Further Ramanujan's equations applied to various sectors of Particle Physics and Cosmology: some possible new mathematical connections. V

Michele Nardelli[1], Antonio Nardelli

Abstract

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

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

http://www.giochicreativi.com/2012/01/pazze-formule-ramanujan.html

$$1729 = 1^3 + 12^3 = 9^3 + 10^3 = 7 \times 13 \times 19$$

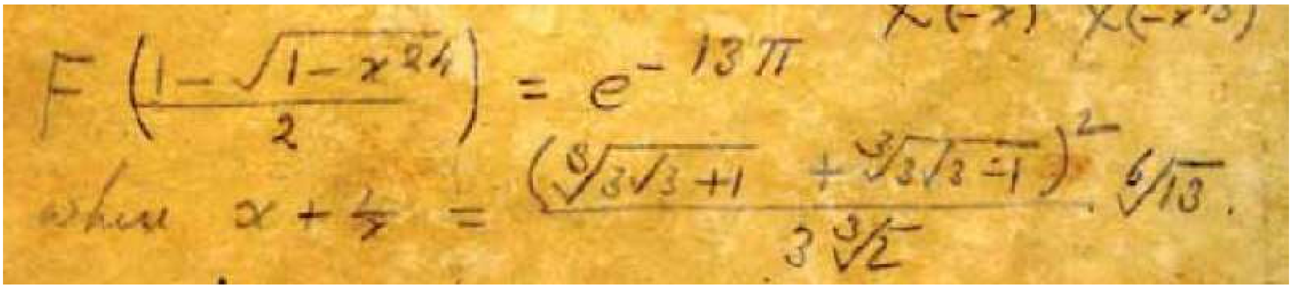
https://www.famousscientists.org/srinivasa-ramanujan/

"It was his insight into algebraical formulae,
transformations of infinite series, and so forth that was most amazing.
On this side most certainly I have never met his equal,
and I can compare him only with Euler or Jacobi."
G. H. HARDY, 1877 – 1947 (Mathematician)

From:

Manuscript Book Of Srinivasa Ramanujan Volume 1

Page 281



(((3sqrt3+1)^1/3+(3sqrt3-1)^1/3))^2 * (13)^1/6 * 1/(3*(2)^1/3)

Input:

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

Result:

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

Decimal approximation:

4.827716585669311505850859903413752753840343568084383506637...

4.8277165856693…

Alternate forms:

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

root of $x^6-26x^4+65x^2-52$ near $x=4.82772$

$$\frac{1}{\sqrt{\frac{3}{26+\sqrt[3]{13\left(821-72\sqrt{3}\right)}+\sqrt[3]{13\left(821+72\sqrt{3}\right)}}}}$$

Minimal polynomial:

$x^6-26x^4+65x^2-52$

e^(-13Pi)

Input:

$e^{-13\pi}$

Decimal approximation:

$1.8327676056715775684639617650534828603659265496720660\ldots \times 10^{-18}$

$1.832767605671\ldots * 10^{-18}$

Property:

$e^{-13\pi}$ is a transcendental number

Alternative representations:

$$e^{-13\pi} = e^{-2340^\circ}$$

$$e^{-13\pi} = e^{13\, i \log(-1)}$$

$$e^{-13\pi} = \exp^{-13\pi}(z) \quad \text{for } z = 1$$

Series representations:

$$e^{-13\pi} = e^{-52 \sum_{k=0}^{\infty} (-1)^k/(1+2k)}$$

$$e^{-13\pi} = \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{-13\pi}$$

$$e^{-13\pi} = \left(\frac{1}{\sum_{k=0}^{\infty} \frac{(-1)^k}{k!}}\right)^{-13\pi}$$

Integral representations:

$$e^{-13\pi} = e^{-52 \int_0^1 \sqrt{1-t^2}\, dt}$$

$$e^{-13\pi} = e^{-26 \int_0^1 1/\sqrt{1-t^2}\, dt}$$

$$e^{-13\pi} = e^{-26 \int_0^{\infty} 1/(1+t^2)\, dt}$$

e^(-13Pi)x = (((3sqrt3+1)^1/3+(3sqrt3-1)^1/3))^2 * (13)^1/6 * 1/(3*(2)^1/3)

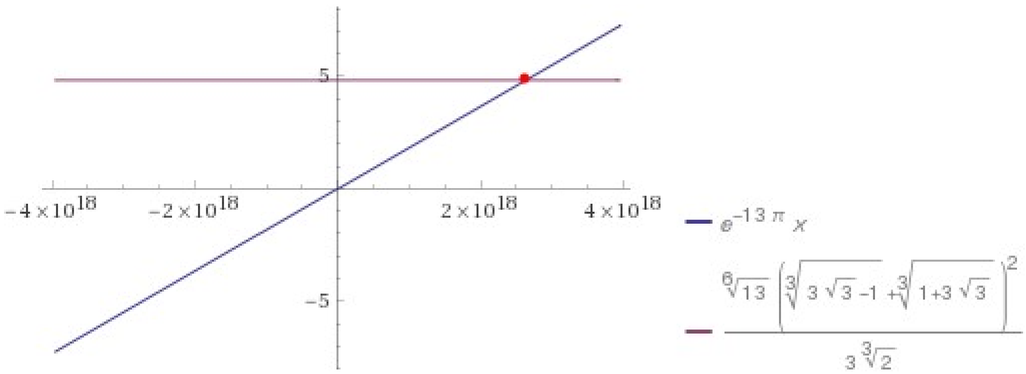
Input:

$$e^{-13\pi} x = \left(\sqrt[3]{3\sqrt{3}+1} + \sqrt[3]{3\sqrt{3}-1}\right)^2 \sqrt[6]{13} \times \frac{1}{3\sqrt[3]{2}}$$

Exact result:

$$e^{-13\pi} x = \frac{\sqrt[6]{13}\left(\sqrt[3]{3\sqrt{3}-1} + \sqrt[3]{1+3\sqrt{3}}\right)^2}{3\sqrt[3]{2}}$$

Plot:



Alternate forms:

$$e^{-13\pi} x = \text{root of } x^6 - 26x^4 + 65x^2 - 52 \text{ near } x = 4.82772$$

$$e^{-13\pi} x = \frac{1}{\sqrt{\frac{3}{26+\sqrt[3]{13(821-72\sqrt{3})}+\sqrt[3]{13(821+72\sqrt{3})}}}}$$

$$e^{-13\pi} x = \frac{\sqrt[6]{13}(3\sqrt{3}-1)^{2/3}}{3\sqrt[3]{2}} + \frac{\sqrt[6]{13}(1+3\sqrt{3})^{2/3}}{3\sqrt[3]{2}} + \frac{1}{3} \times 2^{2/3}\sqrt[6]{13}\sqrt[3]{(3\sqrt{3}-1)(1+3\sqrt{3})}$$

Solution:

$$x \approx 2634112786983868826$$

1/6 13^(1/6) (4 13^(1/3) + (-2 + 6 sqrt(3))^(2/3) + (2 + 6 sqrt(3))^(2/3)) e^(13 π)

Input:

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

Decimal approximation:

$2.6341127869838688278803376180123395006376168896977924\ldots \times 10^{18}$

$2.634112786983\ldots*10^{18}$

Property:

$\frac{1}{6}\sqrt[6]{13}\left(4\sqrt[3]{13}+\left(-2+6\sqrt{3}\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}\right)e^{13\pi}$ is a transcendental number

Alternate forms:

$e^{13\pi}$ (root of $x^6-26x^4+65x^2-52$ near $x=4.82772$)

$$\frac{e^{13\pi}}{\sqrt{\frac{3}{26+\sqrt[3]{13\left(821-72\sqrt{3}\right)}+\sqrt[3]{13\left(821+72\sqrt{3}\right)}}}}$$

$$\frac{2}{3}\sqrt{13}\,e^{13\pi}+\frac{1}{6}\sqrt[6]{13}\left(6\sqrt{3}-2\right)^{2/3}e^{13\pi}+\frac{1}{6}\sqrt[6]{13}\left(2+6\sqrt{3}\right)^{2/3}e^{13\pi}$$

Series representations:

$$\frac{1}{6}\sqrt[6]{13}\left(4\sqrt[3]{13}+\left(-2+6\sqrt{3}\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}\right)e^{13\pi}=\frac{1}{6}\sqrt[6]{13}\,e^{13\pi}\left(4\sqrt[3]{13}+2^{2/3}\left(-1+3\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^{2/3}+2^{2/3}\left(1+3\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^{2/3}\right)$$

$$\frac{1}{6}\sqrt[6]{13}\left(4\sqrt[3]{13}+\left(-2+6\sqrt{3}\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}\right)e^{13\pi}=\frac{1}{6}\sqrt[6]{13}\,e^{13\pi}\left(4\sqrt[3]{13}+2^{2/3}\left(-1+3\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^{2/3}+2^{2/3}\left(1+3\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^{2/3}\right)$$

$$\frac{1}{6}\sqrt[6]{13}\left(4\sqrt[3]{13}+\left(-2+6\sqrt{3}\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}\right)e^{13\pi}=\frac{1}{6}\sqrt[6]{13}\,e^{13\pi}\left(4\sqrt[3]{13}+2^{2/3}\left(-1+3\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right)^{2/3}+2^{2/3}\left(1+3\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right)^{2/3}\right)$$

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

3ln[1/6 13^(1/6) (4 13^(1/3) + (-2 + 6 sqrt(3))^(2/3) + (2 + 6 sqrt(3))^(2/3)) e^(13 π)]-golden ratio

Input:

$$3 \log\left(\frac{1}{6} \sqrt[6]{13} \left(4 \sqrt[3]{13} + \left(-2 + 6 \sqrt{3}\right)^{2/3} + \left(2 + 6 \sqrt{3}\right)^{2/3}\right) e^{13 \pi}\right) - \phi$$

log(x) is the natural logarithm

ϕ is the golden ratio

Decimal approximation:

125.627200299120983059703887264002280114766272988079573073 9...

125.62720029912… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Alternate forms:

$$-\frac{1}{2} - \frac{\sqrt{5}}{2} + 3 \log\left(\frac{1}{6} \sqrt[6]{13} \left(4 \sqrt[3]{13} + \left(6 \sqrt{3} - 2\right)^{2/3} + \left(2 + 6 \sqrt{3}\right)^{2/3}\right) e^{13 \pi}\right)$$

$$\frac{1}{2} \left(-1 - \sqrt{5} + 6 \log\left(\frac{1}{6} \sqrt[6]{13} \left(4 \sqrt[3]{13} + \left(6 \sqrt{3} - 2\right)^{2/3} + \left(2 + 6 \sqrt{3}\right)^{2/3}\right) e^{13 \pi}\right)\right)$$

$$\frac{1}{2} \left(-1 - \sqrt{5}\right) + 3 \log\left(\frac{e^{13 \pi}}{\sqrt{\frac{3}{26 + \sqrt[3]{13 \left(821 - 72 \sqrt{3}\right)} + \sqrt[3]{13 \left(821 + 72 \sqrt{3}\right)}}}}\right)$$

Alternative representations:

$$3 \log\left(\frac{1}{6} \sqrt[6]{13} \left(4 \sqrt[3]{13} + \left(-2 + 6 \sqrt{3}\right)^{2/3} + \left(2 + 6 \sqrt{3}\right)^{2/3}\right) e^{13 \pi}\right) - \phi = -\phi + 3 \log_e\left(\frac{1}{6} \sqrt[6]{13}\, e^{13 \pi} \left(4 \sqrt[3]{13} + \left(-2 + 6 \sqrt{3}\right)^{2/3} + \left(2 + 6 \sqrt{3}\right)^{2/3}\right)\right)$$

$$3 \log\left(\frac{1}{6} \sqrt[6]{13} \left(4 \sqrt[3]{13} + \left(-2 + 6 \sqrt{3}\right)^{2/3} + \left(2 + 6 \sqrt{3}\right)^{2/3}\right) e^{13 \pi}\right) - \phi = -\phi + 3 \log(a) \log_a\left(\frac{1}{6} \sqrt[6]{13}\, e^{13 \pi} \left(4 \sqrt[3]{13} + \left(-2 + 6 \sqrt{3}\right)^{2/3} + \left(2 + 6 \sqrt{3}\right)^{2/3}\right)\right)$$

$$3\log\left(\frac{1}{6}\sqrt[6]{13}\left(4\sqrt[3]{13}+\left(-2+6\sqrt{3}\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}\right)e^{13\pi}\right)-\phi = -\phi-3\,\mathrm{Li}_1\left(1-\frac{1}{6}\sqrt[6]{13}\,e^{13\pi}\left(4\sqrt[3]{13}+\left(-2+6\sqrt{3}\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}\right)\right)$$

((((1/6 13^(1/6) (4 13^(1/3) + (-2 + 6 sqrt(3))^(2/3) + (2 + 6 sqrt(3))^(2/3)) e^(13 π)))))^1/88

Input:

$$\sqrt[88]{\frac{1}{6}\sqrt[6]{13}\left(4\sqrt[3]{13}+\left(-2+6\sqrt{3}\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}\right)e^{13\pi}}$$

Exact result:

$$\frac{\sqrt[528]{13}\,\sqrt[88]{4\sqrt[3]{13}+(6\sqrt{3}-2)^{2/3}+(2+6\sqrt{3})^{2/3}}\;e^{(13\pi)/88}}{\sqrt[88]{6}}$$

Decimal approximation:

1.619292821206264086408656253528087560236095639242293147294...

1.61929821206… result that is a good approximation to the value of the golden ratio 1,618033988749...

Property:

$$\frac{\sqrt[528]{13}\,\sqrt[88]{4\sqrt[3]{13}+(-2+6\sqrt{3})^{2/3}+(2+6\sqrt{3})^{2/3}}\;e^{(13\pi)/88}}{\sqrt[88]{6}}$$ is a transcendental number

Alternate form:

$$\frac{\sqrt[528]{13}\,\sqrt[88]{4\sqrt[3]{13}+(2(3\sqrt{3}-1))^{2/3}+(2(1+3\sqrt{3}))^{2/3}}\;e^{(13\pi)/88}}{\sqrt[88]{6}}$$

All 88th roots of 1/6 13^(1/6) (4 13^(1/3) + (6 sqrt(3) - 2)^(2/3) + (2 + 6 sqrt(3))^(2/3)) e^(13 π):

$$\frac{\sqrt[528]{13}\ e^{(13\pi)/88}\ e^{0}}{\sqrt[88]{\frac{6}{4\sqrt[3]{13}+\left(6\sqrt{3}-2\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}}}} \approx 1.6193 \text{ (real, principal root)}$$

$$\frac{\sqrt[528]{13}\ e^{(13\pi)/88}\ e^{(i\pi)/44}}{\sqrt[88]{\frac{6}{4\sqrt[3]{13}+\left(6\sqrt{3}-2\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}}}} \approx 1.61517+0.11552\,i$$

$$\frac{\sqrt[528]{13}\ e^{(13\pi)/88}\ e^{(i\pi)/22}}{\sqrt[88]{\frac{6}{4\sqrt[3]{13}+\left(6\sqrt{3}-2\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}}}} \approx 1.60281+0.23045\,i$$

$$\frac{\sqrt[528]{13}\ e^{(13\pi)/88}\ e^{(3i\pi)/44}}{\sqrt[88]{\frac{6}{4\sqrt[3]{13}+\left(6\sqrt{3}-2\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}}}} \approx 1.58229+0.34421\,i$$

$$\frac{\sqrt[528]{13}\ e^{(13\pi)/88}\ e^{(i\pi)/11}}{\sqrt[88]{\frac{6}{4\sqrt[3]{13}+\left(6\sqrt{3}-2\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}}}} \approx 1.55370+0.45621\,i$$

Series representations:

$$\sqrt[88]{\frac{1}{6}\sqrt[6]{13}\left(4\sqrt[3]{13}+\left(-2+6\sqrt{3}\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}\right)e^{13\pi}} = \frac{1}{\sqrt[88]{6}}\sqrt[528]{13}\left(e^{13\pi}\left(4\sqrt[3]{13}+2^{2/3}\left(-1+3\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^{2/3}+2^{2/3}\left(1+3\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^{2/3}\right)\right)\wedge(1/88)$$

$$\sqrt[88]{\frac{1}{6}\sqrt[6]{13}\left(4\sqrt[3]{13}+\left(-2+6\sqrt{3}\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}\right)e^{13\pi}} = \frac{1}{\sqrt[88]{6}}\sqrt[528]{13}\left(e^{13\pi}\left(4\sqrt[3]{13}+2^{2/3}\left(-1+3\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^{2/3}+2^{2/3}\left(1+3\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^{2/3}\right)\right)\hat{}\,(1/88)$$

$$\sqrt[88]{\frac{1}{6}\sqrt[6]{13}\left(4\sqrt[3]{13}+\left(-2+6\sqrt{3}\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}\right)e^{13\pi}} = \frac{1}{\sqrt[88]{6}}\sqrt[528]{13}\left(e^{13\pi}\left(4\sqrt[3]{13}+\left(\frac{-2\sqrt{\pi}+3\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)^{2/3}+\left(\frac{2\sqrt{\pi}+3\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)^{2/3}\right)\right)\hat{}\,(1/88)$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(s)\Gamma(-a-s)}{z^s}\,ds}{(2\pi i)\Gamma(-a)} \quad \text{for } (0<\gamma<-\text{Re}(a) \text{ and } |\arg(z)|<\pi)$$

(((1/((((1/6 13^(1/6) (4 13^(1/3) + (-2 + 6 sqrt(3))^(2/3) + (2 + 6 sqrt(3))^(2/3)) e^(13 π)))))^1/88)))^1/32

Input:

$$\sqrt[32]{\frac{1}{\sqrt[88]{\frac{1}{6}\sqrt[6]{13}\left(4\sqrt[3]{13}+\left(-2+6\sqrt{3}\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}\right)e^{13\pi}}}}$$

Exact result:

$$\frac{\sqrt[2816]{\frac{6}{4\sqrt[3]{13}+\left(6\sqrt{3}-2\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}}}\,e^{-(13\pi)/2816}}{\sqrt[16896]{13}}$$

Decimal approximation:

0.985050694517374407899501325597376070207916059031421967889...

