{1+k}\right)\pi^{4k}}{(2k)!}\right)^2 + 16\left(\sum_{k=0}^{\infty}\frac{4^{-k}\left(1+(-4)^k\right)\pi^{4k}}{(2k)!}\right)^2\left(\sum_{k=0}^{\infty}\frac{4^{-k}\left((-1)^k+4^k\right)\pi^{4k}}{(2k)!}\right)^2 + \pi^2\left(\sum_{k=0}^{\infty}\frac{4^{-k}\left(1+(-4)^k\right)\pi^{4k}}{(2k)!}\right)^2\left(\sum_{k=0}^{\infty}\frac{4^{-k}\left((-1)^k+4^k\right)\pi^{4k}}{(2k)!}\right)^2 + 2\pi^2\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\left(\frac{(-1)^{k_1}\,\pi^{4k_1}}{(2k_1)!}+\frac{2^{-2k_1}\,\pi^{4k_1}}{(2k_1)!}\right)\left(\frac{\pi^{4k_2}}{(2k_2)!}+\frac{(-1)^{k_2}\,2^{-2k_2}\,\pi^{4k_2}}{(2k_2)!}\right)\left(\frac{2^{-2k_3}\,\pi^{4k_3}}{(2k_3)!}+\frac{(-1)^{1+k_3}\,2^{-2k_3}\,\pi^{4k_3}}{(2k_3)!}\right)\right) \Big/ \left(16\left(\sum_{k=0}^{\infty}\frac{4^{-k}\left(1+(-4)^k\right)\pi^{4k}}{(2k)!}\right)^2\left(\sum_{k=0}^{\infty}\frac{4^{-k}\left((-1)^k+4^k\right)\pi^{4k}}{(2k)!}\right)^2\right)$$

$$1+\left(\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}\right)^2 = 1+\left(\frac{\pi}{4}+\left(\pi\left(\sum_{k=0}^{\infty}\frac{2^{-2k}\,\pi^{4k}}{(2k)!}-\sqrt{\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{16^s\,\pi^{-4s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\right)\right)\Big/\left(4\left(\sum_{k=0}^{\infty}\frac{2^{-2k}\,\pi^{4k}}{(2k)!}+\sqrt{\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{4^s\,\pi^{-4s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\right)\left(\sum_{k=0}^{\infty}\frac{\pi^{4k}}{(2k)!}+\sqrt{\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{16^s\,\pi^{-4s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\right)\right)\right)^2$$

$$1+\left(\frac{\pi}{4}+\frac{\left(\cosh\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)-\cos\left(\pi\left(\pi-\frac{\pi}{2}\right)\right)\right)\pi}{\left(\left(\cosh(\pi\,\pi)+\cos\left(\frac{\pi\,\pi}{2}\right)\right)\left(\cosh\left(\frac{\pi\,\pi}{2}\right)+\cos(\pi\,\pi)\right)\right)4}\right)^2 =$$

$$1+\left(\frac{\pi}{4}+\left(\pi\left(-\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{-2k}\,\pi^{4k}}{(2k)!}+\sqrt{\pi}\sum_{j=0}^{\infty}\text{Res}_{s=-j}\frac{\left(-\frac{1}{16}\right)^{-s}\pi^{-4s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\right)\right)\Big/\left(4\left(\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{-2k}\,\pi^{4k}}{(2k)!}+\sqrt{\pi}\sum_{j=0}^{\infty}\text{Res}_{s=-j}\frac{\left(-\frac{1}{4}\right)^{-s}\pi^{-4s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\right)\left(\sum_{k=0}^{\infty}\frac{(-1)^k\,\pi^{4k}}{(2k)!}+\sqrt{\pi}\sum_{j=0}^{\infty}\text{Res}_{s=-j}\frac{\left(-\frac{1}{16}\right)^{-s}\pi^{-4s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\right)\right)\right)^2$$

$n!$ is the factorial function

$\Gamma(x)$ is the gamma function

$\text{Res}_{z=z_0} f$ is a complex residue

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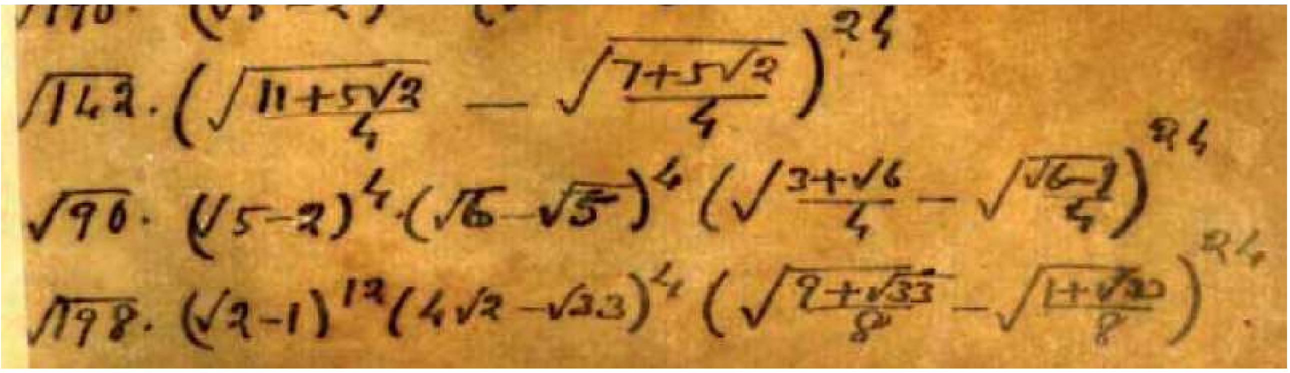


sqrt(142)*(((((sqrt((11+5*sqrt(2))/4)))-((((sqrt((7+5*sqrt(2))/4))))))))^24

Input:

$$\sqrt{142}\left(\sqrt{\frac{1}{4}\left(11+5\sqrt{2}\right)}-\sqrt{\frac{1}{4}\left(7+5\sqrt{2}\right)}\right)^{24}$$

Result:

$$\sqrt{142}\left(\frac{1}{2}\sqrt{11+5\sqrt{2}}-\frac{1}{2}\sqrt{7+5\sqrt{2}}\right)^{24}$$

Decimal approximation:

$4.2063313414753316252174540855706339431072025172919219... \times 10^{-14}$

$4.2063313414... * 10^{-14}$

Alternate forms:

$$\frac{\sqrt{142}\left(\sqrt{11+5\sqrt{2}}-\sqrt{7+5\sqrt{2}}\right)^{24}}{16\,777\,216}$$

$$\sqrt{\left(142\left(20\,064\,178\,973\,593\,989\,354\,119\,025\,601+14\,187\,517\,011\,168\,852\,729\,798\,806\,400\sqrt{2}-2520\sqrt{\left(142\left(892\,859\,977\,067\,899\,354\,121\,985\,954\,835\,246\,279\,027\,023\,601\,409+631\,347\,344\,434\,776\,949\,083\,787\,862\,200\,150\,313\,637\,006\,916\,146\sqrt{2}\right)\right)}\right)\right)}$$

$$\frac{\sqrt{\frac{71}{2}}\left(\sqrt{7+5\sqrt{2}}-\sqrt{11+5\sqrt{2}}\right)^{24}}{8\,388\,608}$$

Minimal polynomial:

$$x^8-11\,396\,453\,657\,001\,385\,953\,139\,606\,541\,368\,x^6+3\,207\,593\,437\,472\,821\,049\,302\,768\,754\,348\,184\,x^4-229\,798\,091\,539\,775\,946\,359\,107\,026\,300\,144\,352\,x^2+406\,586\,896$$

sqrt(90) (((sqrt(5)-2)^4)) (sqrt(6)-sqrt(5))^4 ((((((((sqrt(((3+sqrt(6))/4)))))-((((sqrt(((sqrt(6)-3))/4))))))))))^24

Input:

$$\sqrt{90}\left(\sqrt{5}-2\right)^4\left(\sqrt{6}-\sqrt{5}\right)^4\left(\sqrt{\frac{1}{4}\left(3+\sqrt{6}\right)}-\sqrt{\frac{1}{4}\left(\sqrt{6}-3\right)}\right)^{24}$$

Result:

$$3\sqrt{10}\left(\sqrt{5}-2\right)^4\left(\sqrt{6}-\sqrt{5}\right)^4\left(\frac{\sqrt{3+\sqrt{6}}}{2}-\frac{1}{2}\,i\sqrt{3-\sqrt{6}}\right)^{24}$$

Decimal approximation:

0.0035792157773050722986492370388161013825446770525544777 8... −
0.0070772544913839290607082392887943980166653476156247495 4... i

Polar coordinates:

$r \approx 0.00793086$ (radius), $\theta \approx -63.1727°$ (angle)

0.00793086

Alternate forms:

$$\frac{3\left(161-72\sqrt{5}\right)\left(241\sqrt{10}-440\sqrt{3}\right)\left(\sqrt{3+\sqrt{6}}-i\sqrt{3-\sqrt{6}}\right)^{24}}{16\,777\,216}$$

$$\frac{2187\left(329-460\,i\sqrt{2}\right)\left(\sqrt{5}-2\right)^4\left(241\sqrt{10}-440\sqrt{3}\right)}{4096}$$

$$\frac{3\sqrt{\frac{5}{2}}\left(\sqrt{5}-2\right)^4\left(\sqrt{5}-\sqrt{6}\right)^4\left(\sqrt{3-\sqrt{6}}+i\sqrt{3+\sqrt{6}}\right)^{24}}{8\,388\,608}$$

sqrt(198) (((sqrt(2)-1)^12)) (4sqrt(2)-sqrt(33))^4 ((((((((sqrt(((9+sqrt(33))/8)))))-((((sqrt(((1+sqrt(33))/8))))))))))^24

Input:

$$\sqrt{198}\left(\sqrt{2}-1\right)^{12}\left(4\sqrt{2}-\sqrt{33}\right)^4\left(\sqrt{\frac{1}{8}\left(9+\sqrt{33}\right)}-\sqrt{\frac{1}{8}\left(1+\sqrt{33}\right)}\right)^{24}$$

Result:

$$3\sqrt{22}\left(\sqrt{2}-1\right)^{12}\left(4\sqrt{2}-\sqrt{33}\right)^4\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(9+\sqrt{33}\right)}-\frac{1}{2}\sqrt{\frac{1}{2}\left(1+\sqrt{33}\right)}\right)^{24}$$

Decimal approximation:

$5.7021089610495144448980153678853736270841816487651930\ldots \times 10^{-17}$

$5.702108961\ldots * 10^{-17}$

Alternate forms:

$$\frac{3\left(19\,601-13\,860\sqrt{2}\right)\left(8449\sqrt{22}-22\,880\sqrt{3}\right)\left(\sqrt{2\left(9+\sqrt{33}\right)}-\sqrt{2\left(1+\sqrt{33}\right)}\right)^{24}}{281\,474\,976\,710\,656}$$

$$3\sqrt{22}\left(\sqrt{2}-1\right)^{12}\left(8449-1040\sqrt{66}\right)\left(\text{root of } x^8-5x^6-5x^2+1 \text{ near } x=0.439409\right)^{24}$$

$$\frac{3\sqrt{\frac{11}{2}}\left(\sqrt{2}-1\right)^{12}\left(4\sqrt{2}-\sqrt{33}\right)^4\left(\sqrt{1+\sqrt{33}}-\sqrt{9+\sqrt{33}}\right)^{24}}{34\,359\,738\,368}$$

Minimal polynomial:

$$x^{16} - 12057557915772134092386196727564622384 x^{14} + 2533592302767616739823926559444298928112 x^{12} - 10296208352103720215855121114781503307781952 x^{10} + 9050372678682251025552579128979586235405505120 x^8 - 403652552235874247342384168183894055678283646208 x^6 + 3894013851208455355974515128856354188146662452992 x^4 - 726524891388950974692631170026093950526110002686976 x^2 + 2362226417735475456$$

We take the three results, and obtain:

(76+18)Pi/(5.70210896104951444489 8 × 10^-17 * 1 /4.2063313414753316252174 54 × 10^-14 *1 / 0.00793086)

Input interpretation:

$$(76+18) \times \frac{\pi}{5.702108961049514444898 \times 10^{-17} \times \frac{1}{4.2063313414753316252 17454 \times 10^{-14}} \times \frac{1}{0.00793086}}$$

Result:

1727.69...

1727.69...

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

(5.702108961049514444898 × 10^-17 * 1 /4.206331341475331625217454 × 10^-14 *1 / 0.00793086)^1/128

Input interpretation:

$$\left(5.702108961049514444898 \times 10^{-17} \times \frac{1}{4.206331341475331625217454 \times 10^{-14}} \times \frac{1}{0.00793086}\right)\hat{}\,(1/128)$$

Result:

0.98629389...

0.98629389.... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value **0.989117352243 = ϕ**

24*1/(5.7021089610495144448 98 × 10^-17 *1/ 4.20633134147533162521 7454 × 10^-14 * 1/0.00793086)-(1/golden ratio)

Input interpretation:

$$24\times\frac{1}{5.702108961049514444898\times10^{-17}\times\frac{1}{4.206331341475331625217454\times10^{-14}}\times\frac{1}{0.00793086}}-\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

139.79243607724308281088112592892020107168679552214039360 46...