0.98505069451737… 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:

$$\frac{\sqrt[2816]{\frac{6}{4\sqrt[3]{13}+\left(-2+6\sqrt{3}\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}}}\ e^{-(13\pi)/2816}}{\sqrt[16896]{13}}$$ is a transcendental number

Alternate forms:

$$\frac{e^{-(13\pi)/2816}\sqrt[2816]{\left(\text{root of } 8x^9-25x^6+32x^3-1 \text{ near } x=0.317626\right)}}{\sqrt[16896]{13}}$$

$$\frac{\sqrt[2816]{\frac{6}{4\sqrt[3]{13}+\left(2\left(3\sqrt{3}-1\right)\right)^{2/3}+\left(2\left(1+3\sqrt{3}\right)\right)^{2/3}}}\ e^{-(13\pi)/2816}}{\sqrt[16896]{13}}$$

All 32nd roots of ((6/(4 13^(1/3) + (6 sqrt(3) - 2)^(2/3) + (2 + 6 sqrt(3))^(2/3)))^(1/88) e^(-(13 π)/88))/13^(1/528):

$$\frac{\sqrt[2816]{6}\ e^{-(13\pi)/2816}\ e^0}{\sqrt[16896]{13}\ \sqrt[2816]{4\sqrt[3]{13}+\left(6\sqrt{3}-2\right)^{2/3}+\left(2+6\sqrt{3}\right)^{2/3}}}\approx 0.985051 \text{ (real, principal root)}$$

$$\frac{\sqrt[2816]{6}\ e^{-(13\pi)/2816}\ e^{(i\pi)/16}}{\sqrt[16896]{13}\ \sqrt[2816]{4\sqrt[3]{13}+(6\sqrt{3}-2)^{2/3}+(2+6\sqrt{3})^{2/3}}} \approx 0.966123+0.192174\,i$$

$$\frac{\sqrt[2816]{6}\ e^{-(13\pi)/2816}\ e^{(i\pi)/8}}{\sqrt[16896]{13}\ \sqrt[2816]{4\sqrt[3]{13}+(6\sqrt{3}-2)^{2/3}+(2+6\sqrt{3})^{2/3}}} \approx 0.91007+0.37696\,i$$

$$\frac{\sqrt[2816]{6}\ e^{-(13\pi)/2816}\ e^{(3i\pi)/16}}{\sqrt[16896]{13}\ \sqrt[2816]{4\sqrt[3]{13}+(6\sqrt{3}-2)^{2/3}+(2+6\sqrt{3})^{2/3}}} \approx 0.81904+0.54726\,i$$

$$\frac{\sqrt[2816]{6}\ e^{-(13\pi)/2816}\ e^{(i\pi)/4}}{\sqrt[16896]{13}\ \sqrt[2816]{4\sqrt[3]{13}+(6\sqrt{3}-2)^{2/3}+(2+6\sqrt{3})^{2/3}}} \approx 0.69654+0.69654\,i$$

Series representations:

$$\sqrt[32]{\frac{1}{\sqrt[88]{\frac{1}{6}\sqrt[6]{13}\left(4\sqrt[3]{13}+(-2+6\sqrt{3})^{2/3}+(2+6\sqrt{3})^{2/3}\right)e^{13\pi}}}} =$$

$$\left(\sqrt[2816]{6}\ e^{-13\pi}\left(e^{13\pi}\left(4\sqrt[3]{13}+2^{2/3}\left(-1+3\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^{2/3}+ 2^{2/3}\left(1+3\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^{2/3}\right)\right)^{2815/2816}\right) \Bigg/ \left(\sqrt[16896]{13}\left(4\sqrt[3]{13}+2^{2/3}\left(-1+3\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^{2/3}+2^{2/3}\left(1+3\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^{2/3}\right)\right)$$

$$\sqrt[32]{\frac{1}{\sqrt[88]{\frac{1}{6}\sqrt[6]{13}\left(4\sqrt[3]{13}+(-2+6\sqrt{3})^{2/3}+(2+6\sqrt{3})^{2/3}\right)e^{13\pi}}}} =$$

$$\left(\sqrt[2816]{6}\, e^{-13\pi}\left(e^{13\pi}\left(4\sqrt[3]{13}+2^{2/3}\left(-1+3\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^{2/3}+2^{2/3}\left(1+3\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^{2/3}\right)\right)^{2815/2816}\right) \Big/ \left(\sqrt[16\,896]{13}\left(4\sqrt[3]{13}+2^{2/3}\left(-1+3\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^{2/3}+2^{2/3}\left(1+3\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^{2/3}\right)\right)$$

$$\sqrt[32]{\frac{1}{\sqrt[88]{\frac{1}{6}\sqrt[6]{13}\left(4\sqrt[3]{13}+(-2+6\sqrt{3})^{2/3}+(2+6\sqrt{3})^{2/3}\right)e^{13\pi}}}} =$$

$$\left(\sqrt[2816]{6}\, e^{-13\pi}\left(e^{13\pi}\left(4\sqrt[3]{13}+\left(\frac{-2\sqrt{\pi}+3\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)^{2/3}+\left(\frac{2\sqrt{\pi}+3\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)^{2/3}\right)\right)^{2815/2816}\right) \Big/ \left(\sqrt[16\,896]{13}\left(4\sqrt[3]{13}+\left(\frac{-2\sqrt{\pi}+3\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)^{2/3}+\left(\frac{2\sqrt{\pi}+3\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)^{2/3}\right)\right)$$

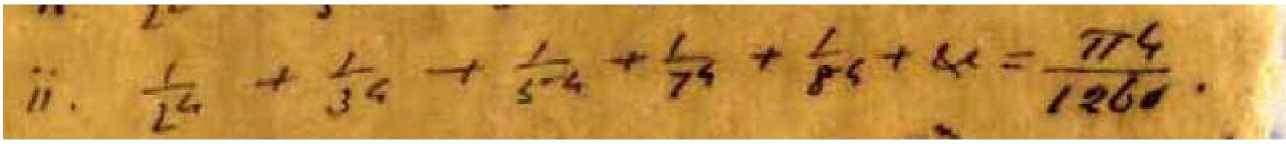
Integral representation:

$$(1+z)^a = \frac{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(s)\Gamma(-a-s)}{z^s}\,ds}{(2\pi i)\Gamma(-a)} \quad \text{for } (0<\gamma<-\operatorname{Re}(a) \text{ and } |\arg(z)|<\pi)$$

From:

Manuscript Book Of Srinivasa Ramanujan Volume II

Page 63



11. $\frac{1}{2^4} + \frac{1}{3^4} + \frac{1}{5^4} + \frac{1}{7^4} + \frac{1}{8^4} + \&c = \frac{\pi^4}{1260}$.

1/2^4 + 1/3^4 + 1/5^4 + 1/7^4 + 1/8^4

Input:

$$\frac{1}{2^4} + \frac{1}{3^4} + \frac{1}{5^4} + \frac{1}{7^4} + \frac{1}{8^4}$$

Exact result:

$$\frac{38\,389\,024\,801}{497\,871\,360\,000}$$

Decimal approximation:

0.077106312765209069266406487009013733989438556979859215039...

0.0771063127652…

(Pi^4)/1263

Input:

$$\frac{\pi^4}{1263}$$

Decimal approximation:

0.077125171048299633599715227782030966943568951443139684632...

0.077125171…

Property:

$\frac{\pi^4}{1263}$ is a transcendental number

Alternative representations:

$$\frac{\pi^4}{1263} = \frac{(180\,°)^4}{1263}$$

$$\frac{\pi^4}{1263} = \frac{(-i\log(-1))^4}{1263}$$

$$\frac{\pi^4}{1263} = \frac{\cos^{-1}(-1)^4}{1263}$$

Series representations:

$$\frac{\pi^4}{1263} = \frac{30}{421}\sum_{k=1}^{\infty}\frac{1}{k^4}$$

$$\frac{\pi^4}{1263} = \frac{32}{421}\sum_{k=0}^{\infty}\frac{1}{(1+2k)^4}$$

$$\frac{\pi^4}{1263} = \frac{256\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^4}{1263}$$

Integral representations:

$$\frac{\pi^4}{1263} = \frac{256\left(\int_0^1\sqrt{1-t^2}\,dt\right)^4}{1263}$$

$$\frac{\pi^4}{1263} = \frac{16\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^4}{1263}$$

$$\frac{\pi^4}{1263} = \frac{16\left(\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt\right)^4}{1263}$$

1/2^4 + 1/3^4 + 1/5^4 + 1/7^4 + 1/8^4 = (Pi^4)/x

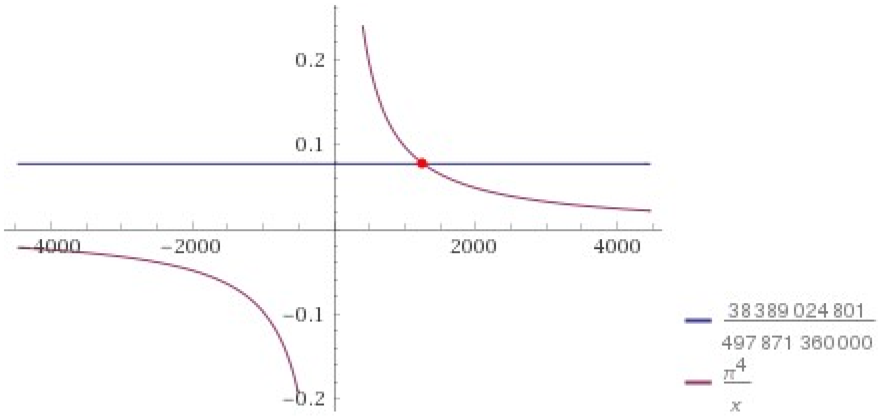
Input:

$$\frac{1}{2^4} + \frac{1}{3^4} + \frac{1}{5^4} + \frac{1}{7^4} + \frac{1}{8^4} = \frac{\pi^4}{x}$$

Exact result:

$$\frac{38\,389\,024\,801}{497\,871\,360\,000} = \frac{\pi^4}{x}$$

Plot:



Alternate form assuming x is real:

$$\frac{497\,871\,360\,000\,\pi^4}{x} = 38\,389\,024\,801$$

Alternate form assuming x is positive:

$38\,389\,024\,801\,x = 497\,871\,360\,000\,\pi^4$ (for $x \neq 0$)

Solution:

$x \approx 1263.30889833386$

1263.30889833386

(Pi^4)/(1/2^4 + 1/3^4 + 1/5^4 + 1/7^4 + 1/8^4)

Input:

$$\frac{\pi^4}{\frac{1}{2^4} + \frac{1}{3^4} + \frac{1}{5^4} + \frac{1}{7^4} + \frac{1}{8^4}}$$

Result:

$$\frac{497871360000\,\pi^4}{38389024801}$$

Decimal approximation:

1263.308898333861577329969799525829595372460284872981338792...

1263.3088983386…

Property:

$\frac{497871360000\,\pi^4}{38389024801}$ is a transcendental number

Alternative representations:

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}} = \frac{(180\,°)^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}} = \frac{(-i\log(-1))^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}} = \frac{\cos^{-1}(-1)^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}$$

Series representations:

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}} = \frac{44808422400000\sum_{k=1}^{\infty}\frac{1}{k^4}}{38389024801}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}} = \frac{47795650560000\sum_{k=0}^{\infty}\frac{1}{(1+2k)^4}}{38389024801}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}} = \frac{127455068160000\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^4}{38389024801}$$

Integral representations:

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}} = \frac{7\,965\,941\,760\,000\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^4}{38\,389\,024\,801}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}} = \frac{7\,965\,941\,760\,000\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt\right)^4}{38\,389\,024\,801}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}} = \frac{127\,455\,068\,160\,000\left(\int_0^1 \sqrt{1-t^2}\,dt\right)^4}{38\,389\,024\,801}$$

(Pi^4)/(1/2^4 + 1/3^4 + 1/5^4 + 1/7^4 + 1/8^4) - 29 – 2

Input:

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}} - 29 - 2$$

Result:

$$\frac{497\,871\,360\,000\,\pi^4}{38\,389\,024\,801} - 31$$

Decimal approximation:

1232.308898333861577329969799525829595372460284872981338792...

1232.30889833386…. result practically equal to the rest mass of Delta baryon 1232

Property:

$$-31 + \frac{497\,871\,360\,000\,\pi^4}{38\,389\,024\,801}$$ is a transcendental number

Alternate form:

$$\frac{497\,871\,360\,000\,\pi^4 - 1\,190\,059\,768\,831}{38\,389\,024\,801}$$

Alternative representations:

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-29-2=-31+\frac{(180\,°)^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-29-2=-31+\frac{(-i\log(-1))^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-29-2=-31+\frac{\cos^{-1}(-1)^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}$$

Series representations:

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-29-2=-31+\frac{44\,808\,422\,400\,000\sum_{k=1}^{\infty}\frac{1}{k^4}}{38\,389\,024\,801}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-29-2=-31+\frac{47\,795\,650\,560\,000\sum_{k=0}^{\infty}\frac{1}{(1+2k)^4}}{38\,389\,024\,801}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-29-2=-31+\frac{127\,455\,068\,160\,000\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^4}{38\,389\,024\,801}$$

Integral representations:

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-29-2=-31+\frac{7\,965\,941\,760\,000\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^4}{38\,389\,024\,801}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-29-2=-31+\frac{7\,965\,941\,760\,000\left(\int_0^{1}\frac{1}{\sqrt{1-t^2}}\,dt\right)^4}{38\,389\,024\,801}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-29-2=-31+\frac{127\,455\,068\,160\,000\left(\int_0^{1}\sqrt{1-t^2}\,dt\right)^4}{38\,389\,024\,801}$$

(Pi^4)/(1/2^4 + 1/3^4 + 1/5^4 + 1/7^4 + 1/8^4) +29^2-322

Input:

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}+29^2-322$$

Result:

$$519+\frac{497871360000\,\pi^4}{38389024801}$$

Decimal approximation:

1782.308898333861577329969799525829595372460284872981338792...

1782.30889833386... result in the range of the hypothetical mass of Gluino (gluino = 1785.16 GeV).

Property:

$519+\frac{497871360000\,\pi^4}{38389024801}$ is a transcendental number

Alternate form:

$$\frac{3\,(6641301290573+165957120000\,\pi^4)}{38389024801}$$

Alternative representations:

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}+29^2-322=-322+29^2+\frac{(180\,°)^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}+29^2-322=-322+29^2+\frac{(-i\log(-1))^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}+29^2-322=-322+29^2+\frac{\cos^{-1}(-1)^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}$$

Series representations:

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}+29^2-322=519+\frac{44\,808\,422\,400\,000\sum_{k=1}^{\infty}\frac{1}{k^4}}{38\,389\,024\,801}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}+29^2-322=519+\frac{47\,795\,650\,560\,000\sum_{k=0}^{\infty}\frac{1}{(1+2k)^4}}{38\,389\,024\,801}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}+29^2-322=519+\frac{127\,455\,068\,160\,000\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^4}{38\,389\,024\,801}$$

Integral representations:

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}+29^2-322=519+\frac{7\,965\,941\,760\,000\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^4}{38\,389\,024\,801}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}+29^2-322=519+\frac{7\,965\,941\,760\,000\left(\int_0^{1}\frac{1}{\sqrt{1-t^2}}\,dt\right)^4}{38\,389\,024\,801}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}+29^2-322=519+\frac{127\,455\,068\,160\,000\left(\int_0^{1}\sqrt{1-t^2}\,dt\right)^4}{38\,389\,024\,801}$$

(Pi^4)/(1/2^4 + 1/3^4 + 1/5^4 + 1/7^4 + 1/8^4)/11+11

Input:

$$\frac{1}{11}\times\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}+11$$

Result:

$$11+\frac{497\,871\,360\,000\,\pi^4}{422\,279\,272\,811}$$

Decimal approximation:

125.84626348489650702999725450234814503386002589754375807 20...

125.84626348489… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Property:

$11 + \frac{497871360000\,\pi^4}{422279272811}$ is a transcendental number

Alternate form:

$$\frac{497871360000\,\pi^4 + 4645072000921}{422279272811}$$

Alternative representations:

$$\frac{\pi^4}{11\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)} + 11 = 11 + \frac{(180\,°)^4}{11\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)}$$

$$\frac{\pi^4}{11\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)} + 11 = 11 + \frac{(-i\log(-1))^4}{11\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)}$$

$$\frac{\pi^4}{11\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)} + 11 = 11 + \frac{\cos^{-1}(-1)^4}{11\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)}$$

Series representations:

$$\frac{\pi^4}{11\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)} + 11 = 11 + \frac{44808422400000\sum_{k=1}^{\infty}\frac{1}{k^4}}{422279272811}$$

$$\frac{\pi^4}{11\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)} + 11 = 11 + \frac{47795650560000\sum_{k=0}^{\infty}\frac{1}{(1+2k)^4}}{422279272811}$$

$$\frac{\pi^4}{11\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)} + 11 = 11 + \frac{127455068160000\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^4}{422279272811}$$

Integral representations:

$$\frac{\pi^4}{11\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)}+11=11+\frac{7965941760000\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^4}{422279272811}$$

$$\frac{\pi^4}{11\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)}+11=11+\frac{7965941760000\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt\right)^4}{422279272811}$$

$$\frac{\pi^4}{11\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)}+11=11+\frac{127455068160000\left(\int_0^1 \sqrt{1-t^2}\,dt\right)^4}{422279272811}$$

(Pi^4)/(1/2^4 + 1/3^4 + 1/5^4 + 1/7^4 + 1/8^4)-199-47+2

Input:

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-199-47+2$$

Result:

$$\frac{497871360000\,\pi^4}{38389024801}-244$$

Decimal approximation:

1019.308898333861577329969799525829595372460284872981338792...

1019.30889833386… result practically equal to the rest mass of Phi meson 1019.445

Property:

$$-244+\frac{497871360000\,\pi^4}{38389024801}$$ is a transcendental number

Alternate form:

$$\frac{4\left(124467840000\,\pi^4-2341730512861\right)}{38389024801}$$

Alternative representations:

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-199-47+2=-244+\frac{(180\,°)^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-199-47+2=-244+\frac{(-i\log(-1))^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-199-47+2=-244+\frac{\cos^{-1}(-1)^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}$$

Series representations:

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-199-47+2=-244+\frac{44\,808\,422\,400\,000\sum_{k=1}^{\infty}\frac{1}{k^4}}{38\,389\,024\,801}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-199-47+2=-244+\frac{47\,795\,650\,560\,000\sum_{k=0}^{\infty}\frac{1}{(1+2k)^4}}{38\,389\,024\,801}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-199-47+2=-244+\frac{127\,455\,068\,160\,000\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^4}{38\,389\,024\,801}$$

Integral representations:

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-199-47+2=-244+\frac{7\,965\,941\,760\,000\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^4}{38\,389\,024\,801}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-199-47+2=-244+\frac{7\,965\,941\,760\,000\left(\int_0^{1}\frac{1}{\sqrt{1-t^2}}\,dt\right)^4}{38\,389\,024\,801}$$

$$\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}-199-47+2=$$
$$-244+\frac{127\,455\,068\,160\,000\left(\int_0^{1}\sqrt{1-t^2}\,dt\right)^4}{38\,389\,024\,801}$$

(Pi^4)*1/(1/2^4 + 1/3^4 + 1/5^4 + 1/7^4 + 1/8^4)*1/3^2-7+golden ratio

Input:

$$\pi^4 \times \frac{1}{\frac{1}{2^4} + \frac{1}{3^4} + \frac{1}{5^4} + \frac{1}{7^4} + \frac{1}{8^4}} \times \frac{1}{3^2} - 7 + \phi$$

ϕ is the golden ratio

Result:

$$\phi - 7 + \frac{55\,319\,040\,000\,\pi^4}{38\,389\,024\,801}$$

Decimal approximation:

134.9856893591789589959790090039022598257714519434703560612...