139.792436.... result very near to the rest mass of the Pion meson 139.57

24*1/(5.7021089610495144448 98 × 10^-17 *1/ 4.20633134147533162521 7454 × 10^-14 * 1/0.00793086)-(1/golden ratio)-5

Input interpretation:

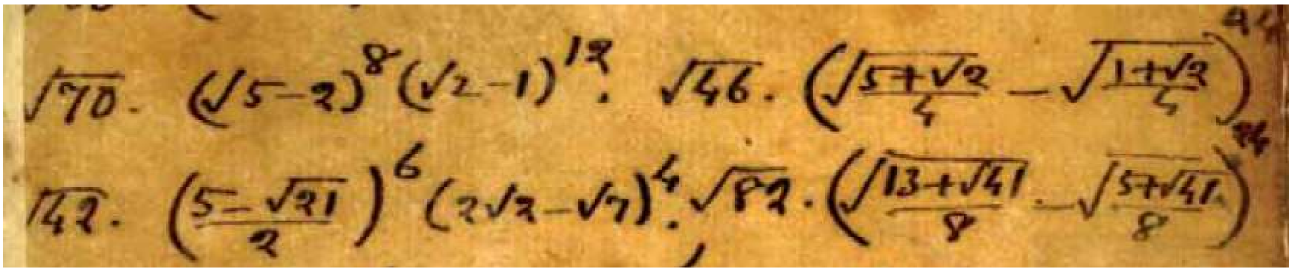
$$24\times\frac{1}{5.702108961049514444898\times10^{-17}\times\frac{1}{4.206331341475331625217454\times10^{-14}}\times\frac{1}{0.00793086}}-\frac{1}{\phi}-5$$

ϕ is the golden ratio

Result:

134.7924360772430828108811259289202010716867955221403936046...

134.792436... result very near to the rest mass of the Pion meson 134.9766



sqrt(70) (((sqrt(5)-2)^8)) (sqrt(2)-1)^12 *sqrt(46) ((((((((sqrt(((5+sqrt(2))/4)))))-((((sqrt(((1+sqrt(2))/4)))))))))))^24

Input:

$$\sqrt{70}\left(\sqrt{5}-2\right)^{8}\left(\sqrt{2}-1\right)^{12}\sqrt{46}\left(\sqrt{\frac{1}{4}\left(5+\sqrt{2}\right)}-\sqrt{\frac{1}{4}\left(1+\sqrt{2}\right)}\right)^{24}$$

Exact result:

$$2\sqrt{805}\left(\sqrt{2}-1\right)^{12}\left(\sqrt{5}-2\right)^{8}\left(\frac{\sqrt{5+\sqrt{2}}}{2}-\frac{1}{2}\sqrt{1+\sqrt{2}}\right)^{24}$$

Decimal approximation:

$4.9824812456009075790315405129245724670950311590232375... \times 10^{-16}$

$4.9824812456\ldots * 10^{-16}$

Alternate forms:

$$\sqrt{\text{root of } x^8 + 106\,356\,847\,048\,126\,276\,950\,880\,x^7 + 2\,827\,934\,228\,787\,970\,847\,137\,211\,739\,659\,343\,955\,353\,918\,400\,x^6 - 50\,043\,261\,381\,920\,343\,079\,823\,090\,739\,476\,807\,551\,519\,667\,838\,662\,326\,256\,847\,296\,000\,x^5 - 46\,057\,206\,754\,622\,431\,631\,070\,519\,228\,569\,947\,303\,761\,500\,086\,868\,056\,623\,656\,498\,240\,000\,x^4 - 10\,597\,123\,166\,687\,536\,241\,219\,503\,815\,551\,247\,417\,085\,484\,241\,223\,920\,871\,900\,603\,366\,400\,000\,x^3 + 1\,622\,747\,015\,272\,977\,243\,631\,067\,873\,374\,314\,041\,427\,496\,220\,995\,076\,410\,522\,879\,744\,000\,000\,x^2 - 46\,553\,852\,714\,046\,249\,068\,603\,854\,999\,208\,620\,425\,208\,502\,341\,806\,080\,000\,000\,x + 11\,557\,049\,504\,227\,688\,473\,600\,000\,000 \text{ near } x = 2.48251\times 10^{-31}}$$

sqrt(42) (((5-sqrt(21))/2)^6)) (2sqrt(2)-sqrt(7))^4 *sqrt(82) ((((((((sqrt(((13+sqrt(41))/8)))))-((((sqrt(((5+sqrt(41))/8))))))))))^24

Input:

$$\sqrt{42}\left(\frac{1}{2}\left(5-\sqrt{21}\right)\right)^6\left(2\sqrt{2}-\sqrt{7}\right)^4\sqrt{82}\left(\sqrt{\frac{1}{8}\left(13+\sqrt{41}\right)}-\sqrt{\frac{1}{8}\left(5+\sqrt{41}\right)}\right)^{24}$$

Result:

$$\frac{1}{32}\sqrt{861}\left(2\sqrt{2}-\sqrt{7}\right)^4\left(5-\sqrt{21}\right)^6\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(13+\sqrt{41}\right)}-\frac{1}{2}\sqrt{\frac{1}{2}\left(5+\sqrt{41}\right)}\right)^{24}$$

Decimal approximation:

$1.5267531076537129490789921102790012152788703609432591... \times 10^{-16}$

$1.5267531076...*10^{-16}$

Alternate forms:

$$\frac{1}{281474976710656}\left(-12446280\sqrt{2}-10162320\sqrt{3}+6652800\sqrt{7}+2716001\sqrt{42}\right)\sqrt{82}\left(\sqrt{2\left(13+\sqrt{41}\right)}-\sqrt{2\left(5+\sqrt{41}\right)}\right)^{24}$$

$$\frac{\sqrt{861}\,(449-120\sqrt{14})(\sqrt{21}-5)^6\left(\sqrt{2(5+\sqrt{41})}-\sqrt{2(13+\sqrt{41})}\right)^{24}}{9007199254740992}$$

$$\frac{\sqrt{861}\,(2\sqrt{2}-\sqrt{7})^4(\sqrt{21}-5)^6\left(\sqrt{5+\sqrt{41}}-\sqrt{13+\sqrt{41}}\right)^{24}}{2199023255552}$$

(4.982481245600907579 × 10^-16 / 1.526753107653712949 × 10^-16)/2

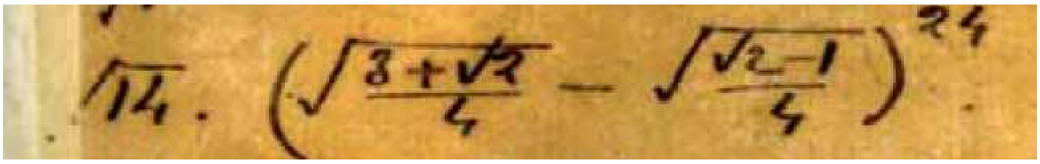
Input interpretation:

$$\frac{1}{2}\times\frac{4.982481245600907579\times 10^{-16}}{1.526753107653712949\times 10^{-16}}$$

Result:

1.6317246123893260766615172929220699831393346587357593386 83...

1.631724612... result that is a golden number, belonging to the range of the golden ratio



sqrt(14) ((((((sqrt((3+sqrt(2))/4)- ((((sqrt(((sqrt(2)-1))/4))))))))))^24

Input:

$$\sqrt{14}\left(\sqrt{\frac{1}{4}\left(3+\sqrt{2}\right)}-\sqrt{\frac{1}{4}\left(\sqrt{2}-1\right)}\right)^{24}$$

Result:

$$\sqrt{14}\left(\frac{\sqrt{3+\sqrt{2}}}{2}-\frac{1}{2}\sqrt{\sqrt{2}-1}\right)^{24}$$

Decimal approximation:

0.0018806023291575609481168681816886686049920111990641311 09...

0.0018806023…

Alternate forms:

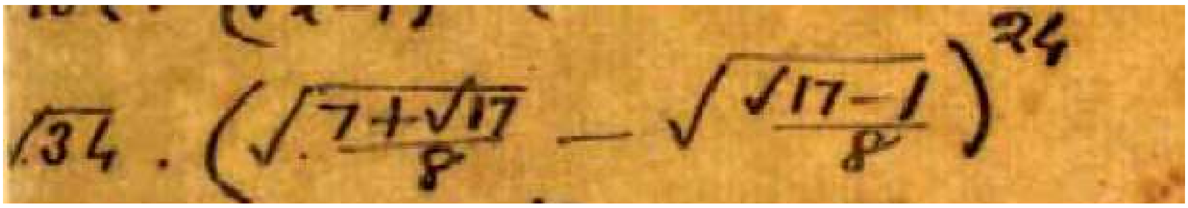
$$\frac{\sqrt{14}\left(\sqrt{3+\sqrt{2}}-\sqrt{\sqrt{2}-1}\right)^{24}}{16\,777\,216}$$

$$\sqrt{14\left(989\,633+699\,776\sqrt{2}-8\sqrt{14\left(2\,186\,100\,865+1\,545\,806\,746\sqrt{2}\right)}\right)}$$

$$\frac{\sqrt{\frac{7}{2}}\left(\sqrt{\sqrt{2}-1}-\sqrt{3+\sqrt{2}}\right)^{24}}{8\,388\,608}$$

Minimal polynomial:

$$x^8-55\,419\,448\,x^6+450\,280\,600\,x^4-10\,862\,211\,808\,x^2+38\,416$$



sqrt(34) * ((((((sqrt((7+sqrt(17))/8)-((((sqrt(((sqrt(17)-1))/8))))))))))^24

Input:

$$\sqrt{34}\left(\sqrt{\frac{1}{8}\left(7+\sqrt{17}\right)}-\sqrt{\frac{1}{8}\left(\sqrt{17}-1\right)}\right)^{24}$$

Result:

$$\sqrt{34}\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(7+\sqrt{17}\right)}-\frac{1}{2}\sqrt{\frac{1}{2}\left(\sqrt{17}-1\right)}\right)^{24}$$

Decimal approximation:

$4.1333926439269591981213714369492937167052179586385156... \times 10^{-6}$

$4.133392643926....*10^{-6}$

Alternate forms:

$$\frac{\sqrt{34}\left(\sqrt{2\left(7+\sqrt{17}\right)}-\sqrt{2\left(\sqrt{17}-1\right)}\right)^{24}}{281474976710656}$$

$$\sqrt{\left(34\left(497514337921+120664950912\sqrt{17}-144\sqrt{23873506600747119133+5790175845221223489\sqrt{17}}\right)\right)}$$

$$\sqrt{34}\left(\text{root of } x^8-3x^6-3x^2+1 \text{ near } x=0.554337\right)^{24}$$

Minimal polynomial:

$$x^8-67661949957256x^6+3928989044632344x^4-78217214150587936x^2+1336336$$

From the six results, we obtain:

1/0.0018806023 *1/4.206331341475331625217454 × 10^-14 *1 / 0.00793086 *1/ 5.702108961049514444898 × 10^-17 *1/ 4.982481245600907579 × 10^-16 *1 / 1.526753107653712949 × 10^-16

Input interpretation:

$$\frac{1}{0.0018806023}\times\frac{1}{4.206331341475331625217454\times 10^{-14}}\times\frac{1}{0.00793086}\times\frac{1}{5.702108961049514444898\times 10^{-17}}\times\frac{1}{4.982481245600907579\times 10^{-16}}\times\frac{1}{1.526753107653712949\times 10^{-16}}$$

Result:

$3.674762503702075160914424885611988769914417017388913 9... \times 10^{65}$

3.6747625037…*10^65

-16+colog((1/(1/0.0018806023 *1/4.2063313414753316 25217454 × 10^-14 *1 / 0.00793086 *1/ 5.70210896104951 4444898 × 10^-17 *1/ 4.982481245600907579 × 10^-16 *1 / 1.526753107653712949 × 10^-16)))

Input interpretation:

$$-16 - \log\left(1 \Big/ \left(\frac{1}{0.0018806023} \times \frac{1}{4.2063313414753316 25217454 \times 10^{-14}} \times \frac{1}{0.00793086} \times \frac{1}{5.702108961049514444898 \times 10^{-17}} \times \frac{1}{4.982481245600907579 \times 10^{-16}} \times \frac{1}{1.526753107653712949 \times 10^{-16}}\right)\right)$$

log(x) is the natural logarithm

Result:

134.96952...

134.96952…. result very near to the rest mass of Pion meson 134.9766

-24+13(((-16+colog((1/(1/0.0018806023 *1/4.206331341475 × 10^-14 *1 / 0.00793086 *1/ 5.70210896104 × 10^-17 *1/ 4.9824812456 × 10^-16 *1 / 1.52675310765 × 10^-16))))))

Input interpretation:

$$-24 + 13\left(-16 - \log\left(1 \Big/ \left(\frac{1}{0.0018806023} \times \frac{1}{4.206331341475 \times 10^{-14}} \times \frac{1}{0.00793086} \times \frac{1}{5.70210896104 \times 10^{-17}} \times \frac{1}{4.9824812456 \times 10^{-16}} \times \frac{1}{1.52675310765 \times 10^{-16}}\right)\right)\right)$$

log(x) is the natural logarithm

Result:

1730.6038...

1730.6038…

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

Zagier theorem. The number 1728 is one less than the Hardy–Ramanujan number 1729

1/(1/0.0018806023 *1/4.206331341475 × 10^-14 *1 / 0.00793086 *1/ 5.70210896104 × 10^-17 *1/ 4.9824812456 × 10^-16 *1 / 1.52675310765 × 10^-16)^1/4096

Input interpretation:

$$1/\left(\left(\frac{1}{0.0018806023}\times\frac{1}{4.206331341475\times10^{-14}}\times\frac{1}{0.00793086}\times\frac{1}{5.70210896104\times10^{-17}}\times\frac{1}{4.9824812456\times10^{-16}}\times\frac{1}{1.52675310765\times10^{-16}}\right)\hat{}\,(1/4096)\right)$$

Result:

0.9638131867...

0.9638131867…. result very near to the spectral index n_s and to the mesonic Regge slope (see Appendix) and to the inflaton value at the end of the inflation 0.9402 and to the value of the following Rogers-Ramanujan continued fraction:

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

1/(1/0.0018806023 *1/4.206331341475 × 10^-14 *1 / 0.00793086 *1/ 5.70210896104 × 10^-17 *1/ 4.9824812456 × 10^-16 *1 / 1.52675310765 × 10^-16)^1/2

Input interpretation:

$$1/\left(\sqrt{\left(\frac{1}{0.0018806023}\times\frac{1}{4.206331341475\times10^{-14}}\times\frac{1}{0.00793086}\times\frac{1}{5.70210896104\times10^{-17}}\times\frac{1}{4.9824812456\times10^{-16}}\times\frac{1}{1.52675310765\times10^{-16}}\right)}\right)$$

Result:

$1.64963... \times 10^{-33}$

$1.64963…*10^{-33}$

We note that:

Input interpretation:

1.64963×10^{-33} cm (centimeters)

Unit conversions:

1.6496×10^{-35} meters

6.4946×10^{-34} inches

Comparisons as length:

≈ (0.2 ≈ 1/6) × length of a putative string in M-theory (≈ 1×10^{-34} m)

≈ Planck length (≈ 1.6×10^{-35} m)

Interpretations:

length

Corresponding quantities:

Wavelength λ from $\lambda = 2\pi ƛ$:

1×10^{-34} meters

Spectroscopic wavenumber $\tilde{\nu}$ from $\tilde{\nu} = 2\pi/ƛ$:

3.8088×10^{35} m^{-1} (reciprocal meters)

Wavenumber k from $k = 1/ƛ$:

6.062×10^{34} m^{-1} (reciprocal meters)

Angular wavelength ƛ from $ƛ = \lambda/(2\pi)$:

2.6×10^{-36} meters

Spectroscopic wavenumber $\tilde{\nu}$ from $\tilde{\nu} = 1/\lambda$:

6.062×10^{34} m^{-1} (reciprocal meters)

Wavenumber k from $k = 2\pi/\lambda$:

3.8088×10^{35} m^{-1} (reciprocal meters)

Now, we have that:

1/(0.0018806023 *4.2063313414753316 * 10^-14 * 0.00793086 * 5.7021089610495 * 10^-17 * 4.98248124560 * 10^-16 * 4.133392643926 *10^-6 * 1.5267531076537 * 10^-16)

Input interpretation:

$$1/(0.0018806023 \times 4.2063313414753316 \times 0.00793086 \times 5.7021089610495 \times 4.98248124560 \times 4.133392643926 \times 1.5267531076537)/(10^{14} \times 10^{17} \times 10^{16} \times 10^{6} \times 10^{16})$$

Result:

$$8.8904268727115250336413927240225004866967797646399225\ldots \times 10^{70}$$

$8.8904268\ldots \times 10^{70}$

-24+ln(((1/(0.0018806023 *4.2063313414753316 * 10^-14 * 0.00793086 * 5.7021089610495 * 10^-17 * 4.98248124560 * 10^-16 * 4.133392643926 *10^-6 * 1.5267531076537 * 10^-16))))

Input interpretation:

$$-24 + \log\left(1/(0.0018806023 \times 4.2063313414753316 \times 0.00793086 \times 5.7021089610495 \times 4.98248124560 \times 4.133392643926 \times 1.5267531076537)/(10^{14} \times 10^{17} \times 10^{16} \times 10^{6} \times 10^{16})\right)$$

log(x) is the natural logarithm

Result:

139.36593...

139.36593… result very near to the rest mass of Pion meson 139.57

Alternative representations:

$$-24 + \log\left(1/(0.0018806 \times 4.2063313414753316 0000 \times 0.00793086 \times 5.70210896104950000 \times 4.982481245600000 \times 4.1333926439260000 \times 1.52675310765370000)/(10^{14} \times 10^{17} \times 10^{16} \times 10^{6} \times 10^{16})\right) = -24 + \log_e\left(\frac{1}{\frac{0.0112481\left(\frac{1}{10^{16}}\right)^2}{10^{17} \times 10^{14} \times 10^{6}}}\right)$$

$$-24+\log\left(1/(0.0018806\times 4.20633134147533160000\times 0.00793086\times 5.70210896104950000\times 4.982481245600000\times 4.1333926439260000\times 1.52675310765370000)/\left(10^{14}\times 10^{17}\times 10^{16}\times 10^{6}\times 10^{16}\right)\right)=$$

$$-24+\log(a)\log_a\left(\frac{1}{\frac{0.0112481\left(\frac{1}{10^{16}}\right)^2}{10^{17}\times 10^{14}\times 10^{6}}}\right)$$

$$-24+\log\left(1/(0.0018806\times 4.20633134147533160000\times 0.00793086\times 5.70210896104950000\times 4.982481245600000\times 4.1333926439260000\times 1.52675310765370000)/\left(10^{14}\times 10^{17}\times 10^{16}\times 10^{6}\times 10^{16}\right)\right)=-24-\mathrm{Li}_1\left(1-\frac{1}{\frac{0.0112481\left(\frac{1}{10^{16}}\right)^2}{10^{17}\times 10^{14}\times 10^{6}}}\right)$$

Series representations:

$$-24+\log\left(1/(0.0018806\times 4.20633134147533160000\times 0.00793086\times 5.70210896104950000\times 4.982481245600000\times 4.1333926439260000\times 1.52675310765370000)/\left(10^{14}\times 10^{17}\times 10^{16}\times 10^{6}\times 10^{16}\right)\right)=$$

$$-24+\log\left(8.89043\times 10^{70}\right)-\sum_{k=1}^{\infty}\frac{(-1)^k e^{-163.366k}}{k}$$

$$-24+\log\left(1/(0.0018806\times 4.20633134147533160000\times 0.00793086\times 5.70210896104950000\times 4.982481245600000\times 4.1333926439260000\times 1.52675310765370000)/\left(10^{14}\times 10^{17}\times 10^{16}\times 10^{6}\times 10^{16}\right)\right)=$$

$$-24+2i\pi\left\lfloor\frac{\arg\left(8.89043\times 10^{70}-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(8.89043\times 10^{70}-x\right)^k x^{-k}}{k}\quad\text{for } x<0$$

$$-24+\log\left(1/(0.0018806\times 4.2063313414753316000\times 0.00793086\times 5.70210896104950000\times 4.982481245600000\times 4.1333926439260000\times 1.52675310765370000)/\left(10^{14}\times 10^{17}\times 10^{16}\times 10^{6}\times 10^{16}\right)\right)=$$
$$-24+\left\lfloor\frac{\arg(8.89043\times 10^{70}-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\log(z_0)+\left\lfloor\frac{\arg(8.89043\times 10^{70}-z_0)}{2\pi}\right\rfloor\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(8.89043\times 10^{70}-z_0)^k\,z_0^{-k}}{k}$$

Integral representations:

$$-24+\log\left(1/(0.0018806\times 4.2063313414753316000\times 0.00793086\times 5.70210896104950000\times 4.982481245600000\times 4.1333926439260000\times 1.52675310765370000)/\left(10^{14}\times 10^{17}\times 10^{16}\times 10^{6}\times 10^{16}\right)\right)=-24+\int_1^{8.89043\times 10^{70}}\frac{1}{t}\,dt$$

$$-24+\log\left(1/(0.0018806\times 4.2063313414753316000\times 0.00793086\times 5.70210896104950000\times 4.982481245600000\times 4.1333926439260000\times 1.52675310765370000)/\left(10^{14}\times 10^{17}\times 10^{16}\times 10^{6}\times 10^{16}\right)\right)=$$
$$-24+\frac{1}{2i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{-163.366s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds$$
for $-1<\gamma<0$

-4-64+11ln(((1/(0.0018806023 *4.2063313414753316 * 10^-14 * 0.00793086 * 5.7021089610495 * 10^-17 * 4.98248124560 * 10^-16 * 4.133392643926 *10^-6 * 1.5267531076537 * 10^-16))))

Input interpretation:

$$-4-64+11\log\left(1/(0.0018806023\times 4.2063313414753316\times 0.00793086\times 5.7021089610495\times 4.98248124560\times 4.133392643926\times 1.5267531076537)/\left(10^{14}\times 10^{17}\times 10^{16}\times 10^{6}\times 10^{16}\right)\right)$$

$\log(x)$ is the natural logarithm

Result:

1729.0252...

1729.0252…

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

Alternative representations:

$$-4-64+11\log\left(1/(0.0018806\times 4.2063313414753316000\times 0.00793086\times 5.7021089610495000\times 4.982481245600000\times 4.1333926439260000\times 1.52675310765370000)/(10^{14}\times 10^{17}\times 10^{16}\times 10^{6}\times 10^{16})\right) = -68+11\log_e\left(\frac{1}{\frac{0.0112481\left(\frac{1}{10^{16}}\right)^2}{10^{17}\times 10^{14}\times 10^{6}}}\right)$$

$$-4-64+11\log\left(1/(0.0018806\times 4.2063313414753316000\times 0.00793086\times 5.7021089610495000\times 4.982481245600000\times 4.1333926439260000\times 1.52675310765370000)/(10^{14}\times 10^{17}\times 10^{16}\times 10^{6}\times 10^{16})\right) = -68+11\log(a)\log_a\left(\frac{1}{\frac{0.0112481\left(\frac{1}{10^{16}}\right)^2}{10^{17}\times 10^{14}\times 10^{6}}}\right)$$

$$-4-64+11\log\left(1/(0.0018806\times 4.2063313414753316000\times 0.00793086\times 5.7021089610495000\times 4.982481245600000\times 4.1333926439260000\times 1.52675310765370000)/(10^{14}\times 10^{17}\times 10^{16}\times 10^{6}\times 10^{16})\right) = -68-11\,\mathrm{Li}_1\left(1-\frac{1}{\frac{0.0112481\left(\frac{1}{10^{16}}\right)^2}{10^{17}\times 10^{14}\times 10^{6}}}\right)$$

Series representations:

$$-4 - 64 + 11 \log\left(1 \Big/ (0.0018806 \times 4.2063313414753316000 \times 0.00793086 \times 5.7021089610495000 \times 4.982481245600000 \times 4.1333926439260000 \times 1.5267531076537000) \Big/ \left(10^{14} \times 10^{17} \times 10^{16} \times 10^{6} \times 10^{16}\right)\right) =$$
$$-68 + 11 \log(8.89043 \times 10^{70}) - 11 \sum_{k=1}^{\infty} \frac{(-1)^k e^{-163.366 k}}{k}$$

$$-4 - 64 + 11 \log\left(1 \Big/ (0.0018806 \times 4.2063313414753316000 \times 0.00793086 \times 5.7021089610495000 \times 4.982481245600000 \times 4.1333926439260000 \times 1.5267531076537000) \Big/ \left(10^{14} \times 10^{17} \times 10^{16} \times 10^{6} \times 10^{16}\right)\right) =$$
$$-68 + 22 i \pi \left\lfloor \frac{\arg(8.89043 \times 10^{70} - x)}{2 \pi} \right\rfloor + 11 \log(x) - 11 \sum_{k=1}^{\infty} \frac{(-1)^k (8.89043 \times 10^{70} - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$-4 - 64 + 11 \log\left(1 \Big/ (0.0018806 \times 4.2063313414753316000 \times 0.00793086 \times 5.7021089610495000 \times 4.982481245600000 \times 4.1333926439260000 \times 1.5267531076537000) \Big/ \left(10^{14} \times 10^{17} \times 10^{16} \times 10^{6} \times 10^{16}\right)\right) =$$
$$-68 + 11 \left\lfloor \frac{\arg(8.89043 \times 10^{70} - z_0)}{2 \pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + 11 \log(z_0) + 11 \left\lfloor \frac{\arg(8.89043 \times 10^{70} - z_0)}{2 \pi} \right\rfloor \log(z_0) - 11 \sum_{k=1}^{\infty} \frac{(-1)^k (8.89043 \times 10^{70} - z_0)^k z_0^{-k}}{k}$$

Integral representations:

$$-4 - 64 + 11 \log\left(1 \Big/ (0.0018806 \times 4.2063313414753316000 \times 0.00793086 \times 5.7021089610495000 \times 4.982481245600000 \times 4.1333926439260000 \times 1.5267531076537000) \Big/ \left(10^{14} \times 10^{17} \times 10^{16} \times 10^{6} \times 10^{16}\right)\right) = -68 + 11 \int_1^{8.89043 \times 10^{70}} \frac{1}{t} \, dt$$

$$-4-64+11\log\left(1\Big/\left(0.0018806\times 4.20633134147533160000\times 0.00793086\times 5.70210896104950000\times 4.982481245600000\times 4.1333926439260000\times 1.52675310765370000\right)\Big/\left(10^{14}\times 10^{17}\times 10^{16}\times 10^{6}\times 10^{16}\right)\right) = -68+\frac{11}{2i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{-163.366s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds$$

for $-1 < \gamma < 0$

(((0.0018806023 *4.2063313414753316 * 10^-14 * 0.00793086 * 5.7021089610495 * 10^-17 * 4.98248124560 * 10^-16 * 4.133392643926 *10^-6 * 1.5267531076537 * 10^-16)))^(1/(4096*3))

Input interpretation:

$$\left(\left(0.0018806023\times 4.2063313414753316\times 0.00793086\times 5.7021089610495\times 4.98248124560\times 4.133392643926\times 1.5267531076537\right)\Big/\left(10^{14}\times 10^{17}\times 10^{16}\times 10^{6}\times 10^{16}\right)\right)\wedge\left(\frac{1}{4096\times 3}\right)$$

Result:

0.9867932313...