134.9856893591… result practically equal to the rest mass of Pion meson 134.9766

Property:

$$-7 + \phi + \frac{55\,319\,040\,000\,\pi^4}{38\,389\,024\,801} \text{ is a transcendental number}$$

Alternate forms:

$$\frac{-499\,057\,322\,413 + 38\,389\,024\,801\sqrt{5} + 110\,638\,080\,000\,\pi^4}{76\,778\,049\,602}$$

$$\frac{38\,389\,024\,801\,\phi - 268\,723\,173\,607 + 55\,319\,040\,000\,\pi^4}{38\,389\,024\,801}$$

$$\frac{38\,389\,024\,801\,\phi + 7\,(7\,902\,720\,000\,\pi^4 - 38\,389\,024\,801)}{38\,389\,024\,801}$$

Alternative representations:

$$\frac{\pi^4}{3^2\left(\frac{1}{2^4} + \frac{1}{3^4} + \frac{1}{5^4} + \frac{1}{7^4} + \frac{1}{8^4}\right)} - 7 + \phi = -7 - 2\cos(216\,°) + \frac{\pi^4}{9\left(\frac{1}{2^4} + \frac{1}{3^4} + \frac{1}{5^4} + \frac{1}{7^4} + \frac{1}{8^4}\right)}$$

$$\frac{\pi^4}{3^2\left(\frac{1}{2^4} + \frac{1}{3^4} + \frac{1}{5^4} + \frac{1}{7^4} + \frac{1}{8^4}\right)} - 7 + \phi = -7 + 2\cos\left(\frac{\pi}{5}\right) + \frac{\pi^4}{9\left(\frac{1}{2^4} + \frac{1}{3^4} + \frac{1}{5^4} + \frac{1}{7^4} + \frac{1}{8^4}\right)}$$

$$\frac{\pi^4}{3^2\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)}-7+\phi=-7-2\cos(216\,°)+\frac{(180\,°)^4}{9\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)}$$

Series representations:

$$\frac{\pi^4}{3^2\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)}-7+\phi=-7+\phi+\frac{4978713600000\sum_{k=1}^{\infty}\frac{1}{k^4}}{38389024801}$$

$$\frac{\pi^4}{3^2\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)}-7+\phi=-7+\phi+\frac{5310627840000\sum_{k=0}^{\infty}\frac{1}{(1+2k)^4}}{38389024801}$$

$$\frac{\pi^4}{3^2\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)}-7+\phi=-7+\phi+\frac{14161674240000\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^4}{38389024801}$$

Integral representations:

$$\frac{\pi^4}{3^2\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)}-7+\phi=-7+\phi+\frac{885104640000\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^4}{38389024801}$$

$$\frac{\pi^4}{3^2\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)}-7+\phi=-7+\phi+\frac{885104640000\left(\int_0^{1}\frac{1}{\sqrt{1-t^2}}\,dt\right)^4}{38389024801}$$

$$\frac{\pi^4}{3^2\left(\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}\right)}-7+\phi=-7+\phi+\frac{14161674240000\left(\int_0^{1}\sqrt{1-t^2}\,dt\right)^4}{38389024801}$$

((((((((((1/((((Pi^4)/(1/2^4 + 1/3^4 + 1/5^4 + 1/7^4 + 1/8^4))))^1/15)))^1/64))))))-pi/10^3

Input:

$$\sqrt[64]{\frac{1}{\sqrt[15]{\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}}}}-\frac{\pi}{10^3}$$

Exact result:

$$\frac{\sqrt[960]{38\,389\,024\,801}}{\sqrt[80]{2}\,\sqrt[240]{105\,\pi}} - \frac{\pi}{1000}$$

Decimal approximation:

0.989446956869959966604428443465641768099347273584635667877...

0.98944695686… 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 $\mathbf{0.989117352243 = \phi}$

Alternate forms:

$$\frac{100\times 2^{79/80}\times 105^{239/240}\,\sqrt[960]{38\,389\,024\,801} - 21\,\pi^{241/240}}{21\,000\,\sqrt[240]{\pi}}$$

$$-\frac{\sqrt[80]{2}\,\sqrt[240]{105}\,\pi^{241/240} - 1000\,\sqrt[960]{38\,389\,024\,801}}{1000\,\sqrt[80]{2}\,\sqrt[240]{105\,\pi}}$$

Alternative representations:

$$\sqrt[64]{\frac{1}{\sqrt[15]{\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}}}} - \frac{\pi}{10^3} = -\frac{180°}{10^3} + \sqrt[64]{\frac{1}{\sqrt[15]{\frac{(180°)^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}}}}$$

$$\sqrt[64]{\frac{1}{\sqrt[15]{\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}}}} - \frac{\pi}{10^3} = -\frac{\cos^{-1}(-1)}{10^3} + \sqrt[64]{\frac{1}{\sqrt[15]{\frac{\cos^{-1}(-1)^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}}}}$$

$$\sqrt[64]{\frac{1}{\sqrt[15]{\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}}}} - \frac{\pi}{10^3} = \frac{i\log(-1)}{10^3} + \sqrt[64]{\frac{1}{\sqrt[15]{\frac{(-i\log(-1))^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}}}}$$

Series representations:

$$\sqrt[64]{\frac{1}{\sqrt[15]{\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}}}} - \frac{\pi}{10^3} = \frac{25\times 2^{47/48}\times 105^{239/240}\sqrt[960]{38\,389\,024\,801} - 21\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^{241/240}}{5250\sqrt[240]{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}}$$

$$\sqrt[64]{\frac{1}{\sqrt[15]{\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}}}} - \frac{\pi}{10^3} = \left(100\times 2^{79/80}\times 105^{239/240}\sqrt[960]{38\,389\,024\,801} - 21\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^{241/240}\right) \Big/ \left(21\,000\sqrt[240]{\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)}\right)$$

$$\sqrt[64]{\frac{1}{\sqrt[15]{\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}}}} - \frac{\pi}{10^3} = \left(100\times 2^{79/80}\times 105^{239/240}\sqrt[960]{38\,389\,024\,801} - 21\left(\sum_{k=0}^{\infty}16^{-k}\left(\frac{1}{-5-8k}-\frac{1}{2+4k}+\frac{4}{1+8k}-\frac{1}{6+8k}\right)\right)^{241/240}\right) \Big/ \left(21\,000\sqrt[240]{\sum_{k=0}^{\infty}16^{-k}\left(\frac{1}{-5-8k}-\frac{1}{2+4k}+\frac{4}{1+8k}-\frac{1}{6+8k}\right)}\right)$$

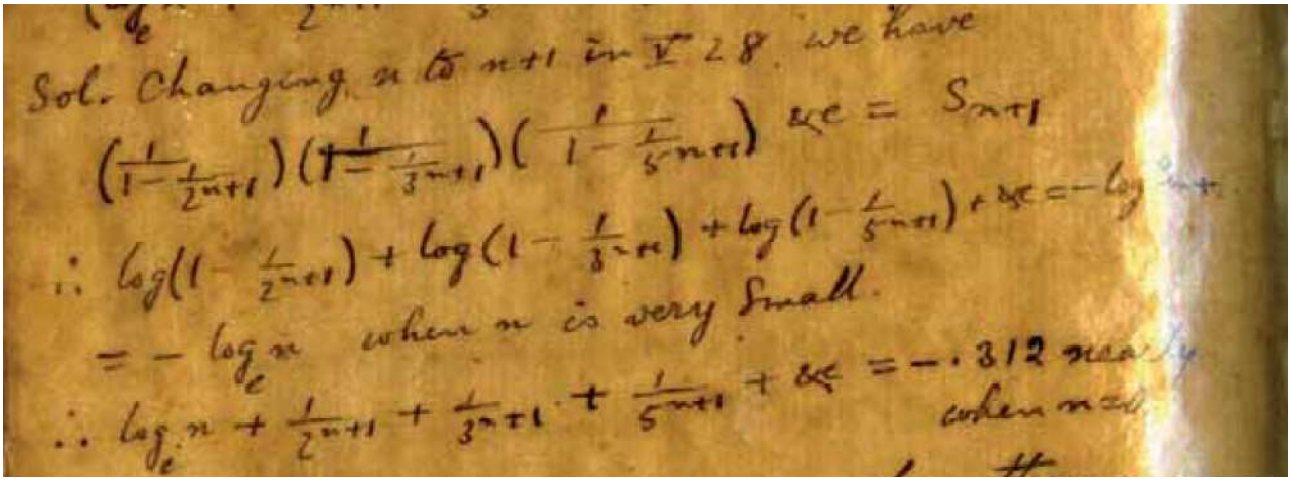
Integral representations:

$$\sqrt[64]{\frac{1}{\sqrt[15]{\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}}}-\frac{\pi}{10^3}} = \frac{50\times 2^{59/60}\times 105^{239/240}\sqrt[960]{38\,389\,024\,801}-21\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^{241/240}}{10\,500\sqrt[240]{\int_0^\infty \frac{1}{1+t^2}\,dt}}$$

$$\sqrt[64]{\frac{1}{\sqrt[15]{\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}}}-\frac{\pi}{10^3}} = \frac{25\times 2^{47/48}\times 105^{239/240}\sqrt[960]{38\,389\,024\,801}-21\left(\int_0^1 \sqrt{1-t^2}\,dt\right)^{241/240}}{5250\sqrt[240]{\int_0^1 \sqrt{1-t^2}\,dt}}$$

$$\sqrt[64]{\frac{1}{\sqrt[15]{\frac{\pi^4}{\frac{1}{2^4}+\frac{1}{3^4}+\frac{1}{5^4}+\frac{1}{7^4}+\frac{1}{8^4}}}}-\frac{\pi}{10^3}} = \frac{50\times 2^{59/60}\times 105^{239/240}\sqrt[960]{38\,389\,024\,801}-21\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^{241/240}}{10\,500\sqrt[240]{\int_0^\infty \frac{\sin(t)}{t}\,dt}}$$

Page 65


Sol. Changing n to n+1 in V 28 we have
$\left(\frac{1}{1-\frac{1}{2^{n+1}}}\right)\left(\frac{1}{1-\frac{1}{3^{n+1}}}\right)\left(\frac{1}{1-\frac{1}{5^{n+1}}}\right)$ &c = S_{n+1}
$\therefore \log(1-\frac{1}{2^{n+1}}) + \log(1-\frac{1}{3^{n+1}}) + \log(1-\frac{1}{5^{n+1}})$ + &c = − log
$= -\log_e n$ when n is very small.
$\therefore \log_e n + \frac{1}{2^{n+1}} + \frac{1}{3^{n+1}} + \frac{1}{5^{n+1}}$ + &c = −.312 nearly when n=0

ln0.352+ 1/(2)^1.352 + 1/(3)^1.352+1/(5)^1.352

Input:

$$\log(0.352) + \frac{1}{2^{1.352}} + \frac{1}{3^{1.352}} + \frac{1}{5^{1.352}}$$

$\log(x)$ is the natural logarithm

Result:

$-0.312447\ldots$

-0.312447…

Alternative representations:

$$\log(0.352) + \frac{1}{2^{1.352}} + \frac{1}{3^{1.352}} + \frac{1}{5^{1.352}} = \log_e(0.352) + \frac{1}{2^{1.352}} + \frac{1}{3^{1.352}} + \frac{1}{5^{1.352}}$$

$$\log(0.352) + \frac{1}{2^{1.352}} + \frac{1}{3^{1.352}} + \frac{1}{5^{1.352}} = \log(a)\log_a(0.352) + \frac{1}{2^{1.352}} + \frac{1}{3^{1.352}} + \frac{1}{5^{1.352}}$$

$$\log(0.352) + \frac{1}{2^{1.352}} + \frac{1}{3^{1.352}} + \frac{1}{5^{1.352}} = -\text{Li}_1(0.648) + \frac{1}{2^{1.352}} + \frac{1}{3^{1.352}} + \frac{1}{5^{1.352}}$$

Series representations:

$$\log(0.352) + \frac{1}{2^{1.352}} + \frac{1}{3^{1.352}} + \frac{1}{5^{1.352}} = 0.731677 - \sum_{k=1}^{\infty} \frac{(-1)^k (-0.648)^k}{k}$$

$$\log(0.352) + \frac{1}{2^{1.352}} + \frac{1}{3^{1.352}} + \frac{1}{5^{1.352}} = 0.731677 + 2 i \pi \left\lfloor \frac{\arg(0.352 - x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.352 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\log(0.352) + \frac{1}{2^{1.352}} + \frac{1}{3^{1.352}} + \frac{1}{5^{1.352}} = 0.731677 + \left\lfloor \frac{\arg(0.352 - z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(0.352 - z_0)}{2\pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.352 - z_0)^k z_0^{-k}}{k}$$

Integral representation:

$$\log(0.352) + \frac{1}{2^{1.352}} + \frac{1}{3^{1.352}} + \frac{1}{5^{1.352}} = 0.731677 + \int_1^{0.352} \frac{1}{t}\,dt$$

From this expression, we obtain also, for n = 0.0833 = 1/12 :

-(((1+34/10^3+ln0.0833+ 1/(2)^1.0833 + 1/(3)^1.0833+1/(5)^1.0833)))

Input interpretation:

$$-\left(1 + \frac{34}{10^3} + \log(0.0833) + \frac{1}{2^{1.0833}} + \frac{1}{3^{1.0833}} + \frac{1}{5^{1.0833}}\right)$$

log(x) is the natural logarithm

Result:

0.500270...

0.500270… . ≅ 0.5 = 1/2

Mathematical connection with Trans-Planckian Censorship and the Swampland (see "Ramanujan mathematics applied to the physics and cosmology")

(((gamma (((5/2)))))) * ((((2.3e-18)^3))) * 1 / ((2Pi^(4-1/2))) *1/((((i/ ((((((Pi^(4-1/2))*1/((gamma (5/2))) * (1/(2.3e-18))^3)))))))))

Input interpretation:

$$\Gamma\left(\frac{5}{2}\right)(2.3\times 10^{-18})^3 \times \frac{1}{2\,\pi^{4-1/2}} \times \frac{1}{\frac{i}{\pi^{4-1/2}\times\frac{1}{\Gamma\left(\frac{5}{2}\right)}\left(\frac{1}{2.3\times 10^{-18}}\right)^3}}$$

Γ(x) is the gamma function

i is the imaginary unit

Result:

$-0.5\,i$

Polar coordinates:

$r = 0.5$ (radius), $\theta = -90°$ (angle)

0.5 = 1/2

Alternative representations:

$$-\left(1+\frac{34}{10^3}+\log(0.0833)+\frac{1}{2^{1.0833}}+\frac{1}{3^{1.0833}}+\frac{1}{5^{1.0833}}\right)=$$
$$-1-\log_e(0.0833)-\frac{1}{2^{1.0833}}-\frac{1}{3^{1.0833}}-\frac{1}{5^{1.0833}}-\frac{34}{10^3}$$

$$-\left(1+\frac{34}{10^3}+\log(0.0833)+\frac{1}{2^{1.0833}}+\frac{1}{3^{1.0833}}+\frac{1}{5^{1.0833}}\right)=$$
$$-1-\log(a)\log_a(0.0833)-\frac{1}{2^{1.0833}}-\frac{1}{3^{1.0833}}-\frac{1}{5^{1.0833}}-\frac{34}{10^3}$$

$$-\left(1+\frac{34}{10^3}+\log(0.0833)+\frac{1}{2^{1.0833}}+\frac{1}{3^{1.0833}}+\frac{1}{5^{1.0833}}\right)=$$
$$-1+\text{Li}_1(0.9167)-\frac{1}{2^{1.0833}}-\frac{1}{3^{1.0833}}-\frac{1}{5^{1.0833}}-\frac{34}{10^3}$$

Series representations:

$$-\left(1+\frac{34}{10^3}+\log(0.0833)+\frac{1}{2^{1.0833}}+\frac{1}{3^{1.0833}}+\frac{1}{5^{1.0833}}\right)=$$
$$-1.98504+\sum_{k=1}^{\infty}\frac{(-1)^k(-0.9167)^k}{k}$$

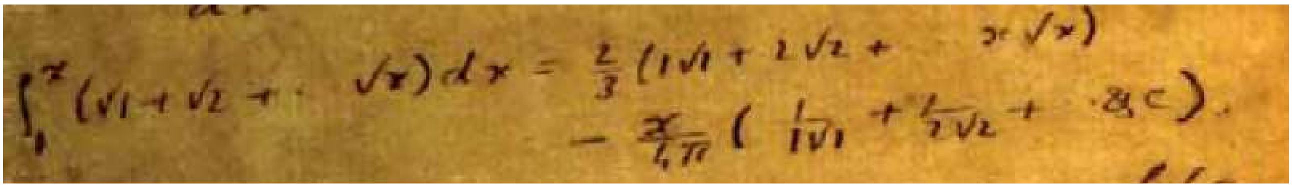
$$-\left(1+\frac{34}{10^3}+\log(0.0833)+\frac{1}{2^{1.0833}}+\frac{1}{3^{1.0833}}+\frac{1}{5^{1.0833}}\right)=$$
$$-1.98504-2i\pi\left\lfloor\frac{\arg(0.0833-x)}{2\pi}\right\rfloor-\log(x)+\sum_{k=1}^{\infty}\frac{(-1)^k(0.0833-x)^k x^{-k}}{k}\quad\text{for } x<0$$

$$-\left(1+\frac{34}{10^3}+\log(0.0833)+\frac{1}{2^{1.0833}}+\frac{1}{3^{1.0833}}+\frac{1}{5^{1.0833}}\right)=$$
$$-1.98504-\left\lfloor\frac{\arg(0.0833-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)-\log(z_0)-$$
$$\left\lfloor\frac{\arg(0.0833-z_0)}{2\pi}\right\rfloor\log(z_0)+\sum_{k=1}^{\infty}\frac{(-1)^k(0.0833-z_0)^k z_0^{-k}}{k}$$

Integral representation:

$$-\left(1+\frac{34}{10^3}+\log(0.0833)+\frac{1}{2^{1.0833}}+\frac{1}{3^{1.0833}}+\frac{1}{5^{1.0833}}\right)=-1.98504-\int_1^{0.0833}\frac{1}{t}\,dt$$

Page 70



$$\int_1^x (\sqrt{1}+\sqrt{2}+\cdots\sqrt{x})\,dx = \frac{2}{3}(1\sqrt{1}+2\sqrt{2}+\cdots x\sqrt{x}) - \frac{x}{4\pi}\left(\frac{1}{1\sqrt{1}}+\frac{1}{2\sqrt{2}}+\cdots \&c\right).$$

2/3(1sqrt1+2sqrt2+3sqrt3+x*sqrtx)-x/(4Pi)(1/(1sqrt1)+1/(2sqrt2)+1/(3sqrt3))

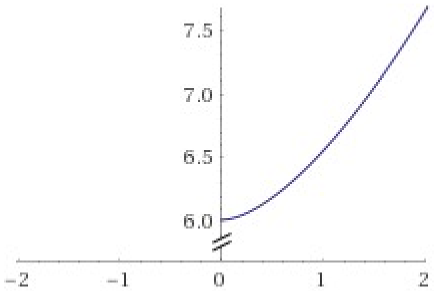
Input:

$$\frac{2}{3}\left(1\sqrt{1}+2\sqrt{2}+3\sqrt{3}+x\sqrt{x}\right)-\frac{x}{4\pi}\left(\frac{1}{1\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)$$

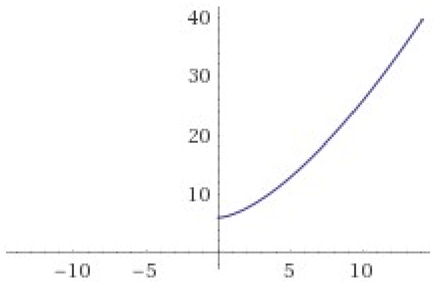
Exact result:

$$\frac{2}{3}\left(x^{3/2}+3\sqrt{3}+2\sqrt{2}+1\right)-\frac{\left(1+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)x}{4\pi}$$

Plots:



(x from −2 to 2)



(x from −14.1 to 14.1)

Alternate forms:

$$\frac{2}{3}\left(x^{3/2}+3\sqrt{3}+2\sqrt{2}+1\right)-\frac{\left(36+9\sqrt{2}+4\sqrt{3}\right)x}{144\pi}$$

$$\frac{96\pi x^{3/2}-4\sqrt{3}\,x-9\sqrt{2}\,x-36x+288\sqrt{3}\,\pi+192\sqrt{2}\,\pi+96\pi}{144\pi}$$

$$\frac{2}{3}\left(x^{3/2}+\sqrt{35+12\sqrt{6}}+1\right)+\frac{\left(-6-\sqrt{\frac{1}{6}\left(35+12\sqrt{6}\right)}\right)x}{24\pi}$$

Expanded form:

$$\frac{2x^{3/2}}{3}-\frac{x}{12\sqrt{3}\,\pi}-\frac{x}{8\sqrt{2}\,\pi}-\frac{x}{4\pi}+2\sqrt{3}+\frac{4\sqrt{2}}{3}+\frac{2}{3}$$