0.9867932313.... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value $\mathbf{0.989117352243} = \boldsymbol{\phi}$

(((0.0018806023 *4.2063313414753316 * 10^-14 * 0.00793086 * 5.7021089610495 * 10^-17 * 4.98248124560 * 10^-16 * 4.133392643926 *10^-6 * 1.5267531076537 * 10^-16)))^(1/4096)

Input interpretation:

$$\left(\left(0.0018806023 \times 4.2063313414753316 \times 0.00793086 \times 5.7021089610495 \times 4.98248124560 \times 4.133392643926 \times 1.5267531076537\right) / \left(10^{14} \times 10^{17} \times 10^{16} \times 10^{6} \times 10^{16}\right)\right) \wedge (1/4096)$$

Result:

0.9609006467...

0.9609006467.... result very near to the spectral index n_s and to the mesonic Regge slope (see Appendix) and to the inflaton value at the end of the inflation 0.9402 and to the value of the following Rogers-Ramanujan continued fraction:

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

Now, we have that:

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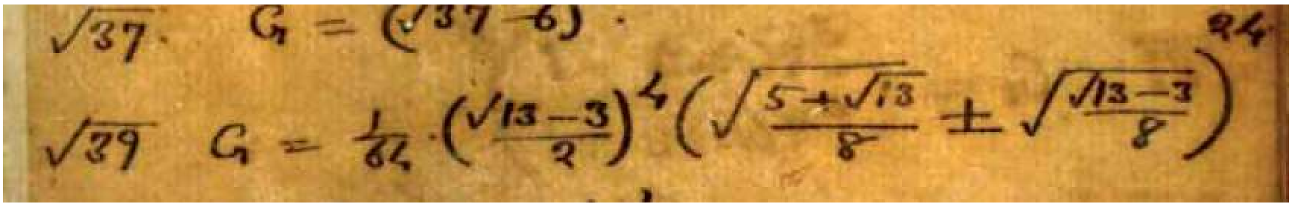


1/64*(((((sqrt(13)-3))/2)))^4 ((((((((sqrt((((5+sqrt(13))/8))))))))+(((sqrt((((sqrt(13))-3))/8))))))))^24

Input:

$$\frac{1}{64}\left(\frac{1}{2}\left(\sqrt{13}-3\right)\right)^4\left(\sqrt{\frac{1}{8}\left(5+\sqrt{13}\right)}+\sqrt{\frac{1}{8}\left(\sqrt{13}-3\right)}\right)^{24}$$

Exact result:

$$\frac{(\sqrt{13}-3)^4\left(\frac{1}{2}\sqrt{\frac{1}{2}(\sqrt{13}-3)}+\frac{1}{2}\sqrt{\frac{1}{2}(5+\sqrt{13})}\right)^{24}}{1024}$$

Decimal approximation:

0.089321319219383532717820532693319698548662535994269836508...

0.08932131921…

Alternate forms:

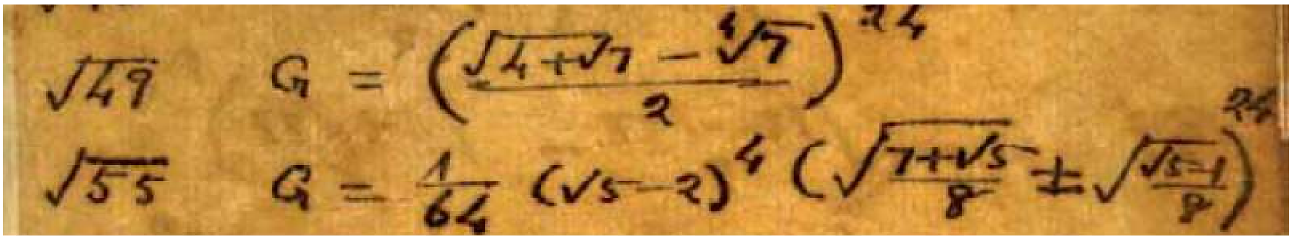
$$\frac{1}{128}\left(-70+21\sqrt{13}+3\sqrt{546\sqrt{13}-1965}\right)$$

$$\frac{1}{128}\left(-70+21\sqrt{13}+64\sqrt{\frac{2457\sqrt{13}}{2048}-\frac{17685}{4096}}\right)$$

$$\frac{(\sqrt{13}-3)^4\left(\sqrt{\sqrt{13}-3}+\sqrt{5+\sqrt{13}}\right)^{24}}{70368744177664}$$

Minimal polynomial:

$$16777216x^4+36700160x^3+54583296x^2-5180224x+1$$



(((1/2(((sqrt((4+sqrt(7)))) -(((7^(1/4))))))))))^24

Input:

$$\left(\frac{1}{2}\left(\sqrt{4+\sqrt{7}}-\sqrt[4]{7}\right)\right)^{24}$$

Result:

$$\frac{\left(\sqrt{4+\sqrt{7}}-\sqrt[4]{7}\right)^{24}}{16777216}$$

Decimal approximation:

$1.801131800625469507867922128912271110397783959054860 7\ldots \times 10^{-8}$

$1.801131800625\ldots * 10^{-8}$

Alternate forms:

$$\frac{\left(\sqrt{2} - 2\sqrt[4]{7} + \sqrt{14}\right)^{24}}{281474976710656}$$

$$13880161 + 5246208\sqrt{7} - 72\sqrt{74328271227 + 28093445864\sqrt{7}}$$

$$\frac{\left(\sqrt[4]{7} - \sqrt{4 + \sqrt{7}}\right)^{24}}{16777216}$$

Minimal polynomial:

$$x^4 - 55520644x^3 - 77075706x^2 - 55520644x + 1$$

1/64* (((sqrt(5)-2)))^4 ((((sqrt(((7+sqrt(5))/8)))))+((sqrt(((sqrt(5)-1))/8))))^24

Input:

$$\frac{1}{64}\left(\sqrt{5} - 2\right)^4 \left(\sqrt{\frac{1}{8}\left(7 + \sqrt{5}\right)} + \sqrt{\frac{1}{8}\left(\sqrt{5} - 1\right)}\right)^{24}$$

Exact result:

$$\frac{1}{64}\left(\sqrt{5} - 2\right)^4 \left(\frac{1}{2}\sqrt{\frac{1}{2}\left(\sqrt{5} - 1\right)} + \frac{1}{2}\sqrt{\frac{1}{2}\left(7 + \sqrt{5}\right)}\right)^{24}$$

Decimal approximation:

$0.4833286774910887522267841088807349924471147678593369596 99\ldots$

$0.483328677491\ldots$

Alternate forms:

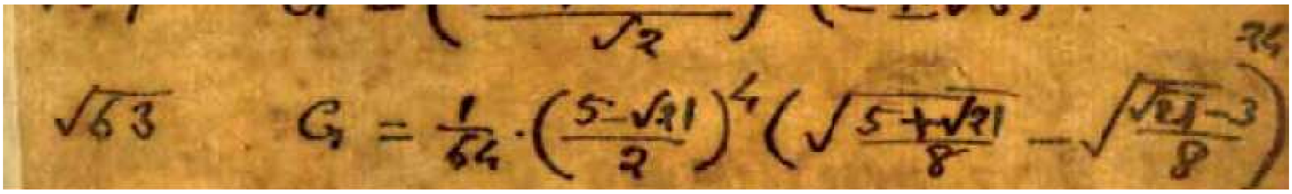
$$\frac{1}{256}\left(-401 + 207\sqrt{5} + 9\sqrt{110\left(23\sqrt{5} - 51\right)}\right)$$

$$\frac{1}{256}\left(-401 + 207\sqrt{5} + 128\sqrt{\frac{102465\sqrt{5}}{8192} - \frac{227205}{8192}}\right)$$

$$\frac{\left(\sqrt{5} - 2\right)^4 \left(\sqrt{\sqrt{5} - 1} + \sqrt{7 + \sqrt{5}}\right)^{24}}{4398046511104}$$

Minimal polynomial:

$$16777216x^4 + 105119744x^3 + 369954816x^2 - 205260736x + 1$$



1/64* (((5-sqrt(21))/2))^4 ((((sqrt(((5+sqrt(21))/8)))))-((sqrt(((sqrt(21)-3))/8))))^24

Input:

$$\frac{1}{64}\left(\frac{1}{2}\left(5-\sqrt{21}\right)\right)^4\left(\sqrt{\frac{1}{8}\left(5+\sqrt{21}\right)}-\sqrt{\frac{1}{8}\left(\sqrt{21}-3\right)}\right)^{24}$$

Exact result:

$$\frac{\left(5-\sqrt{21}\right)^4\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(5+\sqrt{21}\right)}-\frac{1}{2}\sqrt{\frac{1}{2}\left(\sqrt{21}-3\right)}\right)^{24}}{1024}$$

Decimal approximation:

$$9.4793463810790645294767007300671522140861764864488681\ldots\times 10^{-10}$$

$9.479346381\ldots*10^{-10}$

Alternate forms:

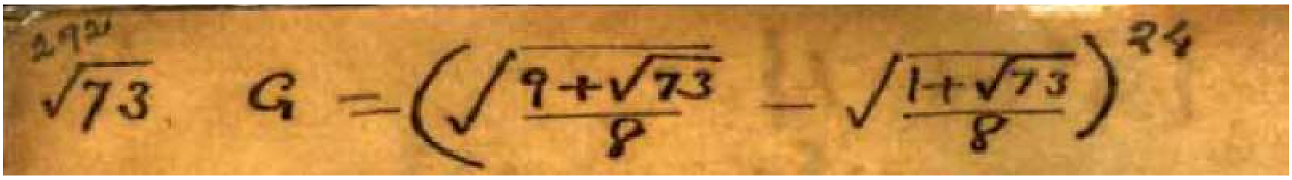
$$\frac{1}{256}\left(829-155\sqrt{21}-5\sqrt{42\left(217\sqrt{21}-981\right)}\right)$$

$$\frac{1}{256}\left(829-155\sqrt{21}-128\sqrt{\frac{113925\sqrt{21}}{8192}-\frac{515025}{8192}}\right)$$

$$\frac{\left(\sqrt{21}-5\right)^4\left(\sqrt{\sqrt{21}-3}-\sqrt{5+\sqrt{21}}\right)^{24}}{70368744177664}$$

Minimal polynomial:

$$16777216x^4-217317376x^3+1324670976x^2-1054925056x+1$$



((((((sqrt(((9+sqrt(73))/8)))))-((sqrt(((1+sqrt(73))/8)))))))^24

Input:

$$\left(\sqrt{\frac{1}{8}\left(9+\sqrt{73}\right)}-\sqrt{\frac{1}{8}\left(1+\sqrt{73}\right)}\right)^{24}$$

Result:

$$\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(9+\sqrt{73}\right)}-\frac{1}{2}\sqrt{\frac{1}{2}\left(1+\sqrt{73}\right)}\right)^{24}$$

Decimal approximation:

$$1.409104807850540572194926788747189142739974265742 7102\ldots\times 10^{-10}$$

$1.40910480785\ldots*10^{-10}$

Alternate forms:

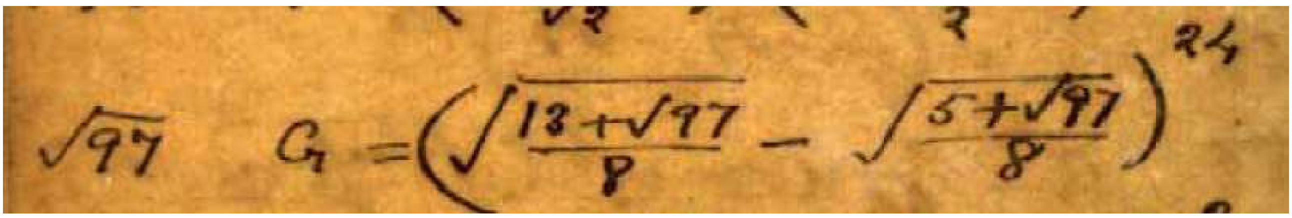
$$\frac{\left(\sqrt{2\left(9+\sqrt{73}\right)}-\sqrt{2\left(1+\sqrt{73}\right)}\right)^{24}}{281\,474\,976\,710\,656}$$

$$1\,774\,176\,049+207\,651\,600\sqrt{73}-180\sqrt{2\left(97\,151\,254\,669\,323+11\,370\,694\,298\,041\sqrt{73}\right)}$$

$$\frac{\left(\sqrt{1+\sqrt{73}}-\sqrt{9+\sqrt{73}}\right)^{24}}{68\,719\,476\,736}$$

Minimal polynomial:

$$x^4-7\,096\,704\,196\,x^3+12\,473\,481\,606\,x^2-7\,096\,704\,196\,x+1$$



((((((sqrt(((13+sqrt(97))/8)))))-((sqrt(((5+sqrt(97))/8)))))))^24

Input:

$$\left(\sqrt{\frac{1}{8}\left(13+\sqrt{97}\right)}-\sqrt{\frac{1}{8}\left(5+\sqrt{97}\right)}\right)^{24}$$

Result:

$$\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(13+\sqrt{97}\right)}-\frac{1}{2}\sqrt{\frac{1}{2}\left(5+\sqrt{97}\right)}\right)^{24}$$

Decimal approximation:

$$2.3368523701975162017491646602966621622386382697868389\ldots \times 10^{-12}$$

$2.33685237\ldots*10^{-12}$

Alternate forms:

$$\frac{\left(\sqrt{2\left(13+\sqrt{97}\right)}-\sqrt{2\left(5+\sqrt{97}\right)}\right)^{24}}{281474976710656}$$

$$106981512049+10862326800\sqrt{97}-180\sqrt{2\left(353242096308027183+35866300785011593\sqrt{97}\right)}$$

$$\frac{\left(\sqrt{5+\sqrt{97}}-\sqrt{13+\sqrt{97}}\right)^{24}}{68719476736}$$

Minimal polynomial:

$$x^4-427926048196\,x^3-717988406394\,x^2-427926048196\,x+1$$

From these six results, we obtain the following interesting expression:

(-8/10^3*1/10^35)+1/(1+sqrt5)[sqrt(39)*0.08932131921*sqrt(49)*1.801131800625e-8*sqrt(55)*0.483328677491*sqrt(63)*9.479346381e-10*sqrt(73)*1.40910480785e-10*sqrt(97)*2.33685237e-12]

Input interpretation:

$$-\frac{8}{10^3}\times\frac{1}{10^{35}}+\frac{1}{1+\sqrt{5}}\left(\sqrt{39}\times 0.08932131921\sqrt{49}\times 1.801131800625\times 10^{-8}\sqrt{55}\times 0.483328677491\sqrt{63}\times 9.479346381\times 10^{-10}\sqrt{73}\times 1.40910480785\times 10^{-10}\sqrt{97}\times 2.33685237\times 10^{-12}\right)$$

Result:

$$1.61608134\ldots \times 10^{-35}$$

$1.61608134\ldots*10^{-35}$ result practically equal to the value of the Planck length $1.616255*10^{-35}$

Or:

6.67430*10^-11*10^16*[0.08932131921 * 1.801131800625e-8 * 0.483328677491 * 9.479346381e-10 * 1.40910480785e-10 * 2.33685237e-12]

Input interpretation:

$$6.67430\times 10^{-11}\times 10^{16}\,(0.08932131921\times 1.801131800625\times 10^{-8}\times 0.483328677491\times 9.479346381\times 10^{-10}\times 1.40910480785\times 10^{-10}\times 2.33685237\times 10^{-12})$$

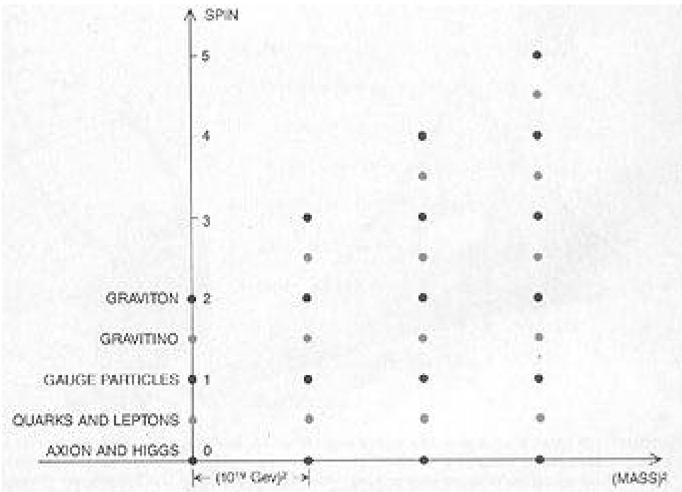
Result:

$$1.6199509951699523203430449485657397899083641659698295\ldots\times 10^{-34}$$

$1.619950995\ldots*10^{-34}$

From:

http://www.damtp.cam.ac.uk/user/mbg15/superstrings/superstrings.html



SPECTRUM OF STRING STATES is plotted for the heterotic string theory in which the extra six dimensions of spacetime have been curled up. Each black dot represents a set of bosons and each colored dot represents a set of fermions. All string states that correspond to known particles are massless states; the states with nonzero mass form an infinite series whose masses are a whole number times the square of the Planck mass, which is 10^11 GeV. For each mass the number of fermion states is equal to the number of boson states. If each possible spin direction is counted as a different state, there are 8,064 massless states, and 18,883,584 states at the first mass level; the number increases exponentially thereafter.

We note that

76+(4096+1.0061571663+0.50970737445 + 248)^2

Where 76 is a Lucas number, while 0.50970737445 and 1.0061571663 are Ramanujan mock theta functions

Input interpretation:

$76 + (4096 + 1.0061571663 + 0.50970737445 + 248)^2$

Result:

$1.88835841289753419032084105625 \times 10^7$

Decimal form:

18883584.1289753419032084105625

18883584.1289.... ≈ 18883584

From the previous result,

$$\left((0.0018806023 \times 4.2063313414753316 \times 0.00793086 \times 5.7021089610495 \times 4.98248124560 \times 4.133392643926 \times 1.5267531076537) / \left(10^{14} \times 10^{17} \times 10^{16} \times 10^{6} \times 10^{16}\right)\right) \wedge (1/4096)$$

= 0.9609006467...

we obtain the following interesting formula:

76+((log base 0.9609006467(((0.0018806023 *4.2063313 * 10^-14 * 0.00793086 * 5.7021089 * 10^-17 * 4.9824812 * 10^-16 * 4.1333926*10^-6 * 1.5267531 * 10^-16))))+1.0061571663+0.50970737445 + 248)^2

Input interpretation:

$$76 + \left(\log_{0.9609006467}\left(\left(0.0018806023 \times 4.2063313 \times 0.00793086 \times 5.7021089 \times 4.9824812 \times 4.1333926 \times 10^{-6} \times 1.5267531\right) / \left(10^{14} \times 10^{17} \times 10^{16} \times 10^{16}\right)\right) + 1.0061571663 + 0.50970737445 + 248\right)^2$$

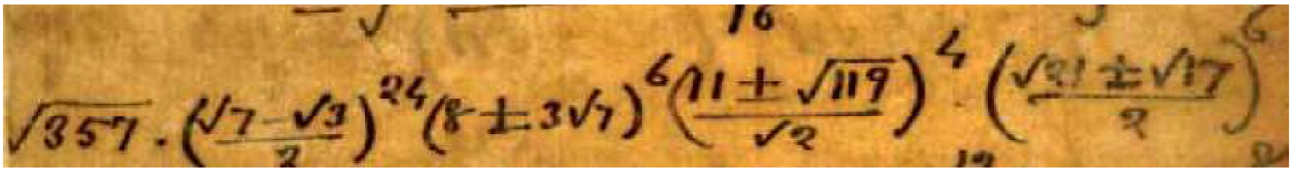
$\log_b(x)$ is the base- b logarithm

Result:

$1.8883584... \times 10^7$

18883584

These results equals to 18883584 corresponding to the number of the string states at the first mass level



sqrt(357) (((sqrt(7)-sqrt(3))/2))^24 (8+3sqrt(7))^6 (((((11+sqrt(119))/(sqrt(2))))))^4 ((((((sqrt(21)+sqrt(17))/2)))))^6

Input:

$$\sqrt{357}\left(\frac{1}{2}\left(\sqrt{7}-\sqrt{3}\right)\right)^{24}\left(8+3\sqrt{7}\right)^{6}\left(\frac{11+\sqrt{119}}{\sqrt{2}}\right)^{4}\left(\frac{1}{2}\left(\sqrt{21}+\sqrt{17}\right)\right)^{6}$$

Result:

$$\frac{\sqrt{357}\,(\sqrt{7}-\sqrt{3})^{24}\,(8+3\sqrt{7})^{6}\,(\sqrt{17}+\sqrt{21})^{6}\,(11+\sqrt{119})^{4}}{4294967296}$$

Decimal approximation:

$8.2876600758436284089814152450446660611881770108337166 9\ldots \times 10^{8}$

$8.28766007584362\ldots*10^{8}$

Alternate forms:

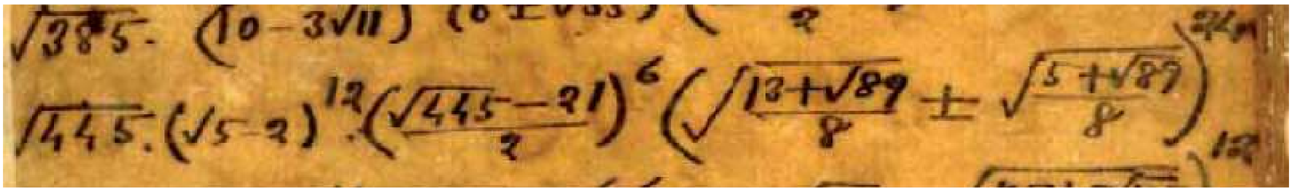
$$\left(73180801-15969360\sqrt{21}\right)\left(8193151+3096720\sqrt{7}\right)\left(28799+2640\sqrt{119}\right)\left(64260+3401\sqrt{357}\right)$$

$$-47295902119915260+27306311483534160\sqrt{3}-17876176967880000\sqrt{7}-11795424479047440\sqrt{17}+10320812022628800\sqrt{21}+6810089212578960\sqrt{51}-4458249881870400\sqrt{119}+2573972655221449\sqrt{357}$$

$$\frac{\sqrt{357}\,(\sqrt{3}-\sqrt{7})^{24}\,(8+3\sqrt{7})^{6}\,(11+\sqrt{119})^{4}\,(19+\sqrt{357})^{3}}{536870912}$$

Minimal polynomial:

$$x^8+378367216959322080x^7-2053476757124410105890999890295828x^6+137473397591521948593825150186230516945188320x^5-112522842219551674720780327332251385491997241482953706x^4-49078002940173335647995578616484294549432230240x^3-261713559218748943585702045018312982772x^2-17215440866026764399289440x+16243247601$$



sqrt(445) (((sqrt(5)-2)))^12 (((sqrt(445)-21))/2)^6 (((((((sqrt((((13+sqrt(89))))/8))))))+((((sqrt((((5+sqrt(89))))/8)))))))^24

Input:

$$\sqrt{445}\left(\sqrt{5}-2\right)^{12}\left(\frac{1}{2}\left(\sqrt{445}-21\right)\right)^{6}\left(\sqrt{\frac{1}{8}\left(13+\sqrt{89}\right)}+\sqrt{\frac{1}{8}\left(5+\sqrt{89}\right)}\right)^{24}$$

Result:

$$\frac{1}{64}\sqrt{445}\left(\sqrt{5}-2\right)^{12}\left(\sqrt{445}-21\right)^{6}\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(5+\sqrt{89}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(13+\sqrt{89}\right)}\right)^{24}$$

Decimal approximation:

0.0023660916820439842763643644551531783998241469537102346 92...

0.002366091682….

Alternate forms:

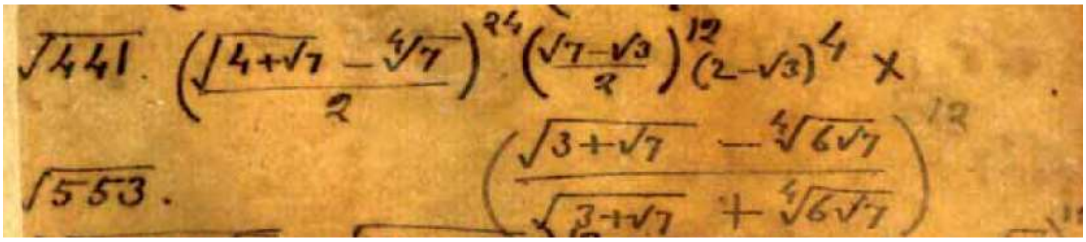
$$\frac{1}{281474976710656}\left(16692641-7465176\sqrt{5}\right)\left(43468489\sqrt{445}-916968780\right)\left(\sqrt{2\left(5+\sqrt{89}\right)}+\sqrt{2\left(13+\sqrt{89}\right)}\right)^{24}$$

$$\frac{\sqrt{445}\left(\sqrt{5}-2\right)^{12}\left(\sqrt{445}-21\right)^{6}\left(\sqrt{5+\sqrt{89}}+\sqrt{13+\sqrt{89}}\right)^{24}}{4398046511104}$$

$$\frac{1}{64}\sqrt{445}\left(\sqrt{5}-2\right)^{12}\left(\sqrt{445}-21\right)^{6}\left(\text{root of } x^8-9x^6-9x^2+1 \text{ near } x=3.01781\right)^{24}$$

Minimal polynomial:

$$x^8+19931993926651868607104761440x^7+3749178296437495879657758726727820x^6+92445655024451323900781466465333600x^5+11095468429541633056004222130641604150x^4-41138316485880839135847752577073452000x^3+742431032152035121569227671860276555500x^2-1756429728309730145010254570949420000x+39213900625$$



(((sqrt(441)))) ((((((sqrt((((4)+sqrt(7))))-7^(1/4)))/2))))^24 ((((((sqrt(7)-sqrt(3))/2)))))^12 (2-sqrt(3))^4