Roots:

$$\begin{aligned}
x = & -\frac{-251-108\sqrt{2}-48\sqrt{3}-12\sqrt{6}}{4608\pi^2} - \\
& \left(1+i\sqrt{3}\right)\Big/\Big(9216\pi^2\Big(2\Big/\Big(82948102+56107080\sqrt{2}+33582240\sqrt{3}+ \\
& 22348296\sqrt{6}-27980660736\pi^3-18166726656\sqrt{2}\,\pi^3- \\
& 18933350400\sqrt{3}\,\pi^3-11530321920\sqrt{6}\,\pi^3+ \\
& 3522410053632\pi^6+391378894848\sqrt{2}\,\pi^6+ \\
& 587068342272\sqrt{3}\,\pi^6+1174136684544\sqrt{6}\,\pi^6+ \\
& \sqrt{}\Big(4\Big(147456\left(108+81\sqrt{2}+112\sqrt{3}+35\sqrt{6}\right)\pi^3- \\
& \left(-251-108\sqrt{2}-48\sqrt{3}-12\sqrt{6}\right)^2\Big)^3+ \\
& \Big(82948102+56107080\sqrt{2}+33582240\sqrt{3}+ \\
& 22348296\sqrt{6}-27980660736\pi^3- \\
& 18166726656\sqrt{2}\,\pi^3-18933350400\sqrt{3}\,\pi^3- \\
& 11530321920\sqrt{6}\,\pi^3+3522410053632\pi^6+ \\
& 391378894848\sqrt{2}\,\pi^6+587068342272\sqrt{3} \\
& \pi^6+1174136684544\sqrt{6}\,\pi^6\Big)^2\Big)\Big)\Big)\hat{}\,(1/3)\Big)+ \\
& \Big(\left(1-i\sqrt{3}\right)\Big(147456\left(108+81\sqrt{2}+112\sqrt{3}+35\sqrt{6}\right)\pi^3- \\
& \left(-251-108\sqrt{2}-48\sqrt{3}-12\sqrt{6}\right)^2\Big)\Big)\Big/ \\
& \Big(4608\times 2^{2/3}\pi^2\Big(82948102+56107080\sqrt{2}+33582240\sqrt{3}+ \\
& 22348296\sqrt{6}-27980660736\pi^3- \\
& 18166726656\sqrt{2}\,\pi^3-18933350400\sqrt{3}\,\pi^3- \\
& 11530321920\sqrt{6}\,\pi^3+3522410053632\pi^6+ \\
& 391378894848\sqrt{2}\,\pi^6+587068342272\sqrt{3}\,\pi^6+ \\
& 1174136684544\sqrt{6}\,\pi^6+ \\
& \sqrt{}\Big(4\Big(147456\left(108+81\sqrt{2}+112\sqrt{3}+35\sqrt{6}\right)\pi^3- \\
& \left(-251-108\sqrt{2}-48\sqrt{3}-12\sqrt{6}\right)^2\Big)^3+ \\
& \Big(82948102+56107080\sqrt{2}+33582240\sqrt{3}+22348296 \\
& \sqrt{6}-27980660736\pi^3-18166726656\sqrt{2} \\
& \pi^3-18933350400\sqrt{3}\,\pi^3-11530321920\sqrt{6} \\
& \pi^3+3522410053632\pi^6+391378894848\sqrt{2} \\
& \pi^6+587068342272\sqrt{3}\,\pi^6+1174136684544 \\
& \sqrt{6}\,\pi^6\Big)^2\Big)\Big)\hat{}\,(1/3)\Big)\approx -2.02771-3.97539\,i
\end{aligned}$$

$$
\begin{aligned}
x = {} & -\frac{-251 - 108\sqrt{2} - 48\sqrt{3} - 12\sqrt{6}}{4608\,\pi^2} - \\
& \left(1 - i\sqrt{3}\right) \Big/ \Bigg(9216\,\pi^2 \Bigg(2 \Big/ \Bigg(82\,948\,102 + 56\,107\,080\sqrt{2} + 33\,582\,240\sqrt{3} + \\
& \quad 22\,348\,296\sqrt{6} - 27\,980\,660\,736\,\pi^3 - 18\,166\,726\,656\sqrt{2}\,\pi^3 - \\
& \quad 18\,933\,350\,400\sqrt{3}\,\pi^3 - 11\,530\,321\,920\sqrt{6}\,\pi^3 + \\
& \quad 3\,522\,410\,053\,632\,\pi^6 + 391\,378\,894\,848\sqrt{2}\,\pi^6 + \\
& \quad 587\,068\,342\,272\sqrt{3}\,\pi^6 + 1\,174\,136\,684\,544\sqrt{6}\,\pi^6 + \\
& \quad \sqrt{\Bigg(4\left(147\,456\left(108 + 81\sqrt{2} + 112\sqrt{3} + 35\sqrt{6}\right)\pi^3 - \left(-251 - 108\sqrt{2} - 48\sqrt{3} - 12\sqrt{6}\right)^2\right)^3 +} \\
& \quad \Big(82\,948\,102 + 56\,107\,080\sqrt{2} + 33\,582\,240\sqrt{3} + \\
& \quad 22\,348\,296\sqrt{6} - 27\,980\,660\,736\,\pi^3 - \\
& \quad 18\,166\,726\,656\sqrt{2}\,\pi^3 - 18\,933\,350\,400\sqrt{3}\,\pi^3 - \\
& \quad 11\,530\,321\,920\sqrt{6}\,\pi^3 + 3\,522\,410\,053\,632\,\pi^6 + \\
& \quad 391\,378\,894\,848\sqrt{2}\,\pi^6 + 587\,068\,342\,272\sqrt{3} \\
& \quad \pi^6 + 1\,174\,136\,684\,544\sqrt{6}\,\pi^6\Big)^2\Bigg)\Bigg)\Bigg) \wedge (1/3)\Bigg) + \\
& \Bigg(\left(1 + i\sqrt{3}\right)\Big(147\,456\left(108 + 81\sqrt{2} + 112\sqrt{3} + 35\sqrt{6}\right)\pi^3 - \\
& \quad \left(-251 - 108\sqrt{2} - 48\sqrt{3} - 12\sqrt{6}\right)^2\Big)\Bigg) \Big/ \\
& \Bigg(4608 \times 2^{2/3}\,\pi^2 \Bigg(82\,948\,102 + 56\,107\,080\sqrt{2} + 33\,582\,240\sqrt{3} + \\
& \quad 22\,348\,296\sqrt{6} - 27\,980\,660\,736\,\pi^3 - \\
& \quad 18\,166\,726\,656\sqrt{2}\,\pi^3 - 18\,933\,350\,400\sqrt{3}\,\pi^3 - \\
& \quad 11\,530\,321\,920\sqrt{6}\,\pi^3 + 3\,522\,410\,053\,632\,\pi^6 + \\
& \quad 391\,378\,894\,848\sqrt{2}\,\pi^6 + 587\,068\,342\,272\sqrt{3}\,\pi^6 + \\
& \quad 1\,174\,136\,684\,544\sqrt{6}\,\pi^6 + \\
& \quad \sqrt{\Bigg(4\left(147\,456\left(108 + 81\sqrt{2} + 112\sqrt{3} + 35\sqrt{6}\right)\pi^3 - \left(-251 - 108\sqrt{2} - 48\sqrt{3} - 12\sqrt{6}\right)^2\right)^3 +} \\
& \quad \Big(82\,948\,102 + 56\,107\,080\sqrt{2} + 33\,582\,240\sqrt{3} + 22\,348\,296 \\
& \quad \sqrt{6} - 27\,980\,660\,736\,\pi^3 - 18\,166\,726\,656\sqrt{2} \\
& \quad \pi^3 - 18\,933\,350\,400\sqrt{3}\,\pi^3 - 11\,530\,321\,920\sqrt{6} \\
& \quad \pi^3 + 3\,522\,410\,053\,632\,\pi^6 + 391\,378\,894\,848\sqrt{2} \\
& \quad \pi^6 + 587\,068\,342\,272\sqrt{3}\,\pi^6 + 1\,174\,136\,684\,544 \\
& \quad \sqrt{6}\,\pi^6\Big)^2\Bigg)\Bigg) \wedge (1/3)\Bigg) \approx -2.02771 + 3.97539\,i
\end{aligned}
$$

Properties as a real function:

Domain

$\{x \in \mathbb{R} : x \geq 0\}$ (all non-negative real numbers)

Range

$\{y \in \mathbb{R} : y \geq 6.01577\}$

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

Derivative:

$$\frac{d}{dx}\left(\frac{2}{3}\left(1\sqrt{1}+2\sqrt{2}+3\sqrt{3}+x\sqrt{x}\right)-\frac{x\left(\frac{1}{1\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}\right)=$$
$$\sqrt{x}-\frac{36+9\sqrt{2}+4\sqrt{3}}{144\pi}$$

Indefinite integral:

$$\int\left(-\frac{\left(1+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)x}{4\pi}+\frac{2}{3}\left(1+2\sqrt{2}+3\sqrt{3}+x^{3/2}\right)\right)dx=$$
$$\frac{4x^{5/2}}{15}-\frac{(36+9\sqrt{2}+4\sqrt{3})x^2}{288\pi}+\frac{2}{3}\left(1+2\sqrt{2}+3\sqrt{3}\right)x+\text{constant}$$

Global minimum:

$$\min\left\{\frac{2}{3}\left(1\sqrt{1}+2\sqrt{2}+3\sqrt{3}+x\sqrt{x}\right)-\frac{x\left(\frac{1}{1\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}\right\}\approx 6.0158$$
at $x \approx 0.015136$

For x = 29+4 = 33, where 29 and 4 are Lucas numbers, we obtain:

Input:

$$\frac{2}{3}\left(1\sqrt{1}+2\sqrt{2}+3\sqrt{3}+(29+4)\sqrt{29+4}\right)-\frac{29+4}{4\pi}\left(\frac{1}{1\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)-3$$

Result:

$$-3+\frac{2}{3}\left(1+2\sqrt{2}+3\sqrt{3}+33\sqrt{33}\right)-\frac{33\left(1+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}$$

Decimal approximation:

125.33687200594858044903649939794871031876862722988318417 02...

125.336872… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Property:

$$-3+\frac{2}{3}\left(1+2\sqrt{2}+3\sqrt{3}+33\sqrt{33}\right)-\frac{33\left(1+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}$$
is a transcendental number

Alternate forms:

$$\frac{-396-99\sqrt{2}-44\sqrt{3}-112\pi+64\sqrt{2}\pi+96\sqrt{3}\pi+1056\sqrt{33}\pi}{48\pi}$$

$$\frac{1}{3}\left(-7+4\sqrt{2}+6\sqrt{3}+66\sqrt{33}\right)-\frac{11\left(36+9\sqrt{2}+4\sqrt{3}\right)}{48\pi}$$

$$-\frac{7}{3}+\frac{4\sqrt{2}}{3}+2\sqrt{3}+22\sqrt{33}-\frac{33}{4\pi}-\frac{33}{8\sqrt{2}\pi}-\frac{11}{4\sqrt{3}\pi}$$

2/3(1sqrt1+2sqrt2+3sqrt3+(29+4)*sqrt(29+4))-(29+4)/(4Pi)(1/(1sqrt1)+1/(2sqrt2)+1/(3sqrt3))+11

Where 11 is a Lucas number

Input:

$$\frac{2}{3}\left(1\sqrt{1}+2\sqrt{2}+3\sqrt{3}+(29+4)\sqrt{29+4}\right)-\frac{29+4}{4\pi}\left(\frac{1}{1\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)+11$$

Result:

$$11+\frac{2}{3}\left(1+2\sqrt{2}+3\sqrt{3}+33\sqrt{33}\right)-\frac{33\left(1+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}$$

Decimal approximation:

139.33687200594858044903649939794871031876862722988318417 02...

139.336872… result practically equal to the rest mass of Pion meson 139.57

Property:

$$11+\frac{2}{3}\left(1+2\sqrt{2}+3\sqrt{3}+33\sqrt{33}\right)-\frac{33\left(1+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}$$
is a transcendental number

Alternate forms:

$$\frac{-396-99\sqrt{2}-44\sqrt{3}+560\pi+64\sqrt{2}\pi+96\sqrt{3}\pi+1056\sqrt{33}\pi}{48\pi}$$

$$\frac{1}{3}\left(35+4\sqrt{2}+6\sqrt{3}+66\sqrt{33}\right)-\frac{11\left(36+9\sqrt{2}+4\sqrt{3}\right)}{48\pi}$$

$$\frac{35}{3}+\frac{4\sqrt{2}}{3}+2\sqrt{3}+22\sqrt{33}-\frac{33}{4\pi}-\frac{33}{8\sqrt{2}\pi}-\frac{11}{4\sqrt{3}\pi}$$

[2/3(1sqrt1+2sqrt2+3sqrt3+(29+4)*sqrt(29+4))-(29+4)/(4Pi)(1/(1sqrt1)+1/(2sqrt2)+1/(3sqrt3))]*18+123+18

Where 18, and 123 are Lucas numbers

Input:

$$\left(\frac{2}{3}\left(1\sqrt{1}+2\sqrt{2}+3\sqrt{3}+(29+4)\sqrt{29+4}\right)-\frac{29+4}{4\pi}\left(\frac{1}{1\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)\right)\times 18+123+18$$

Result:

$$141+18\left(\frac{2}{3}\left(1+2\sqrt{2}+3\sqrt{3}+33\sqrt{33}\right)-\frac{33\left(1+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}\right)$$

Decimal approximation:

2451.063696107074448082656989163076785737835290137897315063...

2451.063696… result very near to the rest mass of charmed Sigma baryon 2452.9

Property:

$$141+18\left(\frac{2}{3}\left(1+2\sqrt{2}+3\sqrt{3}+33\sqrt{33}\right)-\frac{33\left(1+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}\right)$$
is a transcendental number

Alternate forms:

$$\frac{3\left(-396-99\sqrt{2}-44\sqrt{3}+408\pi+64\sqrt{2}\pi+96\sqrt{3}\pi+1056\sqrt{33}\pi\right)}{8\pi}$$

$$3\left(51+8\sqrt{2}+12\sqrt{3}+132\sqrt{33}\right)-\frac{33\left(36+9\sqrt{2}+4\sqrt{3}\right)}{8\pi}$$

$$153+24\sqrt{2}+36\sqrt{3}+396\sqrt{33}-\frac{297}{2\pi}-\frac{297}{4\sqrt{2}\pi}-\frac{33\sqrt{3}}{2\pi}$$

[2/3(1sqrt1+2sqrt2+3sqrt3+(29+4)*sqrt(29+4))-(29+4)/(4Pi)(1/(1sqrt1)+1/(2sqrt2)+1/(3sqrt3))]*18-521-7

Where 521 and 7 are Lucas numbers

Input:

$$\left(\frac{2}{3}\left(1\sqrt{1}+2\sqrt{2}+3\sqrt{3}+(29+4)\sqrt{29+4}\right)-\frac{29+4}{4\pi}\left(\frac{1}{1\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)\right)\times 18-521-7$$

Result:

$$18\left(\frac{2}{3}\left(1+2\sqrt{2}+3\sqrt{3}+33\sqrt{33}\right)-\frac{33\left(1+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}\right)-528$$

Decimal approximation:

1782.063696107074448082656989163076785737835290137897315063...

1782.063696… result in the range of the hypothetical mass of Gluino (gluino = 1785.16 GeV).

Property:

$$-528+18\left(\frac{2}{3}\left(1+2\sqrt{2}+3\sqrt{3}+33\sqrt{33}\right)-\frac{33\left(1+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}\right)$$

is a transcendental number

Alternate forms:

$$\frac{3\left(-396-99\sqrt{2}-44\sqrt{3}-1376\pi+64\sqrt{2}\pi+96\sqrt{3}\pi+1056\sqrt{33}\pi\right)}{8\pi}$$

$$12\left(-43+2\sqrt{2}+3\sqrt{3}+33\sqrt{33}\right)-\frac{33\left(36+9\sqrt{2}+4\sqrt{3}\right)}{8\pi}$$

$$-516+24\sqrt{2}+36\sqrt{3}+396\sqrt{33}-\frac{297}{2\pi}-\frac{297}{4\sqrt{2}\pi}-\frac{33\sqrt{3}}{2\pi}$$

[2/3(1sqrt1+2sqrt2+3sqrt3+(29+4)*sqrt(29+4))-(29+4)/(4Pi)(1/(1sqrt1)+1/(2sqrt2)+1/(3sqrt3))]*18-(521+47+11+2)

Where 521, 47, 11 and 2 are Lucas numbers

Input:

$$\left(\frac{2}{3}\left(1\sqrt{1}+2\sqrt{2}+3\sqrt{3}+(29+4)\sqrt{29+4}\right)-\frac{29+4}{4\pi}\left(\frac{1}{1\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)\right)\times 18-(521+47+11+2)$$

Result:

$$18\left(\frac{2}{3}\left(1+2\sqrt{2}+3\sqrt{3}+33\sqrt{33}\right)-\frac{33\left(1+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}\right)-581$$

Decimal approximation:

1729.0636961070744480826569891630767857378352901378973150630...

1729.063696…

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

Property:

$$-581+18\left(\frac{2}{3}\left(1+2\sqrt{2}+3\sqrt{3}+33\sqrt{33}\right)-\frac{33\left(1+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}\right)$$

is a transcendental number

Alternate forms:

$$\frac{-1188-297\sqrt{2}-132\sqrt{3}-4552\pi+192\sqrt{2}\pi+288\sqrt{3}\pi+3168\sqrt{33}\pi}{8\pi}$$

$$-569+24\sqrt{2}+36\sqrt{3}+396\sqrt{33}-\frac{33\left(36+9\sqrt{2}+4\sqrt{3}\right)}{8\pi}$$

$$-569+24\sqrt{2}+36\sqrt{3}+396\sqrt{33}-\frac{297}{2\pi}-\frac{297}{4\sqrt{2}\pi}-\frac{33\sqrt{3}}{2\pi}$$

Or:

Input:

$$\left(\frac{2}{3}\left(1\sqrt{1}+2\sqrt{2}+3\sqrt{3}+(29+4)\sqrt{29+4}\right)-\frac{29+4}{4\pi}\left(\frac{1}{1\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)\right)(21-3)-\left((21+3)^2+5\right)$$

Where 3, 5 and 21 are Fibonacci numbers

Result:

$$18\left(\frac{2}{3}\left(1+2\sqrt{2}+3\sqrt{3}+33\sqrt{33}\right)-\frac{33\left(1+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}\right)-581$$

Decimal approximation:

1729.063696107074448082656989163076785737835290137897315063...

1729.063696... as above

1/[2/3(1sqrt1+2sqrt2+3sqrt3+5*sqrt5)-5/(4Pi)(1/(1sqrt1)+1/(2sqrt2)+1/(3sqrt3))]^1/512

Input:

$$\frac{1}{\sqrt[512]{\frac{2}{3}\left(1\sqrt{1}+2\sqrt{2}+3\sqrt{3}+5\sqrt{5}\right)-\frac{5}{4\pi}\left(\frac{1}{1\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}}$$

Exact result:

$$\frac{1}{\sqrt[512]{\frac{2}{3}\left(1+2\sqrt{2}+3\sqrt{3}+5\sqrt{5}\right)-\frac{5\left(1+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}}}$$

Decimal approximation:

0.995024687328205147621459128813662019348119101347050667697...