Input:

$$\sqrt{441}\left(\frac{1}{2}\left(\sqrt{4+\sqrt{7}}-\sqrt[4]{7}\right)\right)^{24}\left(\frac{1}{2}\left(\sqrt{7}-\sqrt{3}\right)\right)^{12}\left(2-\sqrt{3}\right)^{4}$$

Result:

$$\frac{21\left(2-\sqrt{3}\right)^{4}\left(\sqrt{7}-\sqrt{3}\right)^{12}\left(\sqrt{4+\sqrt{7}}-\sqrt[4]{7}\right)^{24}}{68\,719\,476\,736}$$

Decimal approximation:

$1.6116139633724039328007999712947585885627476577576094... \times 10^{-13}$

$1.6116139633...*10^{-13}$ partial result

Alternate forms:

$$\frac{21\left(\sqrt{2}-2\sqrt[4]{7}+\sqrt{14}\right)^{24}\left(6049-1320\sqrt{21}\right)\left(97-56\sqrt{3}\right)}{281\,474\,976\,710\,656}$$

$$\frac{21\left(56\sqrt{3}-97\right)\left(1320\sqrt{21}-6049\right)\left(\sqrt[4]{7}-\sqrt{4+\sqrt{7}}\right)^{24}}{16\,777\,216}$$

$$\frac{21\left(\sqrt{3}-2\right)^{4}\left(\sqrt{3}-\sqrt{7}\right)^{12}\left(\sqrt[4]{7}-\sqrt{4+\sqrt{7}}\right)^{24}}{68\,719\,476\,736}$$

Minimal polynomial:

$$x^8 - 2\,736\,387\,311\,245\,224\,x^7 - 3\,614\,336\,567\,069\,941\,188\,x^6 - 2\,220\,155\,221\,033\,548\,790\,488\,x^5 + 2\,332\,421\,523\,793\,822\,092\,744\,294\,x^4 - 979\,088\,452\,475\,795\,016\,605\,208\,x^3 - 702\,919\,789\,900\,329\,232\,183\,428\,x^2 - 234\,689\,325\,239\,122\,542\,256\,104\,x + 37\,822\,859\,361$$

1.6116139633724039328007999712947585885627476577576094 × 10^-13 * ((((((((sqrt(((3+sqrt(7))))-(((6sqrt(7))^1/4))))) / ((((sqrt(((3+sqrt(7))))+(((6sqrt(7))^1/4)))))))))))^12

Input interpretation:

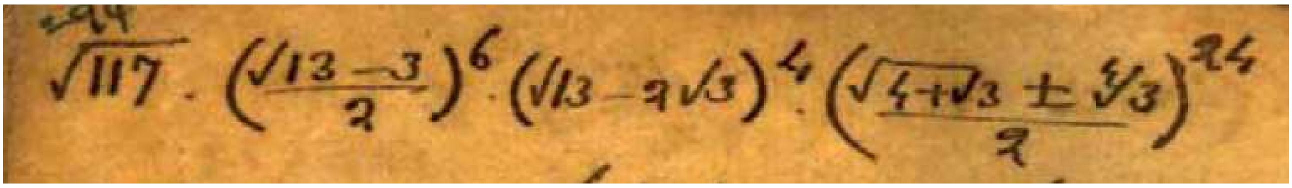
$1.6116139633724039328007999712947585885627476577576094 \times 10^{-13}$

$$\left(\frac{\sqrt{3+\sqrt{7}} - \sqrt[4]{6\sqrt{7}}}{\sqrt{3+\sqrt{7}} + \sqrt[4]{6\sqrt{7}}}\right)^{12}$$

Result:

$2.99568288385540712830132408688204140825191453821399 93\ldots \times 10^{-26}$

$2.9956828838554\ldots*10^{-26}$ final result



sqrt(117) (((sqrt(13)-3))/2)^6 (((sqrt(13)-2sqrt(3))))^4 (((((((sqrt((((4+sqrt(3)))))))+((((3)^1/4)))))/2)))^24

Input:

$$\sqrt{117}\left(\frac{1}{2}\left(\sqrt{13}-3\right)\right)^6\left(\sqrt{13}-2\sqrt{3}\right)^4\left(\frac{1}{2}\left(\sqrt{4+\sqrt{3}}+\sqrt[4]{3}\right)\right)^{24}$$

Result:

$$\frac{3\sqrt{13}\left(\sqrt{13}-3\right)^6\left(\sqrt{13}-2\sqrt{3}\right)^4\left(\sqrt[4]{3}+\sqrt{4+\sqrt{3}}\right)^{24}}{1073741824}$$

Decimal approximation:

$9.208016037890824458855570254304688845619458953437052978389\ldots$

$9.20801603789\ldots..$

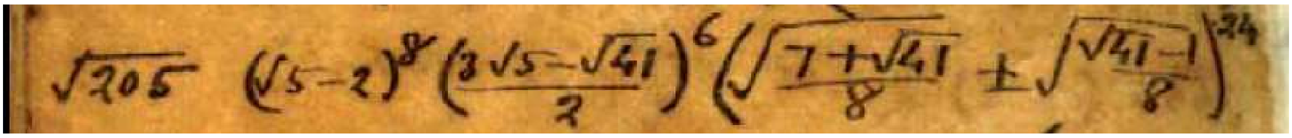
Alternate forms:

$$\frac{3\left(649\sqrt{13}-2340\right)\left(1249-200\sqrt{39}\right)\left(\sqrt{4+\sqrt{3}}+\sqrt[4]{3}\right)^{24}}{16777216}$$

root of $x^8 + 96805418168160\,x^7 + 461446278882732\,x^6 + 34031477760639840\,x^5 + 128439125155493334\,x^4 - 3981682897994861280\,x^3 + 6316738111625718348\,x^2 - 155044816208561242080\,x + 187388721$ near $x = 9.20802$

Minimal polynomial:

$$x^8 + 96\,805\,418\,168\,160\, x^7 + 461\,446\,278\,882\,732\, x^6 + 34\,031\,477\,760\,639\,840\, x^5 + 128\,439\,125\,155\,493\,334\, x^4 - 3\,981\,682\,897\,994\,861\,280\, x^3 + 6\,316\,738\,111\,625\,718\,348\, x^2 - 155\,044\,816\,208\,561\,242\,080\, x + 187\,388\,721$$



sqrt(205) (((sqrt(5)-2)))^8 (((3sqrt(5)-sqrt(41))/2)^6 (((((sqrt((((7+sqrt(41))/8)))+sqrt((((sqrt(41)-1))/8)))))))))))^24

Input:

$$\sqrt{205}\left(\sqrt{5}-2\right)^8\left(\left(\frac{1}{2}\left(3\sqrt{5}-\sqrt{41}\right)\right)^6\left(\sqrt{\frac{1}{8}\left(7+\sqrt{41}\right)}+\sqrt{\frac{1}{8}\left(\sqrt{41}-1\right)}\right)\right)^{24}$$

Result:

$$\frac{\sqrt{205}\,(\sqrt{5}-2)^8\,(3\sqrt{5}-\sqrt{41})^{144}\left(\frac{1}{2}\sqrt{\frac{1}{2}(\sqrt{41}-1)}+\frac{1}{2}\sqrt{\frac{1}{2}(7+\sqrt{41})}\right)^{24}}{22\,300\,745\,198\,530\,623\,141\,535\,718\,272\,648\,361\,505\,980\,416}$$

Decimal approximation:

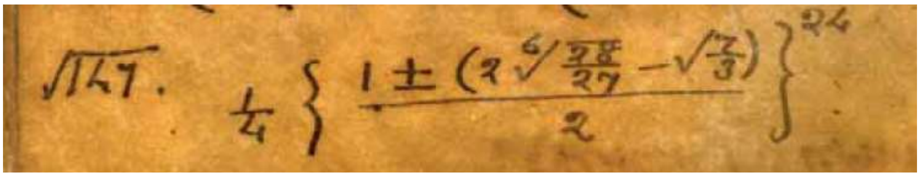
$2.2944728164805310918375266811672872396362953127469 17\ldots \times 10^{-114}$

$2.29447281648\ldots*10^{-114}$

Alternate forms:

$$\frac{1}{281\,474\,976\,710\,656}\left(51\,841-23\,184\sqrt{5}\right)\left(1\,957\,824\,041\,217\,313\,769\,464\,018\,127\,701\,593\,290\,409\,190\,610\,257\,259\,371\,123\,048\,697\,209\,633\,031\,486\,243\,334\,963\,133\,277\,424\,779\,647\,745\,485\,062\,319\,618\,561\sqrt{205}-28\,031\,774\,295\,530\,086\,098\,339\,937\,487\,685\,293\,327\,720\,357\,150\,478\,811\,074\,035\,436\,416\,879\,923\,466\,021\,793\,094\,435\,855\,490\,000\,889\,898\,750\,729\,955\,316\,881\,760\right)\left(\sqrt{2\left(\sqrt{41}-1\right)}+\sqrt{2\left(7+\sqrt{41}\right)}\right)^{24}$$

$$\left(\sqrt{205}\left(\sqrt{5}-2\right)^{8}\left(3\sqrt{5}-\sqrt{41}\right)^{144}\left(\text{root of } x^8-3x^6-6x^4-3x^2+1 \text{ near } x=2.11619\right)^{24}\right)/22300745198530623141535718272648361505980416$$



sqrt(147) 1/4 (((((1+(2(28/27)^1/6-sqrt(7/3)))/2))))^24

Input:

$$\sqrt{147}\times\frac{1}{4}\left(\frac{1}{2}\left(1+\left(2\sqrt[6]{\frac{28}{27}}-\sqrt{\frac{7}{3}}\right)\right)\right)^{24}$$

Result:

$$\frac{7\sqrt{3}\left(1-\sqrt{\frac{7}{3}}+\frac{2\sqrt[3]{2}\sqrt[6]{7}}{\sqrt{3}}\right)^{24}}{67108864}$$

Decimal approximation:

0.002375446998015593652699176828666312896463588049572173350...

0.002375446998….

Alternate forms:

$$\frac{7\sqrt{3}\left(3+2\sqrt[3]{2}\sqrt{3}\sqrt[6]{7}-\sqrt{21}\right)^{24}}{18953525353286467584}$$

$$\frac{7\sqrt{3}\left(-1+\sqrt{\frac{7}{3}}-\frac{2\sqrt[3]{2}\sqrt[6]{7}}{\sqrt{3}}\right)^{24}}{67108864}$$

$$\frac{7\left(\sqrt{3}+2\sqrt[3]{2}\sqrt[6]{7}-\sqrt{7}\right)^{24}}{11888133931008\sqrt{3}}$$

Minimal polynomial:

$$16\,777\,216\,x^{12} + 41\,965\,406\,750\,929\,707\,859\,968\,x^{10} + 26\,242\,365\,893\,781\,074\,497\,078\,567\,129\,850\,511\,360\,x^8 + 613\,126\,613\,976\,783\,772\,404\,361\,354\,938\,184\,718\,499\,840\,x^6 + 3\,606\,652\,938\,269\,232\,022\,348\,555\,370\,061\,318\,335\,121\,719\,040\,x^4 - 20\,351\,435\,261\,937\,652\,270\,756\,815\,897\,837\,426\,960\,672\,x^2 + 10\,090\,298\,369\,529$$

Now, from this results

8.28766007584362…*10^8; 0.002366091682; 2.9956828838554...*10^{-26}
9.20801603789; 2.29447281648…*10^{-114}; 0.002375446998

we obtain:

-2*4096*((((2.29447281648*10^-114 *1/ (1/8.28766007584362*10^8 * 2.9956828838554*10^-26)) *1/ (0.002366091682*1/9.20801603789*0.002375446998))))

Input interpretation:

$$-2\times 4096\left(\left(\frac{2.29447281648}{10^{114}}\times\frac{1}{\frac{1}{8.28766007584362\times 10^8}\times 2.9956828838554\times 10^{-26}}\right)\times\frac{1}{0.002366091682\times\frac{1}{9.20801603789}\times 0.002375446998}\right)$$

Result:

$$-8.5191861080043452731460390662773272071937323065773 54\ldots\times 10^{-70}$$

-8.5191861...*10^{-70}

From the previous six results, we obtain also:

2*6.67430*10^-11*10^17*[0.08932131921 * 1.801131800625e-8 * 0.483328677491 * 9.479346381e-10 * 1.40910480785e-10 * 2.33685237e-12]

Input interpretation:

$$2\times 6.67430\times 10^{-11}\times 10^{17}\,(0.08932131921\times 1.801131800625\times 10^{-8}\times 0.483328677491\times 9.479346381\times 10^{-10}\times 1.40910480785\times 10^{-10}\times 2.33685237\times 10^{-12})$$

Result:

$$3.2399019903399046406860898971314795798167283319396590\ldots\times 10^{-33}$$

3.23990199...*10^{-33}

We have also:

2.103786766*4096*10^6((((2.29447281648*10^-114 *1/ (1/8.28766007584362*10^8 * 2.9956828838554*10^-26)) *1/ (0.002366091682*1/9.20801603789*0.002375446998))))

Where 2.103786766... is the following Ramanujan mock theta function:

(((((1 / (1-0.449329) + (0.449329)^2 / ((1-0.449329^2)(1-0.449329^3)))) + ((((0.449329)^6 / ((1-0.449329^3)(1-0.449329^4)(1-0.449329^5))))

$$\left(\frac{1}{1-0.449329}+\frac{0.449329^2}{(1-0.449329^2)(1-0.449329^3)}\right)+\frac{0.449329^6}{(1-0.449329^3)(1-0.449329^4)(1-0.449329^5)}$$

2.1037867673642342851316026856346242744237225298754854325 1...

2.103786766...

Input interpretation:

$$2.103786766\times 4096\times 10^6\left(\left(\frac{2.29447281648}{10^{114}}\times\frac{1}{\frac{1}{8.28766007584362\times 10^8}\times 2.9956828838554\times 10^{-26}}\right)\times\frac{1}{0.002366091682\times\frac{1}{9.20801603789}\times 0.002375446998}\right)$$

Result:

8.9612754955552941280696460864766189321729570123620470... $\times 10^{-64}$

8.961275495...*10^{-64}

We note also that:

((((2*4096*((((2.29447281648*10^-114 *1/ (1/8.28766007584362*10^8 * 2.9956828838554*10^-26)) *1/ (0.002366091682*1/9.20801603789*0.002375446998))))))))^1/4096

Input interpretation:

$$\left(2\times 4096\left(\left(\frac{2.29447281648}{10^{114}}\times\frac{1}{\frac{1}{8.28766007584362\times 10^{8}}\times 2.9956828838554\times 10^{-26}}\right)\times\frac{1}{0.002366091682\times\frac{1}{9.20801603789}\times 0.002375446998}\right)\right)\text{^}(1/4096)$$

Result:

0.9619163446518...

0.9619163446518.... result very near to the spectral index n_s and to the mesonic Regge slope (see Appendix) and to the inflaton value at the end of the inflation 0.9402 and to the value of the following Rogers-Ramanujan continued fraction:

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

And:

((((2*6.67430*10^-11*10^17*[0.08932131921 * 1.801131800625e-8 * 0.483328677491 * 9.479346381e-10 * 1.40910480785e-10 * 2.33685237e-12]))))^1/4096

Input interpretation:

$$(2\times 6.67430\times 10^{-11}\times 10^{17}(0.08932131921\times 1.801131800625\times 10^{-8}\times 0.483328677491\times 9.479346381\times 10^{-10}\times 1.40910480785\times 10^{-10}\times 2.33685237\times 10^{-12}))\text{^}(1/4096)$$

Result:

0.9819016751...

0.9819016751.... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value $\mathbf{0.989117352243} = \boldsymbol{\phi}$

From:

Physics Letters B - Vol. 694, No. 3 (2010) pp. 181–185 - c Elsevier B. V.
COSMOLOGY WITH TORSION: AN ALTERNATIVE TO COSMIC INFLATION - *Nikodem J. Poplawski*

IV. DENSITY PARAMETERS

Seven-year Wilkinson Microwave Anisotropy Probe (WMAP) observations show that our Universe may be indeed closed, with $\Omega = 1.002$ [29]. The WMAP data give also $H_0^{-1} = 4.4\times10^{17}$ s and $\Omega_R = 8.8\times10^{-5}$. Thus $a_0 = 2.9\times10^{27}$ m. To estimate Ω_S, we use the relic background neutrinos which are the most abundant fermions in the Universe, with $n = 5.6\times10^7\,\mathrm{m}^{-3}$ for each type (out of 6) [28]. Equations (13) and (15) then give

$$\Omega_S = -8.6\times10^{-70}. \tag{23}$$

While in general relativity the torsion density parameter Ω_S vanishes, the ECKS theory of gravity gives Ω_S a nonzero, though extremely small, negative value.

V. FLATNESS PROBLEM

Gravitational repulsion induced by torsion, which becomes significant at extremely high densities, prevents the cosmological singularity. Equation (21) shows that the expansion of the Universe started when $H = 0$, at which $\hat{a} = \hat{a}_m$, where

$$\hat{a}_m = \sqrt{\frac{\Omega_S}{\Omega_R}} = 3.1\times10^{-33}, \tag{24}$$

In the ECKS gravity, where $\Omega_S < 0$, $\Omega(\hat{a})$ is infinite at $\hat{a} = \hat{a}_m$. The function (22) has a local minimum at $\hat{a} = \sqrt{2}\hat{a}_m$, where it is equal to

$$\Omega(\sqrt{2}\hat{a}_m) = 1 - \frac{4\Omega_S(\Omega-1)}{\Omega_R^2} = 1 + 8.9\times10^{-64}. \tag{26}$$

With regard the following results that we have obtained, it is possible to have some new mathematical connections with three important equations of the above cosmology.

Our results:

$$-2\times 4096\left(\left(\frac{2.29447281648}{10^{114}}\times\frac{1}{\frac{1}{8.28766007584362\times 10^{8}}\times 2.9956828838554\times 10^{-26}}\right)\times\frac{1}{0.002366091682\times\frac{1}{9.20801603789}\times 0.002375446998}\right)$$

-8.5191861...*10^{-70}

$$2\times 6.67430\times 10^{-11}\times 10^{17}\,(0.08932131921\times 1.801131800625\times 10^{-8}\times 0.483328677491\times 9.479346381\times 10^{-10}\times 1.40910480785\times 10^{-10}\times 2.33685237\times 10^{-12})$$

3.23990199...*10^{-33}

$$2.103786766\times 4096\times 10^{6}\left(\left(\frac{2.29447281648}{10^{114}}\times\frac{1}{\frac{1}{8.28766007584362\times 10^{8}}\times 2.9956828838554\times 10^{-26}}\right)\times\frac{1}{0.002366091682\times\frac{1}{9.20801603789}\times 0.002375446998}\right)$$

8.961275495...*10^{-64}

Poplawski formulas:

$$\Omega_S = -8.6\times 10^{-70}.$$

$$\hat{a}_m = \sqrt{-\frac{\Omega_S}{\Omega_R}} = 3.1\times 10^{-33},$$

$$\Omega(\hat{a}) = 1+\frac{(\Omega-1)\hat{a}^4}{\Omega_R\hat{a}^2+\Omega_S}. \qquad \Omega(\sqrt{2}\hat{a}_m) = 1-\frac{4\Omega_S(\Omega-1)}{\Omega_R^2} = 1+8.9\times 10^{-64}.$$

Now, we have that:

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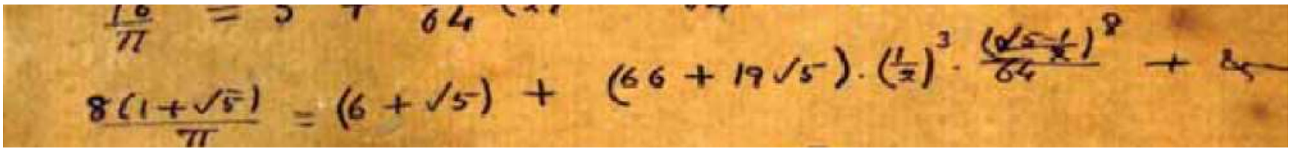

8(1+sqrt(5))* 1/Pi

Input:

$$8\left(1+\sqrt{5}\right)\times\frac{1}{\pi}$$

Result:

$$\frac{8\left(1+\sqrt{5}\right)}{\pi}$$

Decimal approximation:

8.240579436807741840116241625190654312835794522646634343106...

8.2405794368….

Property:

$\frac{8\left(1+\sqrt{5}\right)}{\pi}$ is a transcendental number

Alternate forms:

$$\frac{8}{\pi}+\frac{8\sqrt{5}}{\pi}$$

$$\frac{8+8\sqrt{5}}{\pi}$$

Series representations:

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

$$\frac{8\left(1+\sqrt{5}\right)}{\pi}=\frac{8}{\pi}+\frac{8\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}{\pi}$$

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

(6+sqrt(5)) + (66+19sqrt(5))*(1/2)^3*1/64(((sqrt(5)-1))/2))^8

Input:

$$\left(6+\sqrt{5}\right)+\left(66+19\sqrt{5}\right)\left(\frac{1}{2}\right)^3 \times \frac{1}{64}\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^8$$

Result:

$$6+\sqrt{5}+\frac{(\sqrt{5}-1)^8(66+19\sqrt{5})}{131072}$$

Decimal approximation:

8.240578218801160477337178923922175469745086278275117343347...

8.2405782188….

Alternate forms:

$$\frac{3(2417+177\sqrt{5})}{1024}$$

$$\frac{7251}{1024}+\frac{531\sqrt{5}}{1024}$$

$$\frac{7251+531\sqrt{5}}{1024}$$

Minimal polynomial:

$$262144x^2 - 3712512x + 12791799$$

1/5(((8(1+sqrt(5))* 1/Pi)))

Input:

$$\frac{1}{5}\left(8\left(1+\sqrt{5}\right)\times\frac{1}{\pi}\right)$$

Result:

$$\frac{8(1+\sqrt{5})}{5\pi}$$

Decimal approximation:

1.648115887361548368023248325038130862567158904529326868621...

$1.64811588736.... \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 ...$

Property:

$\frac{8(1+\sqrt{5})}{5\pi}$ is a transcendental number

Alternate forms:

$$\frac{8\sqrt{5}\ \frac{1}{5}}{\pi} + \frac{8}{5\pi}$$

$$\frac{\frac{8}{5} + \frac{8}{\sqrt{5}}}{\pi}$$

$$\frac{8 + 8\sqrt{5}}{5\pi}$$

Series representations:

$$\frac{8(1+\sqrt{5})}{\pi 5} = \frac{8}{5\pi} + \frac{8\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k}}{5\pi}$$

$$\frac{8(1+\sqrt{5})}{\pi 5} = \frac{8}{5\pi} + \frac{8\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}{5\pi}$$

$$\frac{8(1+\sqrt{5})}{\pi 5} = \frac{8}{5\pi} + \frac{4\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{5\pi\sqrt{\pi}}$$

(((1/(((8(1+sqrt(5))* 1/Pi))))))^1/256

Input:

$$\sqrt[256]{\frac{1}{8(1+\sqrt{5})\times\frac{1}{\pi}}}$$

Exact result:

$$\frac{\sqrt[256]{\frac{\pi}{1+\sqrt{5}}}}{2^{3/256}}$$

Decimal approximation:

0.9917952866362366476356011829819345579731207115932159995 56...

0.991795286636…. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value $\mathbf{0.989117352243} = \boldsymbol{\phi}$

Property:

$\frac{\sqrt[256]{\frac{\pi}{1+\sqrt{5}}}}{2^{3/256}}$ is a transcendental number

Alternate form:

$$\frac{\sqrt[256]{(\sqrt{5}-1)\pi}}{2^{5/256}}$$

All 256th roots of π/(8 (1 + sqrt(5))):

$$\frac{\sqrt[256]{\frac{\pi}{1+\sqrt{5}}}\, e^0}{2^{3/256}} \approx 0.991795 \text{ (real, principal root)}$$

$$\frac{\sqrt[256]{\frac{\pi}{1+\sqrt{5}}}\, e^{(i\pi)/128}}{2^{3/256}} \approx 0.991497 + 0.024340\, i$$

$$\frac{\sqrt[256]{\frac{\pi}{1+\sqrt{5}}}\ e^{(i\pi)/64}}{2^{3/256}} \approx 0.990601 + 0.048665\, i$$

$$\frac{\sqrt[256]{\frac{\pi}{1+\sqrt{5}}}\ e^{(3i\pi)/128}}{2^{3/256}} \approx 0.989108 + 0.07296\, i$$

$$\frac{\sqrt[256]{\frac{\pi}{1+\sqrt{5}}}\ e^{(i\pi)/32}}{2^{3/256}} \approx 0.987020 + 0.09721\, i$$

Series representations:

$$\sqrt[256]{\frac{1}{\frac{8\left(1+\sqrt{5}\right)}{\pi}}} = \frac{\sqrt[256]{\frac{\pi}{1+\sqrt{4}\ \sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k}}}}{2^{3/256}}$$

$$\sqrt[256]{\frac{1}{\frac{8\left(1+\sqrt{5}\right)}{\pi}}} = \frac{\sqrt[256]{\frac{\pi}{1+\sqrt{4}\ \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{4}\right)^k \left(-\frac{1}{2}\right)_k}{k!}}}}{2^{3/256}}$$

$$\sqrt[256]{\frac{1}{\frac{8\left(1+\sqrt{5}\right)}{\pi}}} = \frac{\sqrt[256]{\frac{\pi\sqrt{\pi}}{2\sqrt{\pi}+\sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}}}{\sqrt[128]{2}}$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\, ds}{(2\pi i)\,\Gamma(-a)} \quad \text{for } (0 < \gamma < -\operatorname{Re}(a) \text{ and } |\arg(z)| < \pi)$$

And:

Pi+16 [(6+sqrt(5)) + (66+19sqrt(5))*(1/2)^3*1/64((((sqrt(5)-1))/2))^8]

Input:

$$\pi + 16\left(\left(6+\sqrt{5}\right)+\left(66+19\sqrt{5}\right)\left(\frac{1}{2}\right)^3 \times \frac{1}{64}\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^8\right)$$

Result:

$$16\left(6+\sqrt{5}+\frac{\left(\sqrt{5}-1\right)^8\left(66+19\sqrt{5}\right)}{131072}\right)+\pi$$

Decimal approximation:

134.9908441544083608758575061660343104001185498517769833145...