0.995024687328… result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Property:

$$\frac{1}{\sqrt[512]{\frac{2}{3}\left(1+2\sqrt{2}+3\sqrt{3}+5\sqrt{5}\right)-\frac{5\left(1+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}}}$$ is a transcendental number

Alternate forms:

$$\frac{1}{\sqrt[512]{\frac{2}{3}\left(1+2\sqrt{2}+3\sqrt{3}+5\sqrt{5}\right)-\frac{5\left(36+9\sqrt{2}+4\sqrt{3}\right)}{144\pi}}}$$

$$\sqrt[128]{2}\ \sqrt[256]{3}\ \sqrt[512]{\frac{\pi}{-180-45\sqrt{2}-20\sqrt{3}+96\pi+192\sqrt{2}\,\pi+288\sqrt{3}\,\pi+480\sqrt{5}\,\pi}}$$

$$\frac{1}{\sqrt[512]{\frac{1}{6}\left(4+\sqrt{2\left(1280+240\sqrt{15}+3\sqrt{\frac{311296}{9}+20480\sqrt{\frac{5}{3}}}\right)}\right)+\frac{5\left(-6-\sqrt{\frac{1}{6}\left(35+12\sqrt{6}\right)}\right)}{24\pi}}}$$

1/32*log base 0.9950246873282((1/[2/3(1sqrt1+2sqrt2+3sqrt3+5*sqrt5)-5/(4Pi)(1/(1sqrt1)+1/(2sqrt2)+1/(3sqrt3))]))+1/golden ratio

Input interpretation:

$$\frac{1}{32}\log_{0.9950246873282}\left(\frac{1}{\frac{2}{3}\left(1\sqrt{1}+2\sqrt{2}+3\sqrt{3}+5\sqrt{5}\right)-\frac{5}{4\pi}\left(\frac{1}{1\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}\right)+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

16.618033989...

16.618033989… result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternative representation:

$$\frac{1}{32}\log_{0.99502468732820000}\left(\frac{1}{\frac{2}{3}\left(1\sqrt{1}+2\sqrt{2}+3\sqrt{3}+5\sqrt{5}\right)-\frac{5\left(\frac{1}{1\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}}\right)+\frac{1}{\phi}=\frac{1}{\phi}+\frac{\log\left(\frac{1}{-\frac{5\left(\frac{1}{\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}+\frac{2}{3}\left(\sqrt{1}+2\sqrt{2}+3\sqrt{3}+5\sqrt{5}\right)}\right)}{32\log(0.99502468732820000)}$$

Series representations:

$$\frac{1}{32}\log_{0.99502468732820000}\left(\frac{1}{\frac{2}{3}\left(1\sqrt{1}+2\sqrt{2}+3\sqrt{3}+5\sqrt{5}\right)-\frac{5\left(\frac{1}{1\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}}\right)+\frac{1}{\phi}=\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1}{-\frac{5\left(\frac{1}{\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}+\frac{2}{3}\left(\sqrt{1}+2\sqrt{2}+3\sqrt{3}+5\sqrt{5}\right)}\right)^k}{k}}{32\log(0.99502468732820000)}$$

$$\frac{1}{32}\log_{0.99502468732820000}\left(\frac{1}{\frac{2}{3}\left(1\sqrt{1}+2\sqrt{2}+3\sqrt{3}+5\sqrt{5}\right)-\frac{5\left(\frac{1}{1\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}}\right)+\frac{1}{\phi}=\frac{1.00000000000000}{\phi}+\log\left(\frac{1}{-\frac{5\left(\frac{1}{\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}+\frac{2}{3}\left(\sqrt{1}+2\sqrt{2}+3\sqrt{3}+5\sqrt{5}\right)}\right)\left(-6.2653872823284-0.031250000000000\sum_{k=0}^{\infty}(-0.00497531267180000)^k\,G(k)\right)$$

$$\text{for}\left(G(0)=0\text{ and }\frac{(-1)^k\,k}{2(1+k)(2+k)}+G(k)=\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

$$\frac{1}{32}\log_{0.99502468732820000}\left(\frac{1}{\frac{2}{3}\left(1\sqrt{1}+2\sqrt{2}+3\sqrt{3}+5\sqrt{5}\right)-\frac{5\left(\frac{1}{1\sqrt{1}}+\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}\right)}{4\pi}}\right)+$$

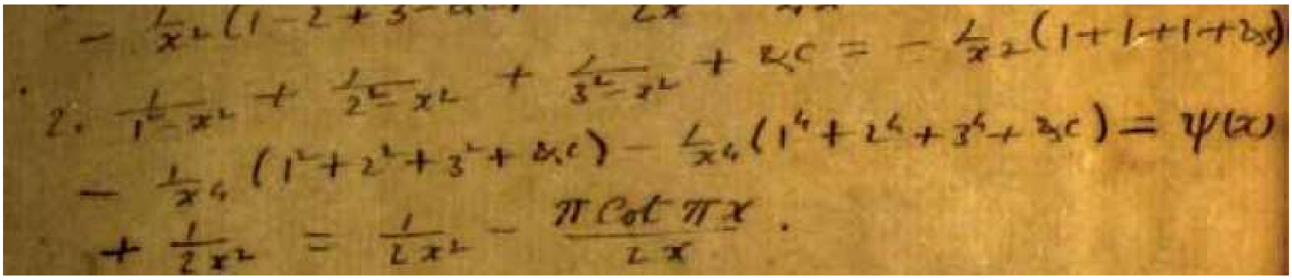
$$\frac{1}{\phi}=\frac{1.00000000000000}{\phi}+$$

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

$$\left(-6.2653872823284-0.031250000000000\sum_{k=0}^{\infty}(-0.00497531267180000)^k\,G(k)\right)$$

$$\text{for}\left(G(0)=0\text{ and }G(k)=\frac{(-1)^{1+k}\,k}{2(1+k)(2+k)}+\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

Page 76


$$-\frac{1}{x^2}(1-2+3-\ldots$$
$$+\&c=-\frac{1}{x^2}(1+1+1+\&c)$$
$$2.\ \frac{1}{1^2x^2}+\frac{1}{2^2x^2}+\frac{1}{3^2x^2}+\&c$$
$$-\frac{1}{x^4}(1^2+2^2+3^2+\&c)-\frac{1}{x^6}(1^4+2^4+3^4+\&c)=\psi(x)$$
$$+\frac{1}{2x^2}=\frac{1}{2x^2}-\frac{\pi\cot\pi x}{2x}.$$

For x = 2, we obtain:

1/(2*2^2) – (Pi*cot 2Pi)/(2*2)

Input:

$$\frac{1}{2\times2^2}-\frac{\pi\cot(2)\pi}{2\times2}$$

cot(x) is the cotangent function

Exact result:

$$\frac{1}{8}-\frac{1}{4}\pi^2\cot(2)$$

Decimal approximation:

1.2542247531765171901210475787609513140366453053500981368 28...

1.2542247531765….

Alternate forms:

$$\frac{1}{8}\left(1-2\pi^2\cot(2)\right)$$

$$\frac{1}{8}-\frac{\pi^2\cos(2)}{4\sin(2)}$$

$$\frac{1}{8}+\frac{\pi^2\sin(4)}{4(\cos(4)-1)}$$

Alternative representations:

$$\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}=\frac{1}{8}-\frac{\pi^2}{4\tan(2)}$$

$$\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}=\frac{1}{4}\,i\,\pi^2\coth(-2\,i)+\frac{1}{8}$$

$$\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}=-\frac{1}{4}\,i\left(\pi^2\coth(2\,i)\right)+\frac{1}{8}$$

Series representations:

$$\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}=\frac{1}{8}-\frac{1}{2}\pi^2\sum_{k=-\infty}^{\infty}\frac{1}{4-k^2\pi^2}$$

$$\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}=\frac{1}{8}+\frac{1}{4}\,i\,\pi^2\sum_{k=-\infty}^{\infty}e^{4ik}\operatorname{sgn}(k)$$

$$\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}=\frac{1}{8}-\frac{\pi^2}{8}-\pi^2\sum_{k=1}^{\infty}\frac{1}{4-k^2\pi^2}$$

Integral representation:

$$\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}=\frac{1}{8}+\frac{\pi^2}{4}\int_{\frac{\pi}{2}}^{2}\csc^2(t)\,dt$$

0.5(((1/(2*2^2) – (Pi*cot 2Pi)/(2*2))))

Input:

$$0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)$$

cot(x) is the cotangent function

Result:

0.627112376588258595060523789380475657018322652675049068414...

0.62711237658…

Alternative representations:

$$0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)=0.5\left(\frac{1}{8}-\frac{\pi^2}{4\tan(2)}\right)$$

$$0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)=0.5\left(\frac{1}{4}\,i\,\pi^2\coth(-2\,i)+\frac{1}{8}\right)$$

$$0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)=0.5\left(-\frac{1}{4}\,i\left(\pi^2\coth(2\,i)\right)+\frac{1}{8}\right)$$

Series representations:

$$0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)=0.0625-0.25\,\pi^2\sum_{k=-\infty}^{\infty}\frac{1}{4-k^2\pi^2}$$

$$0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)=0.0625+0.125\,i\,\pi^2\sum_{k=-\infty}^{\infty}e^{4ik}\operatorname{sgn}(k)$$

$$0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)=0.0625+0.125\,i\,\pi^2+0.25\,i\,\pi^2\sum_{k=1}^{\infty}q^{2k}\quad\text{for } q=e^{2i}$$

Integral representation:

$$0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)=0.0625+0.125\,\pi^2\int_{\frac{\pi}{2}}^{2}\csc^2(t)\,dt$$

(((((0.5(((1/(2*2^2) – (Pi*cot 2Pi)/(2*2))))))))))^1/64

Input:

$$\sqrt[64]{0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)}$$

cot(x) is the cotangent function

Result:

0.99273543...

0.99273543... 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 $\mathbf{0.989117352243}=\boldsymbol{\phi}$

2*log base 0.99273543 (((((0.5(((1/(2*2^2) – (Pi*cot 2Pi)/(2*2))))))))))-Pi+1/golden ratio

Input interpretation:

$$2\log_{0.99273543}\left(0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)\right)-\pi+\frac{1}{\phi}$$

Result:

125.476...

125.476… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Alternative representations:

$$2\log_{0.992735}\left(0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)\right)-\pi+\frac{1}{\phi}=$$
$$-\pi+2\log_{0.992735}\left(0.5\left(\frac{1}{8}-\frac{\pi^2}{4\tan(2)}\right)\right)+\frac{1}{\phi}$$

$$2\log_{0.992735}\left(0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)\right)-\pi+\frac{1}{\phi}=$$
$$-\pi+2\log_{0.992735}\left(0.5\left(\frac{1}{4}i\pi^2\coth(-2i)+\frac{1}{8}\right)\right)+\frac{1}{\phi}$$

$$2\log_{0.992735}\left(0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)\right)-\pi+\frac{1}{\phi}=$$
$$-\pi+2\log_{0.992735}\left(0.5\left(-\frac{1}{4}i\left(\pi^2\coth(2i)\right)+\frac{1}{8}\right)\right)+\frac{1}{\phi}$$

Series representations:

$$2\log_{0.992735}\left(0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+2\log_{0.992735}\left(0.0625-0.25\pi^2\sum_{k=-\infty}^{\infty}\frac{1}{4-k^2\pi^2}\right)$$

$$2\log_{0.992735}\left(0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+2\log_{0.992735}\left(0.0625+0.125i\pi^2\sum_{k=-\infty}^{\infty}e^{4ik}\operatorname{sgn}(k)\right)$$

$$2\log_{0.992735}\left(0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+2\log_{0.992735}\left(0.0625+0.125i\pi^2+0.25i\pi^2\sum_{k=1}^{\infty}q^{2k}\right)\text{ for }q=e^{2i}$$

Integral representation:

$$2\log_{0.992735}\left(0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+2\log_{0.992735}\left(0.0625+0.125\pi^2\int_{\frac{\pi}{2}}^{2}\csc^2(t)\,dt\right)$$

1/4 log base 0.99273543 (((((0.5(((1/(2*2^2) – (Pi*cot 2Pi)/(2*2))))))))))+1/golden ratio

Input interpretation:

$$\frac{1}{4}\log_{0.99273543}\left(0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)\right)+\frac{1}{\phi}$$

Result:

16.6180...

16.6180… result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternative representations:

$$\frac{1}{4}\log_{0.992735}\left(0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)\right)+\frac{1}{\phi}=\frac{1}{4}\log_{0.992735}\left(0.5\left(\frac{1}{8}-\frac{\pi^2}{4\tan(2)}\right)\right)+\frac{1}{\phi}$$

$$\frac{1}{4}\log_{0.992735}\left(0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)\right)+\frac{1}{\phi}=\frac{1}{4}\log_{0.992735}\left(0.5\left(\frac{1}{4}i\pi^2\coth(-2i)+\frac{1}{8}\right)\right)+\frac{1}{\phi}$$

$$\frac{1}{4}\log_{0.992735}\left(0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)\right)+\frac{1}{\phi}=\frac{1}{4}\log_{0.992735}\left(0.5\left(-\frac{1}{4}i\left(\pi^2\coth(2i)\right)+\frac{1}{8}\right)\right)+\frac{1}{\phi}$$

Series representations:

$$\frac{1}{4}\log_{0.992735}\left(0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)\right)+\frac{1}{\phi}=\frac{1}{\phi}+\frac{1}{4}\log_{0.992735}\left(0.0625-0.25\pi^2\sum_{k=-\infty}^{\infty}\frac{1}{4-k^2\pi^2}\right)$$

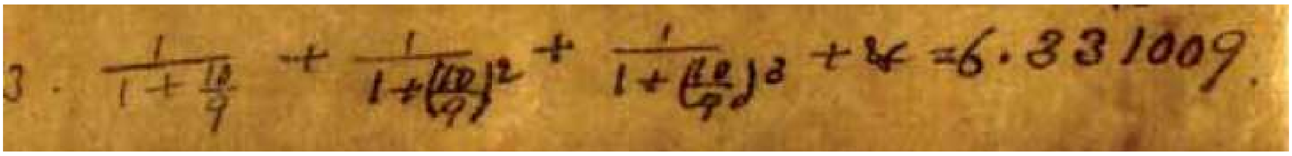
$$\frac{1}{4}\log_{0.992735}\left(0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)\right)+\frac{1}{\phi}=\frac{1}{\phi}+\frac{1}{4}\log_{0.992735}\left(0.0625+0.125i\pi^2\sum_{k=-\infty}^{\infty}e^{4ik}\operatorname{sgn}(k)\right)$$

$$\frac{1}{4}\log_{0.992735}\left(0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)\right)+\frac{1}{\phi}=$$
$$\frac{1}{\phi}+\frac{1}{4}\log_{0.992735}\left(0.0625+0.125\,i\,\pi^2+0.25\,i\,\pi^2\sum_{k=1}^{\infty}q^{2k}\right)\ \text{for } q=e^{2i}$$

Integral representation:

$$\frac{1}{4}\log_{0.992735}\left(0.5\left(\frac{1}{2\times 2^2}-\frac{\pi\cot(2)\pi}{2\times 2}\right)\right)+\frac{1}{\phi}=$$
$$\frac{1}{\phi}+\frac{1}{4}\log_{0.992735}\left(0.0625+0.125\,\pi^2\int_{\frac{\pi}{2}}^{2}\csc^2(t)\,dt\right)$$

Page 77



3*(((1/(1+10/9)+1/(1+(10/9)^2) + 1/(1+(10/9)^3) + 1/(1+(10/9)^4)+1/(1+(10/9)^5))))

Input:

$$3\left(\frac{1}{1+\frac{10}{9}}+\frac{1}{1+\left(\frac{10}{9}\right)^2}+\frac{1}{1+\left(\frac{10}{9}\right)^3}+\frac{1}{1+\left(\frac{10}{9}\right)^4}+\frac{1}{1+\left(\frac{10}{9}\right)^5}\right)$$

Exact result:

$$\frac{274660021421055}{43384786764319}$$

Decimal approximation:

6.330791088431577974847329057763804618029615684913650820416...

6.33079108843...

((5/((21-2))))* 3*(((1/(1+10/9)+1/(1+(10/9)^2) + 1/(1+(10/9)^3) + 1/(1+(10/9)^4)+1/(1+(10/9)^5))))+7/10^3

Where 7 is a Lucas number

Input:

$$\frac{5}{21-2}\times 3\left(\frac{1}{1+\frac{10}{9}}+\frac{1}{1+\left(\frac{10}{9}\right)^2}+\frac{1}{1+\left(\frac{10}{9}\right)^3}+\frac{1}{1+\left(\frac{10}{9}\right)^4}+\frac{1}{1+\left(\frac{10}{9}\right)^5}\right)+\frac{7}{10^3}$$

Exact result:

$$\frac{1379070283744929427}{824310948522061000}$$

Decimal approximation:

1.672997654850415256538770804674685425797267285503592321162...

1.672997654... result very near to the proton mass

1/ [3(((1/(1+10/9)+1/(1+(10/9)^2) + 1/(1+(10/9)^3) + 1/(1+(10/9)^4)+1/(1+(10/9)^5))))]^1/256

Input:

$$\frac{1}{\sqrt[256]{3\left(\frac{1}{1+\frac{10}{9}}+\frac{1}{1+\left(\frac{10}{9}\right)^2}+\frac{1}{1+\left(\frac{10}{9}\right)^3}+\frac{1}{1+\left(\frac{10}{9}\right)^4}+\frac{1}{1+\left(\frac{10}{9}\right)^5}\right)}}$$

Result:

$$\frac{\sqrt[256]{\frac{43384786764319}{10172593385965}}}{3^{3/256}}$$

Decimal approximation:

0.992817228101858669753657924300494131952884012295137331033...

0.992817228101… result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value **$0.989117352243 = \phi$**

Alternate form:

$$\frac{\sqrt[256]{43384786764319}\ 3^{253/256} \times 10172593385965^{255/256}}{30517780157895}$$

1/2*log base 0.9928172281(((1/ [3(((1/(1+10/9)+1/(1+(10/9)^2) + 1/(1+(10/9)^3) + 1/(1+(10/9)^4)+1/(1+(10/9)^5))))]))))-Pi+1/golden ratio

Input interpretation:

$$\frac{1}{2}\log_{0.9928172281}\left(\frac{1}{3\left(\frac{1}{1+\frac{10}{9}}+\frac{1}{1+\left(\frac{10}{9}\right)^2}+\frac{1}{1+\left(\frac{10}{9}\right)^3}+\frac{1}{1+\left(\frac{10}{9}\right)^4}+\frac{1}{1+\left(\frac{10}{9}\right)^5}\right)}\right)-\pi+\frac{1}{\phi}$$

Result:

125.4764413019181575498316994162801404138567605155344181607...

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

Alternative representation:

$$\frac{1}{2}\log_{0.992817}\left(\frac{1}{3\left(\frac{1}{1+\frac{10}{9}}+\frac{1}{1+\left(\frac{10}{9}\right)^2}+\frac{1}{1+\left(\frac{10}{9}\right)^3}+\frac{1}{1+\left(\frac{10}{9}\right)^4}+\frac{1}{1+\left(\frac{10}{9}\right)^5}\right)}\right)-\pi+\frac{1}{\phi}=$$

$$-\pi+\frac{1}{\phi}+\frac{\log\left(\frac{1}{3\left(\frac{1}{1+\frac{10}{9}}+\frac{1}{1+\left(\frac{10}{9}\right)^2}+\frac{1}{1+\left(\frac{10}{9}\right)^3}+\frac{1}{1+\left(\frac{10}{9}\right)^4}+\frac{1}{1+\left(\frac{10}{9}\right)^5}\right)}\right)}{2\log(0.992817)}$$

Series representations:

$$\frac{1}{2}\log_{0.992817}\left(\frac{1}{3\left(\frac{1}{1+\frac{10}{9}}+\frac{1}{1+\left(\frac{10}{9}\right)^2}+\frac{1}{1+\left(\frac{10}{9}\right)^3}+\frac{1}{1+\left(\frac{10}{9}\right)^4}+\frac{1}{1+\left(\frac{10}{9}\right)^5}\right)}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-\frac{231275234656736}{274660021421055}\right)^k}{k}}{2\log(0.992817)}$$

$$\frac{1}{2}\log_{0.992817}\left(\frac{1}{3\left(\frac{1}{1+\frac{10}{9}}+\frac{1}{1+\left(\frac{10}{9}\right)^2}+\frac{1}{1+\left(\frac{10}{9}\right)^3}+\frac{1}{1+\left(\frac{10}{9}\right)^4}+\frac{1}{1+\left(\frac{10}{9}\right)^5}\right)}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi-69.361\log\left(\frac{43384786764319}{274660021421055}\right)-\frac{1}{2}\log\left(\frac{43384786764319}{274660021421055}\right)\sum_{k=0}^{\infty}(-0.00718277)^k\,G(k)$$

$$\text{for }\left(G(0)=0\text{ and }G(k)=\frac{(-1)^{1+k}\,k}{2(1+k)(2+k)}+\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

1/16*log base 0.9928172281(((1/ [3(((1/(1+10/9)+1/(1+(10/9)^2) + 1/(1+(10/9)^3) + 1/(1+(10/9)^4)+1/(1+(10/9)^5))))])))+1/golden ratio

Input interpretation:

$$\frac{1}{16}\log_{0.9928172281}\left(\frac{1}{3\left(\frac{1}{1+\frac{10}{9}}+\frac{1}{1+\left(\frac{10}{9}\right)^2}+\frac{1}{1+\left(\frac{10}{9}\right)^3}+\frac{1}{1+\left(\frac{10}{9}\right)^4}+\frac{1}{1+\left(\frac{10}{9}\right)^5}\right)}\right)+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

16.618034...

16.618034… result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternative representation:

$$\frac{1}{16}\log_{0.992817}\left(\frac{1}{3\left(\frac{1}{1+\frac{10}{9}}+\frac{1}{1+\left(\frac{10}{9}\right)^2}+\frac{1}{1+\left(\frac{10}{9}\right)^3}+\frac{1}{1+\left(\frac{10}{9}\right)^4}+\frac{1}{1+\left(\frac{10}{9}\right)^5}\right)}\right)+\frac{1}{\phi}=$$

$$\frac{1}{\phi}+\frac{\log\left(\frac{1}{3\left(\frac{1}{1+\frac{10}{9}}+\frac{1}{1+\left(\frac{10}{9}\right)^2}+\frac{1}{1+\left(\frac{10}{9}\right)^3}+\frac{1}{1+\left(\frac{10}{9}\right)^4}+\frac{1}{1+\left(\frac{10}{9}\right)^5}\right)}\right)}{16\log(0.992817)}$$

Series representations:

$$\frac{1}{16}\log_{0.992817}\left(\frac{1}{3\left(\frac{1}{1+\frac{10}{9}}+\frac{1}{1+\left(\frac{10}{9}\right)^2}+\frac{1}{1+\left(\frac{10}{9}\right)^3}+\frac{1}{1+\left(\frac{10}{9}\right)^4}+\frac{1}{1+\left(\frac{10}{9}\right)^5}\right)}\right)+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-\frac{231\,275\,234\,656\,736}{274\,660\,021\,421\,055}\right)^k}{k}}{16\log(0.992817)}$$

$$\frac{1}{16}\log_{0.992817}\left(\frac{1}{3\left(\frac{1}{1+\frac{10}{9}}+\frac{1}{1+\left(\frac{10}{9}\right)^2}+\frac{1}{1+\left(\frac{10}{9}\right)^3}+\frac{1}{1+\left(\frac{10}{9}\right)^4}+\frac{1}{1+\left(\frac{10}{9}\right)^5}\right)}\right)+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-8.67013\log\left(\frac{43\,384\,786\,764\,319}{274\,660\,021\,421\,055}\right)-0.0625\log\left(\frac{43\,384\,786\,764\,319}{274\,660\,021\,421\,055}\right)\sum_{k=0}^{\infty}(-0.00718277)^k\,G(k)$$

$$\text{for}\left(G(0)=0\text{ and }G(k)=\frac{(-1)^{1+k}\,k}{2\,(1+k)\,(2+k)}+\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

Or, precisely:

1/(1+10/9)+1/(1+(10/9)^2) + 1/(1+(10/9)^3) +...

Input interpretation:

$$\frac{1}{1+\frac{10}{9}}+\frac{1}{1+\left(\frac{10}{9}\right)^2}+\frac{1}{1+\left(\frac{10}{9}\right)^3}+\cdots$$

Infinite sum:

$$\sum_{n=1}^{\infty}\frac{1}{\left(\frac{10}{9}\right)^n+1}=\frac{i\,\mathrm{Im}\left(\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log\left(\frac{10}{9}\right)}+\frac{\mathrm{Re}\left(\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log\left(\frac{10}{9}\right)}-\frac{\log(10)}{\log\left(\frac{10}{9}\right)}$$

Decimal approximation:

6.331008692864745537718386879838180649341260412564743295777...

6.33100869286… = 2πr, with r = 1.0076113282271...

Note that from 1/r, we obtain:

1/1.0076113282271832

Input interpretation:

$$\frac{1}{1.0076113282271832}$$

Result:

0.992446166479117733848602881177141829359184370297518673158...

0.992446166… result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

this result could mean that the dilaton, obtained by inverting the formula of a circumference of radius 1.0076113282271 ..., is a string having the perimeter of an ellipse

Possible closed forms:

$$\frac{35\,120\,413\,\pi}{111\,173\,820} \approx 0.99244616647911775559583650 80$$

$$\frac{1}{8}\,\pi\tan^2\left(\frac{335\,710}{332\,617}\right) \approx 0.992446166479117919504391902$$

$$\frac{1}{52}\left(10\,e^{\pi} + 10\,\pi + 235\log(\pi) - 150\log(2\,\pi) - 162\tan^{-1}(\pi)\right) \approx$$
$$0.992446166479118232952762 05$$

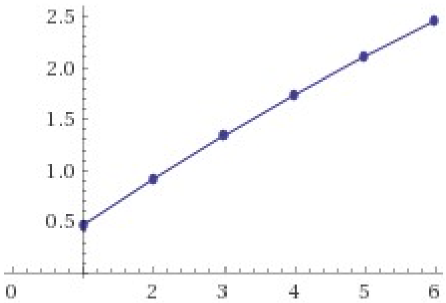
Convergence tests:

By the ratio test, the series converges.

Partial sum formula:

$$\sum_{n=1}^{m}\frac{1}{1+\left(\frac{10}{9}\right)^n} = \frac{\psi^{(0)}_{\frac{9}{10}}\left(-\frac{i\,\pi-\log\left(\frac{10}{9}\right)}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)} - \frac{\psi^{(0)}_{\frac{9}{10}}\left(-\frac{i\,\pi-(m+1)\log\left(\frac{10}{9}\right)}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)}$$

Partial sums:



Alternate forms:

$$-\frac{\log(10) - \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\,\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)}$$

$$-\frac{\log(10)}{\log\left(\frac{10}{9}\right)} + \frac{\psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\,\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)}$$

$$\frac{-\log(10)+\psi_{\frac{9}{10}}^{(0)}\left(\frac{-i\pi-2\log(3)+\log(10)}{-2\log(3)+\log(10)}\right)}{\log(10)-2\log(3)}$$

Series representations:

$$\frac{i\,\mathrm{Im}\left(\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log\left(\frac{10}{9}\right)}-\frac{\log(10)}{\log\left(\frac{10}{9}\right)}+\frac{\mathrm{Re}\left(\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log\left(\frac{10}{9}\right)}=$$

$$-\left(\left(2\pi\left\lfloor\frac{\arg(10-x)}{2\pi}\right\rfloor-\mathrm{Im}\left(\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{2i\pi\left\lfloor\frac{\arg\left(\frac{10}{9}-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-x\right)^k x^{-k}}{k}}\right)\right)-\right.\right.$$

$$i\log(x)+i\,\mathrm{Re}\left(\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{2i\pi\left\lfloor\frac{\arg\left(\frac{10}{9}-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-x\right)^k x^{-k}}{k}}\right)\right)+$$

$$\left.i\sum_{k=1}^{\infty}\frac{(-1)^k(10-x)^k x^{-k}}{k}\right)\Bigg/$$

$$\left.\left(2\pi\left\lfloor\frac{\arg\left(\frac{10}{9}-x\right)}{2\pi}\right\rfloor-i\log(x)+i\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-x\right)^k x^{-k}}{k}\right)\right)\quad\text{for } x<0$$

$$\frac{i\,\mathrm{Im}\left(\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log\left(\frac{10}{9}\right)}-\frac{\log(10)}{\log\left(\frac{10}{9}\right)}+\frac{\mathrm{Re}\left(\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log\left(\frac{10}{9}\right)}=$$

$$-\left(\left(2\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor-\mathrm{Im}\left(\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}\right)\right)-i\log(z_0)+\right.\right.$$

$$i\,\mathrm{Re}\left(\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}\right)\right)+$$

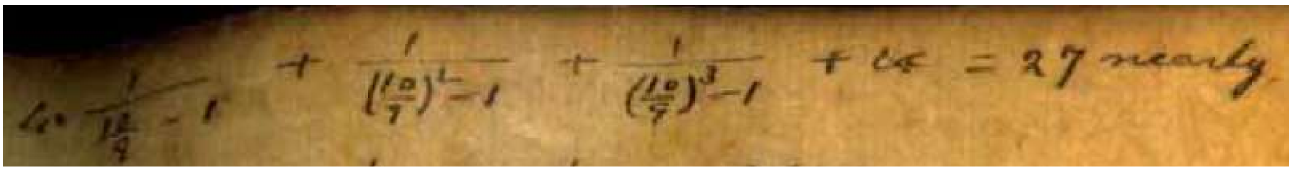
$$\left.i\sum_{k=1}^{\infty}\frac{(-1)^k\,(10-z_0)^k\,z_0^{-k}}{k}\right)\Bigg/$$

$$\left.\left(2\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor-i\log(z_0)+i\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}\right)\right)$$

$$\frac{i\,\mathrm{Im}\left(\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log\left(\frac{10}{9}\right)} - \frac{\log(10)}{\log\left(\frac{10}{9}\right)} + \frac{\mathrm{Re}\left(\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log\left(\frac{10}{9}\right)} =$$

$$\left(i\,\mathrm{Im}\left(\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log(z_0)+\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}\right)\right) - \left\lfloor\frac{\arg(10-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right) - \log(z_0) - \left\lfloor\frac{\arg(10-z_0)}{2\pi}\right\rfloor\log(z_0) + \mathrm{Re}\left(\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log(z_0)+\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}\right)\right) + \sum_{k=1}^{\infty}\frac{(-1)^k(10-z_0)^k z_0^{-k}}{k}\right) \Big/ \left(\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\log(z_0)+\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}\right)$$

Page 78



((((1/((10/9)^1-1) + 1/((10/9)^2-1) + 1/((10/9)^3-1) +...))))

Input interpretation:

$$\frac{1}{\left(\frac{10}{9}\right)^1-1} + \frac{1}{\left(\frac{10}{9}\right)^2-1} + \frac{1}{\left(\frac{10}{9}\right)^3-1} + \cdots$$

Infinite sum:

$$\sum_{n=1}^{\infty} \frac{1}{\left(\frac{10}{9}\right)^n - 1} = \frac{\log(10) - \psi_{\frac{9}{10}}^{(0)}(1)}{\log\left(\frac{10}{9}\right)}$$

log(x) is the natural logarithm

$\psi_q(z)$ gives the q-digamma function

Decimal approximation:

27.08648503406816780327872576570091022140786017495536508019...

27.08648503… note that the square of result is:

733.6776712804141009 ≈ 729 = 9^3 (Ramanujan cube $9^3 – 1$)

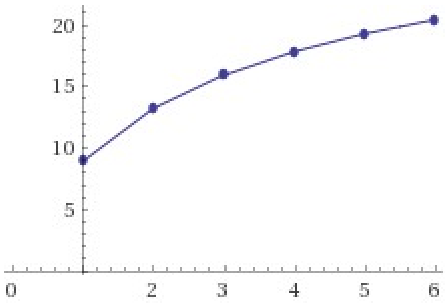
Convergence tests:

By the ratio test, the series converges.

Partial sum formula:

$$\sum_{n=1}^{m} \frac{1}{-1 + \left(\frac{10}{9}\right)^n} = \frac{\psi_{\frac{9}{10}}^{(0)}(m+1)}{\log\left(\frac{10}{9}\right)} - \frac{\psi_{\frac{9}{10}}^{(0)}(1)}{\log\left(\frac{10}{9}\right)}$$

Partial sums:



Alternate forms:

$$-\frac{\psi_{\frac{9}{10}}^{(0)}(1) - \log(10)}{\log(10) - 2\log(3)}$$

$$\frac{\log(10)}{\log\left(\frac{10}{9}\right)} - \frac{\psi_{\frac{9}{10}}^{(0)}(1)}{\log\left(\frac{10}{9}\right)}$$

$$-\frac{\psi_{\frac{9}{10}}^{(0)}(1)}{\log(2) - 2\log(3) + \log(5)} + \frac{\log(2)}{\log(2) - 2\log(3) + \log(5)} + \frac{\log(5)}{\log(2) - 2\log(3) + \log(5)}$$

Series representations:

$$\frac{\log(10)-\psi^{(0)}_{\frac{9}{10}}(1)}{\log\left(\frac{10}{9}\right)} = \frac{2\pi\left\lfloor\frac{\arg(10-x)}{2\pi}\right\rfloor - i\log(x) + i\,\psi^{(0)}_{\frac{9}{10}}(1) + i\sum_{k=1}^{\infty}\frac{(-1)^k(10-x)^k x^{-k}}{k}}{2\pi\left\lfloor\frac{\arg\left(\frac{10}{9}-x\right)}{2\pi}\right\rfloor - i\log(x) + i\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-x\right)^k x^{-k}}{k}} \quad \text{for } x<0$$

$$\frac{\log(10)-\psi^{(0)}_{\frac{9}{10}}(1)}{\log\left(\frac{10}{9}\right)} = \frac{2\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor - i\log(z_0) + i\,\psi^{(0)}_{\frac{9}{10}}(1) + i\sum_{k=1}^{\infty}\frac{(-1)^k(10-z_0)^k z_0^{-k}}{k}}{2\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor - i\log(z_0) + i\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}$$

$$\frac{\log(10)-\psi^{(0)}_{\frac{9}{10}}(1)}{\log\left(\frac{10}{9}\right)} = \frac{\left\lfloor\frac{\arg(10-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor\frac{\arg(10-z_0)}{2\pi}\right\rfloor\log(z_0) - \psi^{(0)}_{\frac{9}{10}}(1) - \sum_{k=1}^{\infty}\frac{(-1)^k(10-z_0)^k z_0^{-k}}{k}}{\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\log(z_0) - \sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}$$

And:

((((1/((10/9)^1-1) + 1/((10/9)^2-1) + 1/((10/9)^3-1) +...))))^2+10^3

Input interpretation:

$$\left(\frac{1}{\left(\frac{10}{9}\right)^1-1}+\frac{1}{\left(\frac{10}{9}\right)^2-1}+\frac{1}{\left(\frac{10}{9}\right)^3-1}+\cdots\right)^2+10^3$$

Result:

$$\frac{\left(\log(10)-\psi^{(0)}_{\frac{9}{10}}(1)\right)^2}{\log^2\left(\frac{10}{9}\right)}+1000$$

$\log(x)$ is the natural logarithm

$\psi_q(z)$ gives the q-digamma function

Alternate forms:

$$\frac{\psi^{(0)}_{\frac{9}{10}}(1)^2 - 2\,\psi^{(0)}_{\frac{9}{10}}(1)\log(10) + 1000\log^2\left(\frac{10}{9}\right) + \log^2(10)}{\log^2\left(\frac{10}{9}\right)}$$

$$-\frac{2\,\psi^{(0)}_{\frac{9}{10}}(1)\log(10)}{\log^2\left(\frac{10}{9}\right)} + \frac{\psi^{(0)}_{\frac{9}{10}}(1)^2}{\log^2\left(\frac{10}{9}\right)} + 1000 + \frac{\log^2(10)}{\log^2\left(\frac{10}{9}\right)}$$

$$\frac{1}{(\log(10) - 2\log(3))^2}\left(\psi^{(0)}_{\frac{9}{10}}(1)^2 - 2\,\psi^{(0)}_{\frac{9}{10}}(1)\log(10) + 1001\log^2(2) + 4000\log^2(3) + 1001\log^2(5) - 2\log(2)(2000\log(3) - 1001\log(5)) - 4000\log(3)\log(5)\right)$$

Thence:

1000 + (log(10) - QPolyGamma(0, 1, 9/10))^2/(log^2(10/9))-5

Input:

$$1000 + \frac{\left(\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)\right)^2}{\log^2\left(\frac{10}{9}\right)} - 5$$

Exact result:

$$\frac{\left(\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)\right)^2}{\log^2\left(\frac{10}{9}\right)} + 995$$

Decimal approximation:

1728.677671500798833522624370015899637519935597740039029216...

1728.677671…

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

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

Alternate forms:

$$\frac{\psi^{(0)}_{\frac{9}{10}}(1)^2 - 2\,\psi^{(0)}_{\frac{9}{10}}(1)\log(10) + 995\log^2\left(\frac{10}{9}\right) + \log^2(10)}{\log^2\left(\frac{10}{9}\right)}$$

$$-\frac{2\,\psi^{(0)}_{\frac{9}{10}}(1)\log(10)}{\log^2\left(\frac{10}{9}\right)} + \frac{\psi^{(0)}_{\frac{9}{10}}(1)^2}{\log^2\left(\frac{10}{9}\right)} + 995 + \frac{\log^2(10)}{\log^2\left(\frac{10}{9}\right)}$$

$$\frac{1}{(\log(10) - 2\log(3))^2}\left(\psi^{(0)}_{\frac{9}{10}}(1)^2 - 2\,\psi^{(0)}_{\frac{9}{10}}(1)\log(10) + 4\left(249\log^2(2) + 995\log^2(3) + 249\log^2(5) - 995\log(3)\log(5) + \log(2)(498\log(5) - 995\log(3))\right)\right)$$

Alternative representations:

$$1000 + \frac{\left(\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)\right)^2}{\log^2\left(\frac{10}{9}\right)} - 5 = 995 + \frac{\left(\log_e(10) - \psi^{(0)}_{\frac{9}{10}}(1)\right)^2}{\log_e^2\left(\frac{10}{9}\right)}$$

$$1000 + \frac{\left(\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)\right)^2}{\log^2\left(\frac{10}{9}\right)} - 5 = 995 + \frac{\left(\log(a)\log_a(10) - \psi^{(0)}_{\frac{9}{10}}(1)\right)^2}{\left(\log(a)\log_a\left(\frac{10}{9}\right)\right)^2}$$

$$1000 + \frac{\left(\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)\right)^2}{\log^2\left(\frac{10}{9}\right)} - 5 = 995 + \frac{\left(-\text{Li}_1(-9) - \psi^{(0)}_{\frac{9}{10}}(1)\right)^2}{\left(-\text{Li}_1\left(1 - \frac{10}{9}\right)\right)^2}$$

Series representations:

$$1000+\frac{\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)^2}{\log^2\left(\frac{10}{9}\right)}-5=$$

$$995+\frac{\left(2 i \pi \left\lfloor \frac{\arg(10-x)}{2\pi} \right\rfloor + \log(x) - \psi_{\frac{9}{10}}^{(0)}(1) - \sum_{k=1}^{\infty} \frac{(-1)^k (10-x)^k x^{-k}}{k}\right)^2}{\left(2 i \pi \left\lfloor \frac{\arg\left(\frac{10}{9}-x\right)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k \left(\frac{10}{9}-x\right)^k x^{-k}}{k}\right)^2} \quad \text{for } x<0$$

$$1000+\frac{\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)^2}{\log^2\left(\frac{10}{9}\right)}-5=$$

$$995+\frac{\left(2 i \pi \left\lfloor \frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi} \right\rfloor + \log(z_0) - \psi_{\frac{9}{10}}^{(0)}(1) - \sum_{k=1}^{\infty} \frac{(-1)^k (10-z_0)^k z_0^{-k}}{k}\right)^2}{\left(2 i \pi \left\lfloor \frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi} \right\rfloor + \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k \left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}\right)^2}$$

$$1000+\frac{\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)^2}{\log^2\left(\frac{10}{9}\right)}-5=$$

$$995+\frac{\left(\log(z_0) + \left\lfloor \frac{\arg(10-z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \psi_{\frac{9}{10}}^{(0)}(1) - \sum_{k=1}^{\infty} \frac{(-1)^k (10-z_0)^k z_0^{-k}}{k}\right)^2}{\left(\log(z_0) + \left\lfloor \frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k \left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}\right)^2}$$

Integral representations:

$$1000+\frac{\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)^2}{\log^2\left(\frac{10}{9}\right)}-5=$$

$$\frac{995\left(\int_1^{\frac{10}{9}} \frac{1}{t}\,dt\right)^2 + \left(\int_1^{10} \frac{1}{t}\,dt\right)^2 - 2\,\psi_{\frac{9}{10}}^{(0)}(1) \int_1^{10} \frac{1}{t}\,dt + \psi_{\frac{9}{10}}^{(0)}(1)^2}{\left(\int_1^{\frac{10}{9}} \frac{1}{t}\,dt\right)^2}$$

$$1000 + \frac{\left(\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)\right)^2}{\log^2\left(\frac{10}{9}\right)} - 5 =$$

$$\left(\left(\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{9^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^2 + 995\left(\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{9^{s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^2 - 4\,i\,\pi\,\psi^{(0)}_{\frac{9}{10}}(1)\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{9^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds - 4\,\pi^2\,\psi^{(0)}_{\frac{9}{10}}(1)^2\right) \Big/ \left(\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{9^{s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^2 \quad \text{for } -1<\gamma<0$$

Multiplying the two results, we obtain:

(log(10) - QPolyGamma(0, 1, 9/10))/log(10/9) * -(log(10) - QPolyGamma(0, 1 - (i π)/log(10/9), 9/10))/log(10/9)

Input:

$$\frac{\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)}{\log\left(\frac{10}{9}\right)}\left(-\frac{\log(10) - \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)}\right)$$

Exact result:

$$\frac{\left(\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)\right)\left(-\log(10) + \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log^2\left(\frac{10}{9}\right)}$$

Decimal approximation:

171.48477220983640354875847545239699751265485586272986261 91...