134.9908441544… result very near to the rest mass of Pion meson 134.9766

Property:

$$16\left(6+\sqrt{5}+\frac{\left(-1+\sqrt{5}\right)^8\left(66+19\sqrt{5}\right)}{131072}\right)+\pi \text{ is a transcendental number}$$

Alternate forms:

$$\frac{1}{64}\left(64\pi+7251+531\sqrt{5}\right)$$

$$\frac{7251}{64}+\frac{531\sqrt{5}}{64}+\pi$$

$$\frac{3}{64}\left(2417+177\sqrt{5}\right)+\pi$$

Series representations:

$$\pi + 16\left(\left(6+\sqrt{5}\right)+\frac{1}{64}\left(66+19\sqrt{5}\right)\left(\frac{1}{2}\right)^3\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^8\right) = 96+\pi+16\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+\frac{\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^8\left(66+19\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)}{8192}$$

$$\pi + 16\left(\left(6+\sqrt{5}\right)+\frac{1}{64}\left(66+19\sqrt{5}\right)\left(\frac{1}{2}\right)^3\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^8\right) = 96+\pi+16\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+\frac{\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^8\left(66+19\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)}{8192}$$

$$\pi+16\left(\left(6+\sqrt{5}\right)+\frac{1}{64}\left(66+19\sqrt{5}\right)\left(\frac{1}{2}\right)^3\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^8\right)=$$

$$96+\pi+16\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+$$

$$\frac{\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)^8\left(66+19\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)}{8192}$$

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

Appendix

From:

Rotating strings confronting PDG mesons
Jacob Sonnenschein and Dorin Weissman - arXiv:1402.5603v1 [hep-ph] 23 Feb 2014

$c\bar{c}$. **The Ψ trajectory:** The left side of figure (15) depicts the Ψ trajectory. Here we use the states $J/\Psi(1S)(3097)1^{--}, \chi_{c1}(1P)(3510)1^{++}$, and $\Psi(3770)1^{--}$. Since no $J=3$ state has been observed, we use three states with $J=1$, but with increasing orbital angular momentum ($L=0,1,2$) and do the fit to L instead of J. To give an idea of the shifts in mass involved, the $J^{PC}=2^{++}$ state χ_{c2} has a mass of 3556 MeV, and the $J^{PC}=3^{--}$ state is expected to lie $30-60$ MeV above the $\Psi(3770)$[23].

The best linear fit is

$$\alpha' = 0.418, a = -4.04$$

with $\chi_l^2 = 3.41 \times 10^{-4}$, but the optimal fit is far from the linear, with endpoint masses in the range of the constituent c quark mass:

$$m_c = 1500, \alpha' = 0.979, a = -0.09$$

with $\chi_m^2 = 5 \times 10^{-7}$ $(\chi_m^2/\chi_l^2 = 0.002)$. Aside from the improvement in χ^2, by adding the mass we also get a value for the slope (and to a lesser extent, the intercept) that is much closer to that obtained in fits for the light meson trajectories.

where α' is the Regge slope (string tension)

We know also that:

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

The average of the various Regge slope of Omega mesons are:

1/7 * (0.979 + 0.910 + 0.918 + 0.988 + 0.937 + 1.18 +1) = 0.987428571 result very near to the value of dilaton and to the solution 0.987516007… of the above expression.

From:

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

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

from:

Modular equations and approximations to π - *Srinivasa Ramanujan*
Quarterly Journal of Mathematics, XLV, 1914, 350 – 372

We have that:

Hence

$$\begin{aligned} 64g_{22}^{24} &= e^{\pi\sqrt{22}} - 24 + 276e^{-\pi\sqrt{22}} - \cdots, \\ 64g_{22}^{-24} &= \qquad\qquad 4096e^{-\pi\sqrt{22}} + \cdots, \end{aligned}$$

so that

$$64(g_{22}^{24} + g_{22}^{-24}) = e^{\pi\sqrt{22}} - 24 + 4372e^{-\pi\sqrt{22}} + \cdots = 64\{(1+\sqrt{2})^{12} + (1-\sqrt{2})^{12}\}.$$

Hence

$$e^{\pi\sqrt{22}} = 2508951.9982\ldots.$$

Again

$$G_{37} = (6+\sqrt{37})^{\frac{1}{4}},$$

$$\begin{aligned} 64G_{37}^{24} &= e^{\pi\sqrt{37}} + 24 + 276e^{-\pi\sqrt{37}} + \cdots, \\ 64G_{37}^{-24} &= \qquad\qquad 4096e^{-\pi\sqrt{37}} - \cdots, \end{aligned}$$

so that

$$64(G_{37}^{24} + G_{37}^{-24}) = e^{\pi\sqrt{37}} + 24 + 4372e^{-\pi\sqrt{37}} - \cdots = 64\{(6+\sqrt{37})^6 + (6-\sqrt{37})^6\}.$$

Hence

$$e^{\pi\sqrt{37}} = 199148647.999978\ldots.$$

Similarly, from

$$g_{58} = \sqrt{\left(\frac{5+\sqrt{29}}{2}\right)},$$

we obtain

$$64(g_{58}^{24} + g_{58}^{-24}) = e^{\pi\sqrt{58}} - 24 + 4372e^{-\pi\sqrt{58}} + \cdots = 64\left\{\left(\frac{5+\sqrt{29}}{2}\right)^{12} + \left(\frac{5-\sqrt{29}}{2}\right)^{12}\right\}.$$

Hence

$$e^{\pi\sqrt{58}} = 24591257751.99999982\ldots.$$

From:

An Update on Brane Supersymmetry Breaking
J. Mourad and A. Sagnotti - arXiv:1711.11494v1 [hep-th] 30 Nov 2017

From the following vacuum equations:

$$T\, e^{\gamma_E \phi} \;=\; -\,\frac{\beta_E^{(p)}\, h^2}{\gamma_E}\; e^{-2\,(8-p)\,C + 2\,\beta_E^{(p)}\,\phi}$$

$$16\, k'\, e^{\;\;2C} \;=\; \frac{h^2 \left(p \,+\, 1 \,-\, \frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{-2\,(8-p)\,C + 2\,\beta_E^{(p)}\,\phi}}{(7\,-\,p)}$$

$$(A')^2 \;-\; k\, e^{-2A} \;+\; \frac{h^2}{16(p\,+\,1)}\, \left(7 \,-\, p \,+\, \frac{2\,\beta_E^{(p)}}{\gamma_E}\right)\, e^{-2\,(8-p)\,C + 2\,\beta_E^{(p)}\,\phi}$$

we have obtained, from the results almost equals of the equations, putting

$4096\, e^{-\pi\sqrt{18}}$ instead of

$$e^{-2\,(8-p)\,C + 2\,\beta_E^{(p)}\,\phi}$$

a new possible mathematical connection between the two exponentials. Thence, also the values concerning p, C, β_E and ϕ correspond to the exponents of e (i.e. of exp). Thence we obtain for p = 5 and $\beta_E = 1/2$:

$$e^{-6C+\phi} = 4096 e^{-\pi\sqrt{18}}$$

Therefore, with respect to the exponentials of the vacuum equations, the Ramanujan's exponential has a coefficient of 4096 which is equal to 64^2, while -6C+ϕ is equal to -$\pi\sqrt{18}$. From this it follows that it is possible to establish mathematically, the dilaton value.

For

exp((-Pi*sqrt(18)) we obtain:

Input:

$\exp\left(-\pi\sqrt{18}\right)$

Exact result:

$e^{-3\sqrt{2}\,\pi}$

Decimal approximation:

$1.6272016226072509292942156739117979541838581136954016... \times 10^{-6}$

1.6272016… * 10^{-6}

Property:

$e^{-3\sqrt{2}\,\pi}$ is a transcendental number

Series representations:

$$e^{-\pi\sqrt{18}} = e^{-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\, 17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now, we have the following calculations:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

$$e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10^{-6}$$

from which:

$$\frac{1}{4096}e^{-6C+\phi} = 1.6272016\ldots * 10^{-6}$$

$$0.000244140625\; e^{-6C+\phi} = e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10^{-6}$$

Now:

$$\ln\left(e^{-\pi\sqrt{18}}\right) = -13.328648814475 = -\pi\sqrt{18}$$

And:

(1.6272016* 10^-6) *1/ (0.000244140625)

Input interpretation:

$$\frac{1.6272016}{10^6} \times \frac{1}{0.000244140625}$$

Result:

0.0066650177536

0.006665017...

Thence:

$$0.000244140625\, e^{-6C+\phi} = e^{-\pi\sqrt{18}}$$

Dividing both sides by 0.000244140625, we obtain:

$$\frac{0.000244140625}{0.000244140625} e^{-6C+\phi} = \frac{1}{0.000244140625} e^{-\pi\sqrt{18}}$$

$$e^{-6C+\phi} = 0.0066650177536$$

((((exp((-Pi*sqrt(18)))))))*1/0.000244140625

Input interpretation:

$$\exp\left(-\pi\sqrt{18}\right) \times \frac{1}{0.000244140625}$$

Result:

0.00666501785...

0.00666501785…

Series representations:

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096 \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096 \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096 \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now:

$$e^{-6C+\phi} = 0.0066650177536$$

$$\exp\left(-\pi\sqrt{18}\right)\times\frac{1}{0.000244140625} =$$

$$e^{-\pi\sqrt{18}}\times\frac{1}{0.000244140625}$$

$$= 0.00666501785\ldots$$

From:

ln(0.00666501784619)

Input interpretation:

log(0.00666501784619)

Result:

–5.010882647757...

-5.010882647757…

Alternative representations:

$$\log(0.006665017846190000) = \log_e(0.006665017846190000)$$

$$\log(0.006665017846190000) = \log(a)\log_a(0.006665017846190000)$$

$$\log(0.006665017846190000) = -\text{Li}_1(0.993334982153810000)$$

Series representations:

$$\log(0.006665017846190000) = -\sum_{k=1}^{\infty} \frac{(-1)^k (-0.993334982153810000)^k}{k}$$

$$\log(0.006665017846190000) = 2 i \pi \left\lfloor \frac{\arg(0.006665017846190000 - x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\log(0.006665017846190000) = \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2\pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - z_0)^k z_0^{-k}}{k}$$

Integral representation:

$$\log(0.006665017846190000) = \int_1^{0.006665017846190000} \frac{1}{t}\, dt$$

In conclusion:

$$-6C + \phi = -5.010882647757 \ldots$$

and for C = 1, we obtain:

$\phi = -5.010882647757 + 6 = \mathbf{0.989117352243} = \boldsymbol{\phi}$

Note that the values of n_s (spectral index) 0.965, of the average of the Omega mesons Regge slope 0.987428571 and of the dilaton 0.989117352243, are also connected to the following two Rogers-Ramanujan continued fractions:

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

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

(http://www.bitman.name/math/article/102/109/)

Also performing the 512th root of the inverse value of the Pion meson rest mass 139.57, we obtain:

((1/(139.57)))^1/512

Input interpretation:

$$\sqrt[512]{\frac{1}{139.57}}$$

Result:

0.99040073270864402755097375571330141546073279617855555168 4...

0.99040073.... result very near to the dilaton value **0.989117352243** = $\boldsymbol{\phi}$ and to the value of the following Rogers-Ramanujan continued fraction:

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

From:

Eur. Phys. J. C (2019) 79:713 - https://doi.org/10.1140/epjc/s10052-019-7225-2-Regular Article - Theoretical Physics

Generalized dilaton–axion models of inflation, de Sitter vacua and spontaneous SUSY breaking in supergravity

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Table 1 The predictions for the inflationary parameters (n_s, r), and the values of φ at the horizon crossing (φ_i) and at the end of inflation (φ_f), in the case $3 \le \alpha \le \alpha_*$ with both signs of ω_1. The α parameter is taken to be integer, except of the upper limit $\alpha_* \equiv (7+\sqrt{33})/2$

α	3	4		5	6		α_*
sgn(ω_1)	−	+	−	+/−	+	−	−
n_s	0.9650	0.9649	0.9640	0.9639	0.9634	0.9637	0.9632
r	0.0035	0.0010	0.0013	0.0007	0.0005	0.0004	0.0003
$-\kappa\varphi_i$	5.3529	3.5542	3.9899	3.2657	3.0215	2.7427	2.5674
$-\kappa\varphi_f$	0.9402	0.7426	0.8067	0.7163	0.6935	0.6488	0.6276

Acknowledgments

I would like to thank Prof. **George E. Andrews** Evan Pugh Professor of Mathematics at Pennsylvania State University for his availability and kindness towards me

References

Ramanujan's Notebooks, Part I, by Bruce C. Berndt (Springer, 1985, ISBN 0-387-96110-0)

Ramanujan's Notebooks, Part II, by Bruce C. Berndt (Springer, 1999, ISBN 0-387-96794-X)

Ramanujan's Notebooks, Part III, by Bruce C. Berndt (Springer, 2004, ISBN 0-387-97503-9)

Ramanujan's Notebooks, Part IV, by Bruce C. Berndt (Springer, 1993, ISBN 0-387-94109-6)

Ramanujan's Notebooks, Part V, by Bruce C. Berndt (Springer, 2005, ISBN 0-387-94941-0)

Ramanujan's Lost Notebook, Part I, by George Andrews and Bruce C. Berndt (Springer, 2005, ISBN 0-387-25529-X)

Ramanujan's Lost Notebook, Part II, George E. Andrews, Bruce C. Berndt (Springer, 2008, ISBN 978-0-387-77765-8)

Ramanujan's Lost Notebook: Part III, George E. Andrews, Bruce C. Berndt (Springer, 2012, ISBN 978-1-4614-3809-0)

Ramanujan's Lost Notebook: Part IV, George E. Andrews, Bruce C. Berndt (Springer, 2013, ISBN 978-1-4614-4080-2)

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