171.4847722098…

Alternate forms:

$$-\frac{\log(10)\left(\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)\right)}{\log^2\left(\frac{10}{9}\right)} + \frac{\left(\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)\right)\psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log^2\left(\frac{10}{9}\right)}$$

$$-\frac{\left(\psi_{\frac{9}{10}}^{(0)}(1)-\log(10)\right)\left(-\log(10)+\psi_{\frac{9}{10}}^{(0)}\left(\frac{-i\pi-2\log(3)+\log(10)}{-2\log(3)+\log(10)}\right)\right)}{(\log(10)-2\log(3))^2}$$

$$\frac{\psi_{\frac{9}{10}}^{(0)}(1)\log(10)}{\log^2\left(\frac{10}{9}\right)}+\frac{\log(10)\,\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log^2\left(\frac{10}{9}\right)}-\frac{\psi_{\frac{9}{10}}^{(0)}(1)\,\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log^2\left(\frac{10}{9}\right)}-\frac{\log^2(10)}{\log^2\left(\frac{10}{9}\right)}$$

Alternative representations:

$$-\frac{\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)}{\log\left(\frac{10}{9}\right)\log\left(\frac{10}{9}\right)}=$$
$$\left(\frac{1}{\log_e\left(\frac{10}{9}\right)}\right)^2\left(\log_e(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)\left(-\log_e(10)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log_e\left(\frac{10}{9}\right)}\right)\right)$$

$$-\frac{\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)}{\log\left(\frac{10}{9}\right)\log\left(\frac{10}{9}\right)}=\left(\frac{1}{\log(a)\log_a\left(\frac{10}{9}\right)}\right)^2$$
$$\left(\log(a)\log_a(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)\left(-\log(a)\log_a(10)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log(a)\log_a\left(\frac{10}{9}\right)}\right)\right)$$

$$-\frac{\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)}{\log\left(\frac{10}{9}\right)\log\left(\frac{10}{9}\right)}=$$
$$\left(-\frac{1}{\text{Li}_1\left(1-\frac{10}{9}\right)}\right)^2\left(-\text{Li}_1(-9)-\psi_{\frac{9}{10}}^{(0)}(1)\right)\left(\text{Li}_1(-9)+\psi_{\frac{9}{10}}^{(0)}\left(1--\frac{i\pi}{\text{Li}_1\left(1-\frac{10}{9}\right)}\right)\right)$$

Series representations:

$$-\frac{\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)}{\log\left(\frac{10}{9}\right)\log\left(\frac{10}{9}\right)}=$$

$$-\left(\left(\left(2\pi\left\lfloor\frac{\arg(10-x)}{2\pi}\right\rfloor-i\log(x)+i\psi_{\frac{9}{10}}^{(0)}(1)+i\sum_{k=1}^{\infty}\frac{(-1)^k(10-x)^k x^{-k}}{k}\right)\right.\right.$$

$$\left(2\pi\left\lfloor\frac{\arg(10-x)}{2\pi}\right\rfloor-i\log(x)+\right.$$

$$i\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{2i\pi\left\lfloor\frac{\arg\left(\frac{10}{9}-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-x\right)^k x^{-k}}{k}}\right)+$$

$$\left.\left.i\sum_{k=1}^{\infty}\frac{(-1)^k(10-x)^k x^{-k}}{k}\right)\right)\Bigg/$$

$$\left.\left(2\pi\left\lfloor\frac{\arg\left(\frac{10}{9}-x\right)}{2\pi}\right\rfloor-i\log(x)+i\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-x\right)^k x^{-k}}{k}\right)^2\right)\quad\text{for } x<0$$

$$-\frac{\left(\log(10)-\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\left(\log(10)-\psi^{(0)}_{\frac{9}{10}}(1)\right)}{\log\left(\frac{10}{9}\right)\log\left(\frac{10}{9}\right)} =$$

$$-\left(\left(\left(2\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor - i\log(z_0) + i\,\psi^{(0)}_{\frac{9}{10}}(1) + i\sum_{k=1}^{\infty}\frac{(-1)^k\,(10-z_0)^k\,z_0^{-k}}{k}\right)\right.\right.$$

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

$$i\,\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor + \log(z_0) - \sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}\right) +$$

$$\left.\left. i\sum_{k=1}^{\infty}\frac{(-1)^k\,(10-z_0)^k\,z_0^{-k}}{k}\right)\right)\Bigg/$$

$$\left.\left(2\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor - i\log(z_0) + i\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}\right)^2\right)$$

$$-\frac{\left(\log(10)-\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\left(\log(10)-\psi^{(0)}_{\frac{9}{10}}(1)\right)}{\log\left(\frac{10}{9}\right)\log\left(\frac{10}{9}\right)} =$$

$$-\left(\left(\left(\left\lfloor\frac{\arg(10-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\log(z_0)+\left\lfloor\frac{\arg(10-z_0)}{2\pi}\right\rfloor\log(z_0)-\psi^{(0)}_{\frac{9}{10}}(1)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(10-z_0)^k\,z_0^{-k}}{k}\right)\right.\right.$$
$$\left(\left\lfloor\frac{\arg(10-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\log(z_0)+\left\lfloor\frac{\arg(10-z_0)}{2\pi}\right\rfloor\log(z_0)-\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log(z_0)+\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}\right)-\right.$$
$$\left.\left.\sum_{k=1}^{\infty}\frac{(-1)^k\,(10-z_0)^k\,z_0^{-k}}{k}\right)\right)\Bigg/\left(\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\right.$$
$$\left.\left.\log(z_0)+\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}\right)^2\right)$$

Integral representations:

$$-\frac{\left(\log(10)-\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\left(\log(10)-\psi^{(0)}_{\frac{9}{10}}(1)\right)}{\log\left(\frac{10}{9}\right)\log\left(\frac{10}{9}\right)} =$$

$$-\frac{\left(\int_1^{10}\frac{1}{t}\,dt-\psi^{(0)}_{\frac{9}{10}}(1)\right)\left(\int_1^{10}\frac{1}{t}\,dt-\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\int_1^{\frac{10}{9}}\frac{1}{t}\,dt}\right)\right)}{\left(\int_1^{\frac{10}{9}}\frac{1}{t}\,dt\right)^2}$$

$$-\frac{\left(\log(10)-\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\left(\log(10)-\psi^{(0)}_{\frac{9}{10}}(1)\right)}{\log\left(\frac{10}{9}\right)\log\left(\frac{10}{9}\right)} = -\left(\left(\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{9^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds-2\,i\,\pi\,\psi^{(0)}_{\frac{9}{10}}(1)\right)\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{9^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds-2\,i\,\pi\,\psi^{(0)}_{\frac{9}{10}}\left(1+\frac{2\pi^2}{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{9^{s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}\right)\right)\right)\Big/\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{9^{s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^2\right) \quad \text{for } -1<\gamma<0$$

And:

(log(10) - QPolyGamma(0, 1, 9/10))/log(10/9) * -(log(10) - QPolyGamma(0, 1 - (i π)/log(10/9), 9/10))/log(10/9)-29-7

Where 29 and 7 are Lucas number

Input:

$$\frac{\log(10)-\psi^{(0)}_{\frac{9}{10}}(1)}{\log\left(\frac{10}{9}\right)}\left(-\frac{\log(10)-\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)}\right)-29-7$$

Exact result:

$$-36+\frac{\left(\log(10)-\psi^{(0)}_{\frac{9}{10}}(1)\right)\left(-\log(10)+\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log^2\left(\frac{10}{9}\right)}$$

Decimal approximation:

135.4847722098364035487584754523969975126548558627298626191...

135.4847722098… result very near to the rest mass of Pion meson 134.9766

Alternate forms:

$$-\frac{-\psi_{\frac{9}{10}}^{(0)}(1)\log(10)+36\log^2\left(\frac{10}{9}\right)+\log^2(10)}{\log^2\left(\frac{10}{9}\right)}+\frac{\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log^2\left(\frac{10}{9}\right)}$$

$$-\frac{1}{\log^2\left(\frac{10}{9}\right)}\left(-\psi_{\frac{9}{10}}^{(0)}(1)\log(10)-\log(10)\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)+\psi_{\frac{9}{10}}^{(0)}(1)\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)+36\log^2\left(\frac{10}{9}\right)+\log^2(10)\right)$$

$$-\frac{1}{(\log(10)-2\log(3))^2}\left(-\psi_{\frac{9}{10}}^{(0)}(1)\log(10)+\left(\psi_{\frac{9}{10}}^{(0)}(1)-\log(10)\right)\psi_{\frac{9}{10}}^{(0)}\left(\frac{-i\pi-2\log(3)+\log(10)}{-2\log(3)+\log(10)}\right)+37\log^2(2)+144\log^2(3)+37\log^2(5)-2\log(2)(72\log(3)-37\log(5))-144\log(3)\log(5)\right)$$

Expanded form:

$$\frac{\psi_{\frac{9}{10}}^{(0)}(1)\log(10)}{\log^2\left(\frac{10}{9}\right)}+\frac{\log(10)\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log^2\left(\frac{10}{9}\right)}-\frac{\psi_{\frac{9}{10}}^{(0)}(1)\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log^2\left(\frac{10}{9}\right)}-36-\frac{\log^2(10)}{\log^2\left(\frac{10}{9}\right)}$$

Alternative representations:

$$-\frac{\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)}{\log\left(\frac{10}{9}\right)\log\left(\frac{10}{9}\right)}-29-7=$$
$$-36+\left(\frac{1}{\log_e\left(\frac{10}{9}\right)}\right)^2\left(\log_e(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)\left(-\log_e(10)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log_e\left(\frac{10}{9}\right)}\right)\right)$$

$$-\frac{\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)}{\log\left(\frac{10}{9}\right)\log\left(\frac{10}{9}\right)}-29-7=$$
$$-36+\left(\frac{1}{\log(a)\log_a\left(\frac{10}{9}\right)}\right)^2\left(\log(a)\log_a(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)\left(-\log(a)\log_a(10)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log(a)\log_a\left(\frac{10}{9}\right)}\right)\right)$$

$$-\frac{\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)}{\log\left(\frac{10}{9}\right)\log\left(\frac{10}{9}\right)}-29-7=$$

$$-36+\left(-\frac{1}{\text{Li}_1\left(1-\frac{10}{9}\right)}\right)^2\left(-\text{Li}_1(-9)-\psi_{\frac{9}{10}}^{(0)}(1)\right)\left(\text{Li}_1(-9)+\psi_{\frac{9}{10}}^{(0)}\left(1--\frac{i\pi}{\text{Li}_1\left(1-\frac{10}{9}\right)}\right)\right)$$

Series representations:

$$-\frac{\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)}{\log\left(\frac{10}{9}\right)\log\left(\frac{10}{9}\right)}-29-7=$$

$$-36+\left(\left(2i\pi\left\lfloor\frac{\arg(10-x)}{2\pi}\right\rfloor+\log(x)-\psi_{\frac{9}{10}}^{(0)}(1)-\sum_{k=1}^{\infty}\frac{(-1)^k(10-x)^k x^{-k}}{k}\right)\left(-2i\pi\left\lfloor\frac{\arg(10-x)}{2\pi}\right\rfloor-\log(x)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{2i\pi\left\lfloor\frac{\arg\left(\frac{10}{9}-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-x\right)^k x^{-k}}{k}}\right)+\sum_{k=1}^{\infty}\frac{(-1)^k(10-x)^k x^{-k}}{k}\right)\right)\Big/\left(2i\pi\left\lfloor\frac{\arg\left(\frac{10}{9}-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-x\right)^k x^{-k}}{k}\right)^2 \quad \text{for } x<0$$

$$-\frac{\left(\log(10)-\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\left(\log(10)-\psi^{(0)}_{\frac{9}{10}}(1)\right)}{\log\left(\frac{10}{9}\right)\log\left(\frac{10}{9}\right)}-29-7=$$

$$-36+\left(\left(\log(z_0)+\left\lfloor\frac{\arg(10-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\psi^{(0)}_{\frac{9}{10}}(1)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(10-z_0)^k\,z_0^{-k}}{k}\right)\right.$$
$$\left(-\log(z_0)-\left\lfloor\frac{\arg(10-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)+\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log(z_0)+\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}\right)+\right.$$
$$\left.\left.\sum_{k=1}^{\infty}\frac{(-1)^k\,(10-z_0)^k\,z_0^{-k}}{k}\right)\right)\Bigg/$$
$$\left(\log(z_0)+\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}\right)^2$$

$$-\frac{\left(\log(10)-\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\left(\log(10)-\psi^{(0)}_{\frac{9}{10}}(1)\right)}{\log\left(\frac{10}{9}\right)\log\left(\frac{10}{9}\right)}-29-7=$$

$$-36+\left(\left(2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\psi^{(0)}_{\frac{9}{10}}(1)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(10-z_0)^k\,z_0^{-k}}{k}\right)\right.$$
$$\left(-2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor-\log(z_0)+\right.$$
$$\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}\right)+$$
$$\left.\left.\sum_{k=1}^{\infty}\frac{(-1)^k\,(10-z_0)^k\,z_0^{-k}}{k}\right)\right)\Bigg/$$
$$\left(2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}\right)^2$$

Dividing the two results, we obtain:

((((1/((10/9)^1-1) + 1/((10/9)^2-1) + 1/((10/9)^3-1) +...)))) / (((1/(1+10/9)+1/(1+(10/9)^2) + 1/(1+(10/9)^3) +...)))

Input interpretation:

$$\frac{\frac{1}{\left(\frac{10}{9}\right)^1-1}+\frac{1}{\left(\frac{10}{9}\right)^2-1}+\frac{1}{\left(\frac{10}{9}\right)^3-1}+\cdots}{\frac{1}{1+\frac{10}{9}}+\frac{1}{1+\left(\frac{10}{9}\right)^2}+\frac{1}{1+\left(\frac{10}{9}\right)^3}+\cdots}$$

Result:

$$\frac{\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)}{-\log(10) + \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}$$

log(x) is the natural logarithm

$\psi_q(z)$ gives the q-digamma function

Alternate forms:

$$\frac{\psi^{(0)}_{\frac{9}{10}}(1) - \log(10)}{\log(10) - \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}$$

$$\frac{\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)}{-\log(10) + \psi^{(0)}_{\frac{9}{10}}\left(\frac{-i\pi - 2\log(3) + \log(10)}{-2\log(3) + \log(10)}\right)}$$

$$\frac{\psi^{(0)}_{\frac{9}{10}}(1)}{\log(10) - \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)} - \frac{\log(10)}{\log(10) - \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}$$

(log(10) - QPolyGamma(0, 1, 9/10))/(-log(10) + QPolyGamma(0, 1 - (i π)/log(10/9), 9/10))

Input:

$$\frac{\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)}{-\log(10) + \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}$$

Decimal approximation:

4.278383800767091807827635053107807949599048192974066311525...

4.2783838007…

Alternate forms:

$$\frac{\psi^{(0)}_{\frac{9}{10}}(1) - \log(10)}{\log(10) - \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}$$

$$\frac{\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)}{-\log(10) + \psi^{(0)}_{\frac{9}{10}}\left(\frac{-i\pi - 2\log(3) + \log(10)}{-2\log(3) + \log(10)}\right)}$$

$$\frac{\psi^{(0)}_{\frac{9}{10}}(1)}{\log(10) - \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)} - \frac{\log(10)}{\log(10) - \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}$$

Alternative representations:

$$\frac{\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)}{-\log(10) + \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)} = \frac{\log_e(10) - \psi^{(0)}_{\frac{9}{10}}(1)}{-\log_e(10) + \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log_e\left(\frac{10}{9}\right)}\right)}$$

$$\frac{\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)}{-\log(10) + \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)} = \frac{\log(a)\log_a(10) - \psi^{(0)}_{\frac{9}{10}}(1)}{-\log(a)\log_a(10) + \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log(a)\log_a\left(\frac{10}{9}\right)}\right)}$$

$$\frac{\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)}{-\log(10) + \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)} = \frac{-\mathrm{Li}_1(-9) - \psi^{(0)}_{\frac{9}{10}}(1)}{\mathrm{Li}_1(-9) + \psi^{(0)}_{\frac{9}{10}}\left(1 - -\frac{i\pi}{\mathrm{Li}_1\left(1 - \frac{10}{9}\right)}\right)}$$

Series representations:

$$\frac{\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)}{-\log(10) + \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)} =$$

$$-\left(\left(2\pi\left\lfloor\frac{\arg(10-x)}{2\pi}\right\rfloor - i\log(x) + i\,\psi^{(0)}_{\frac{9}{10}}(1) + i\sum_{k=1}^{\infty}\frac{(-1)^k\,(10-x)^k\,x^{-k}}{k}\right)\right/$$

$$\left(2\pi\left\lfloor\frac{\arg(10-x)}{2\pi}\right\rfloor - i\log(x) + \right.$$

$$i\,\psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{2\,i\,\pi\left\lfloor\frac{\arg\left(\frac{10}{9}-x\right)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-x\right)^k x^{-k}}{k}}\right) +$$

$$\left.\left. i\sum_{k=1}^{\infty}\frac{(-1)^k\,(10-x)^k\,x^{-k}}{k}\right)\right) \text{ for } x < 0$$

$$\frac{\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)}{-\log(10) + \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)} =$$

$$-\left(\left(2\pi \left\lfloor \frac{\pi - \arg\left(\frac{1}{z_0}\right) - \arg(z_0)}{2\pi} \right\rfloor - i\log(z_0) + i\,\psi^{(0)}_{\frac{9}{10}}(1) + i\sum_{k=1}^{\infty} \frac{(-1)^k\,(10 - z_0)^k\, z_0^{-k}}{k}\right)\right/$$

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

$$i\,\psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{2i\pi \left\lfloor \frac{\pi - \arg\left(\frac{1}{z_0}\right) - \arg(z_0)}{2\pi} \right\rfloor + \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k \left(\frac{10}{9} - z_0\right)^k z_0^{-k}}{k}}\right) +$$

$$\left.\left. i\sum_{k=1}^{\infty} \frac{(-1)^k\,(10 - z_0)^k\, z_0^{-k}}{k}\right)\right)$$

$$\frac{\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)}{-\log(10) + \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)} =$$

$$-\left(\left(\left\lfloor \frac{\arg(10 - z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(10 - z_0)}{2\pi} \right\rfloor \log(z_0) - \psi^{(0)}_{\frac{9}{10}}(1) - \sum_{k=1}^{\infty} \frac{(-1)^k (10 - z_0)^k z_0^{-k}}{k}\right) \Big/ \left(\left\lfloor \frac{\arg(10 - z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(10 - z_0)}{2\pi} \right\rfloor \log(z_0) - \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log(z_0) + \left\lfloor \frac{\arg\left(\frac{10}{9} - z_0\right)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k \left(\frac{10}{9} - z_0\right)^k z_0^{-k}}{k}}\right) - \sum_{k=1}^{\infty} \frac{(-1)^k (10 - z_0)^k z_0^{-k}}{k}\right)\right)$$

Integral representations:

$$\frac{\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)}{-\log(10) + \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)} = -\frac{\int_1^{10} \frac{1}{t}\, dt - \psi^{(0)}_{\frac{9}{10}}(1)}{\int_1^{10} \frac{1}{t}\, dt - \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\int_1^{\frac{10}{9}} \frac{1}{t}\, dt}\right)}$$

$$\frac{\log(10) - \psi^{(0)}_{\frac{9}{10}}(1)}{-\log(10) + \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)} =$$

$$-\frac{\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{9^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\, ds - 2i\pi\,\psi^{(0)}_{\frac{9}{10}}(1)}{\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{9^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\, ds - 2i\pi\,\psi^{(0)}_{\frac{9}{10}}\left(1 + \frac{2\pi^2}{\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{9^{s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\, ds}\right)} \quad \text{for } -1 < \gamma < 0$$

And:

7*((((-log(10) + QPolyGamma(0, 1 - (i π)/log(10/9), 9/10)) / (log(10) - QPolyGamma(0, 1, 9/10)))))-18/10^3

Where 7 and 18 are Lucas numbers

Input:

$$7\times\frac{-\log(10)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)}-\frac{18}{10^3}$$

Exact result:

$$-\frac{9}{500}+\frac{7\left(-\log(10)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)}$$

Decimal approximation:

1.618131849308361877648675866122824745830417908174497998899...

1.618131849... result that is a very good approximation to the value of the golden ratio 1,618033988749...

Alternate forms:

$$-\frac{-9\,\psi_{\frac{9}{10}}^{(0)}(1)-3500\,\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)+3509\log(10)}{500\left(\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)\right)}$$

$$-\frac{7\log(10)}{\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)}+\frac{7\,\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)}-\frac{9}{500}$$

$$-\frac{9\,\psi_{\frac{9}{10}}^{(0)}(1)+3500\,\psi_{\frac{9}{10}}^{(0)}\left(\frac{-i\pi-2\log(3)+\log(10)}{-2\log(3)+\log(10)}\right)-3509\log(10)}{500\left(\psi_{\frac{9}{10}}^{(0)}(1)-\log(10)\right)}$$

Alternative representations:

$$\frac{7\left(-\log(10)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)}-\frac{18}{10^3}=-\frac{18}{10^3}+\frac{7\left(-\log_e(10)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log_e\left(\frac{10}{9}\right)}\right)\right)}{\log_e(10)-\psi_{\frac{9}{10}}^{(0)}(1)}$$

$$\frac{7\left(-\log(10)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)}-\frac{18}{10^3}=$$
$$-\frac{18}{10^3}+\frac{7\left(-\log(a)\log_a(10)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log(a)\log_a\left(\frac{10}{9}\right)}\right)\right)}{\log(a)\log_a(10)-\psi_{\frac{9}{10}}^{(0)}(1)}$$

$$\frac{7\left(-\log(10)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)}-\frac{18}{10^3}=-\frac{18}{10^3}+\frac{7\left(\text{Li}_1(-9)+\psi_{\frac{9}{10}}^{(0)}\left(1--\frac{i\pi}{\text{Li}_1\left(1-\frac{10}{9}\right)}\right)\right)}{-\text{Li}_1(-9)-\psi_{\frac{9}{10}}^{(0)}(1)}$$

Series representations:

$$\frac{7\left(-\log(10)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)}-\frac{18}{10^3}=$$

$$-\left(\left(7018\,\pi\left\lfloor\frac{\arg(10-x)}{2\pi}\right\rfloor-3509\,i\log(x)+9\,i\,\psi_{\frac{9}{10}}^{(0)}(1)+\right.\right.$$

$$3500\,i\,\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{2\,i\,\pi\left\lfloor\frac{\arg\left(\frac{10}{9}-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-x\right)^k x^{-k}}{k}}\right)+$$

$$\left.3509\,i\sum_{k=1}^{\infty}\frac{(-1)^k\,(10-x)^k\,x^{-k}}{k}\right)\Bigg/$$

$$\left.\left(500\left(2\pi\left\lfloor\frac{\arg(10-x)}{2\pi}\right\rfloor-i\log(x)+i\,\psi_{\frac{9}{10}}^{(0)}(1)+i\sum_{k=1}^{\infty}\frac{(-1)^k\,(10-x)^k\,x^{-k}}{k}\right)\right)\right)$$

for $x < 0$

$$\frac{7\left(-\log(10)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)}-\frac{18}{10^3} =$$

$$-\left(\left(7018\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor-3509\,i\log(z_0)+9\,i\,\psi_{\frac{9}{10}}^{(0)}(1)+\right.\right.$$

$$3500\,i\,\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}\right)+$$

$$\left.3509\,i\sum_{k=1}^{\infty}\frac{(-1)^k\,(10-z_0)^k\,z_0^{-k}}{k}\right)\Bigg/\left(500\left(2\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor-\right.\right.$$

$$\left.\left.\left.i\log(z_0)+i\,\psi_{\frac{9}{10}}^{(0)}(1)+i\sum_{k=1}^{\infty}\frac{(-1)^k\,(10-z_0)^k\,z_0^{-k}}{k}\right)\right)\right)$$

$$\frac{7\left(-\log(10)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)}-\frac{18}{10^3}=$$

$$-\left(\left(3509\left\lfloor\frac{\arg(10-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+3509\log(z_0)+3509\left\lfloor\frac{\arg(10-z_0)}{2\pi}\right\rfloor\log(z_0)-\right.\right.$$

$$9\,\psi_{\frac{9}{10}}^{(0)}(1)-3500\,\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log(z_0)+\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}\right)-$$

$$\left.3509\sum_{k=1}^{\infty}\frac{(-1)^k(10-z_0)^k z_0^{-k}}{k}\right)\Bigg/\left(500\left(\left\lfloor\frac{\arg(10-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\right.\right.$$

$$\left.\left.\left.\log(z_0)+\left\lfloor\frac{\arg(10-z_0)}{2\pi}\right\rfloor\log(z_0)-\psi_{\frac{9}{10}}^{(0)}(1)-\sum_{k=1}^{\infty}\frac{(-1)^k(10-z_0)^k z_0^{-k}}{k}\right)\right)\right)$$

Integral representations:

$$\frac{7\left(-\log(10)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)}-\frac{18}{10^3}=$$

$$-\frac{3509\int_1^{10}\frac{1}{t}\,dt-9\,\psi_{\frac{9}{10}}^{(0)}(1)-3500\,\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\int_1^{\frac{10}{9}}\frac{1}{t}\,dt}\right)}{500\left(\int_1^{10}\frac{1}{t}\,dt-\psi_{\frac{9}{10}}^{(0)}(1)\right)}$$

$$\frac{7\left(-\log(10)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)}{\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)}-\frac{18}{10^3}=$$

$$-\left(\left(3509\, i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{9^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds+18\,\pi\,\psi_{\frac{9}{10}}^{(0)}(1)+7000\,\pi\,\psi_{\frac{9}{10}}^{(0)}\left(1+\frac{2\pi^2}{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{9^s\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}\right)\right)\Big/\left(500\left(i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{9^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds+2\,\pi\,\psi_{\frac{9}{10}}^{(0)}(1)\right)\right)\right)\quad \text{for } -1<\gamma<0$$

Subtracting the two results, we obtain:

((((1/((10/9)^1-1) + 1/((10/9)^2-1) + 1/((10/9)^3-1) +...)))) - (((1/(1+10/9)+1/(1+(10/9)^2) + 1/(1+(10/9)^3) +...)))

Input interpretation:

$$\left(\frac{1}{\left(\frac{10}{9}\right)^1-1}+\frac{1}{\left(\frac{10}{9}\right)^2-1}+\frac{1}{\left(\frac{10}{9}\right)^3-1}+\cdots\right)-\left(\frac{1}{1+\frac{10}{9}}+\frac{1}{1+\left(\frac{10}{9}\right)^2}+\frac{1}{1+\left(\frac{10}{9}\right)^3}+\cdots\right)$$

Result:

$$\frac{\log(10)-\psi_{\frac{9}{10}}^{(0)}(1)}{\log\left(\frac{10}{9}\right)}-\frac{-\log(10)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)}$$

$\log(x)$ is the natural logarithm

$\psi_q(z)$ gives the q-digamma function

Alternate forms:

$$-\frac{\psi_{\frac{9}{10}}^{(0)}(1)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)-\log(100)}{\log\left(\frac{10}{9}\right)}$$

$$\frac{-\psi^{(0)}_{\frac{9}{10}}(1) - \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right) + 2\log(10)}{\log\left(\frac{10}{9}\right)}$$

$$-\frac{\psi^{(0)}_{\frac{9}{10}}(1)}{\log\left(\frac{10}{9}\right)} - \frac{\psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)} + \frac{2\log(10)}{\log\left(\frac{10}{9}\right)}$$

-(-log(100) + QPolyGamma(0, 1, 9/10) + QPolyGamma(0, 1 - (i π)/log(10/9), 9/10))/log(10/9)

Input:

$$-\frac{-\log(100) + \psi^{(0)}_{\frac{9}{10}}(1) + \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)}$$

Exact result:

$$\frac{-\psi^{(0)}_{\frac{9}{10}}(1) - \psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right) + \log(100)}{\log\left(\frac{10}{9}\right)}$$

Decimal approximation:

20.755476341203422265560338885862729572066599762390621784 41...

20.75547634…

Alternate forms:

$$\frac{\log(100) - \psi^{(0)}_{\frac{9}{10}}(1)}{\log\left(\frac{10}{9}\right)} - \frac{\psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)}$$

$$-\frac{\psi^{(0)}_{\frac{9}{10}}(1)}{\log\left(\frac{10}{9}\right)} - \frac{\psi^{(0)}_{\frac{9}{10}}\left(1 - \frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)} + \frac{\log(100)}{\log\left(\frac{10}{9}\right)}$$

$$-\frac{\psi^{(0)}_{\frac{9}{10}}(1)+\psi^{(0)}_{\frac{9}{10}}\left(\frac{-i\pi-2\log(3)+\log(10)}{-2\log(3)+\log(10)}\right)-2\log(10)}{\log(10)-2\log(3)}$$

Alternative representations:

$$-\frac{-\log(100)+\psi^{(0)}_{\frac{9}{10}}(1)+\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)}=\frac{\log_e(100)-\psi^{(0)}_{\frac{9}{10}}(1)-\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log_e\left(\frac{10}{9}\right)}\right)}{\log_e\left(\frac{10}{9}\right)}$$

$$-\frac{-\log(100)+\psi^{(0)}_{\frac{9}{10}}(1)+\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)}=$$
$$\frac{\log(a)\log_a(100)-\psi^{(0)}_{\frac{9}{10}}(1)-\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log(a)\log_a\left(\frac{10}{9}\right)}\right)}{\log(a)\log_a\left(\frac{10}{9}\right)}$$

$$-\frac{-\log(100)+\psi^{(0)}_{\frac{9}{10}}(1)+\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)}=-\frac{-\text{Li}_1(-99)-\psi^{(0)}_{\frac{9}{10}}(1)-\psi^{(0)}_{\frac{9}{10}}\left(1--\frac{i\pi}{\text{Li}_1\left(1-\frac{10}{9}\right)}\right)}{\text{Li}_1\left(1-\frac{10}{9}\right)}$$

Series representations:

$$-\frac{-\log(100)+\psi^{(0)}_{\frac{9}{10}}(1)+\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)}=\left(2\pi\left\lfloor\frac{\arg(100-x)}{2\pi}\right\rfloor-i\log(x)+\right.$$
$$i\,\psi^{(0)}_{\frac{9}{10}}(1)+i\,\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{2i\pi\left\lfloor\frac{\arg\left(\frac{10}{9}-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-x\right)^k x^{-k}}{k}}\right)+$$
$$\left.i\sum_{k=1}^{\infty}\frac{(-1)^k(100-x)^k x^{-k}}{k}\right)\Bigg/$$
$$\left(2\pi\left\lfloor\frac{\arg\left(\frac{10}{9}-x\right)}{2\pi}\right\rfloor-i\log(x)+i\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-x\right)^k x^{-k}}{k}\right)\quad\text{for } x<0$$

$$-\frac{-\log(100)+\psi_{\frac{9}{10}}^{(0)}(1)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)}=$$

$$\left(2\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor-i\log(z_0)+i\,\psi_{\frac{9}{10}}^{(0)}(1)+\right.$$

$$i\,\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{2\,i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}\right)+$$

$$\left.i\sum_{k=1}^{\infty}\frac{(-1)^k\,(100-z_0)^k\,z_0^{-k}}{k}\right)\Big/$$

$$\left(2\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor-i\log(z_0)+i\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}\right)$$

$$-\frac{-\log(100)+\psi_{\frac{9}{10}}^{(0)}(1)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)}=$$

$$\left(\left\lfloor\frac{\arg(100-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\log(z_0)+\left\lfloor\frac{\arg(100-z_0)}{2\pi}\right\rfloor\log(z_0)-\psi_{\frac{9}{10}}^{(0)}(1)-\right.$$

$$\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log(z_0)+\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}\right)-$$

$$\left.\sum_{k=1}^{\infty}\frac{(-1)^k\,(100-z_0)^k\,z_0^{-k}}{k}\right)\Big/$$

$$\left(\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\log(z_0)+\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}\right)$$

Integral representations:

$$-\frac{-\log(100)+\psi^{(0)}_{\frac{9}{10}}(1)+\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)} = \frac{\int_1^{100}\frac{1}{t}\,dt-\psi^{(0)}_{\frac{9}{10}}(1)-\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\int_1^{\frac{10}{9}}\frac{1}{t}\,dt}\right)}{\int_1^{\frac{10}{9}}\frac{1}{t}\,dt}$$

$$-\frac{-\log(100)+\psi^{(0)}_{\frac{9}{10}}(1)+\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)} = \frac{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{99^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds-2\,i\,\pi\,\psi^{(0)}_{\frac{9}{10}}(1)-2\,i\,\pi\,\psi^{(0)}_{\frac{9}{10}}\left(1+\frac{2\pi^2}{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{9^s\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}\right)}{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{9^s\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds} \quad \text{for} \quad -1<\gamma<0$$

And:

6(((-(-log(100) + QPolyGamma(0, 1, 9/10) + QPolyGamma(0, 1 - (i π)/log(10/9), 9/10))/log(10/9))))+1/golden ratio

Input:

$$6\left(-\frac{-\log(100)+\psi^{(0)}_{\frac{9}{10}}(1)+\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)}\right)+\frac{1}{\phi}$$

Exact result:

$$\frac{1}{\phi}+\frac{6\left(-\psi^{(0)}_{\frac{9}{10}}(1)-\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)+\log(100)\right)}{\log\left(\frac{10}{9}\right)}$$

Decimal approximation:

125.15089203597042844156662014954201555011990775414949356 86...

125.150892035… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Alternate forms:

$$\frac{1}{2}\left(\sqrt{5}-1\right)+\frac{6\left(-\psi_{\frac{9}{10}}^{(0)}(1)-\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)+\log(100)\right)}{\log\left(\frac{10}{9}\right)}$$

$$\frac{1}{\phi}-\frac{6\left(\psi_{\frac{9}{10}}^{(0)}(1)+\psi_{\frac{9}{10}}^{(0)}\left(\frac{-i\pi-2\log(3)+\log(10)}{-2\log(3)+\log(10)}\right)-2\log(10)\right)}{\log(10)-2\log(3)}$$

$$-\frac{6\,\psi_{\frac{9}{10}}^{(0)}(1)}{\log\left(\frac{10}{9}\right)}-\frac{6\,\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)}{\log\left(\frac{10}{9}\right)}+\frac{2}{1+\sqrt{5}}+\frac{6\log(100)}{\log\left(\frac{10}{9}\right)}$$

Alternative representations:

$$\frac{6\left(-\left(-\log(100)+\psi_{\frac{9}{10}}^{(0)}(1)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\right)}{\log\left(\frac{10}{9}\right)}+\frac{1}{\phi}=$$
$$\frac{1}{\phi}+\frac{6\left(\log_e(100)-\psi_{\frac{9}{10}}^{(0)}(1)-\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log_e\left(\frac{10}{9}\right)}\right)\right)}{\log_e\left(\frac{10}{9}\right)}$$

$$\frac{6\left(-\left(-\log(100)+\psi_{\frac{9}{10}}^{(0)}(1)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\right)}{\log\left(\frac{10}{9}\right)}+\frac{1}{\phi}=$$
$$\frac{1}{\phi}+\frac{6\left(\log(a)\log_a(100)-\psi_{\frac{9}{10}}^{(0)}(1)-\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log(a)\log_a\left(\frac{10}{9}\right)}\right)\right)}{\log(a)\log_a\left(\frac{10}{9}\right)}$$

$$\frac{6\left(-\left(-\log(100)+\psi_{\frac{9}{10}}^{(0)}(1)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\right)}{\log\left(\frac{10}{9}\right)}+\frac{1}{\phi}=$$
$$\frac{1}{\phi}+-\frac{6\left(-\text{Li}_1(-99)-\psi_{\frac{9}{10}}^{(0)}(1)-\psi_{\frac{9}{10}}^{(0)}\left(1--\frac{i\pi}{\text{Li}_1\left(1-\frac{10}{9}\right)}\right)\right)}{\text{Li}_1\left(1-\frac{10}{9}\right)}$$

Series representations:

$$\frac{6\left(-\left(-\log(100)+\psi^{(0)}_{\frac{9}{10}}(1)+\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\right)}{\log\left(\frac{10}{9}\right)}+\frac{1}{\phi}=$$

$$\left(2\left(2\pi\left\lfloor\frac{\arg\left(\frac{10}{9}-x\right)}{2\pi}\right\rfloor+6\pi\left\lfloor\frac{\arg(100-x)}{2\pi}\right\rfloor+6\sqrt{5}\,\pi\left\lfloor\frac{\arg(100-x)}{2\pi}\right\rfloor-\right.\right.$$
$$4i\log(x)-3i\sqrt{5}\log(x)+3i\psi^{(0)}_{\frac{9}{10}}(1)+3i\sqrt{5}\,\psi^{(0)}_{\frac{9}{10}}(1)+$$
$$3i\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{2i\pi\left\lfloor\frac{\arg\left(\frac{10}{9}-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-x\right)^k x^{-k}}{k}}\right)+$$
$$3i\sqrt{5}\,\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{2i\pi\left\lfloor\frac{\arg\left(\frac{10}{9}-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-x\right)^k x^{-k}}{k}}\right)+$$
$$i\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-x\right)^k x^{-k}}{k}+3i\sum_{k=1}^{\infty}\frac{(-1)^k(100-x)^k x^{-k}}{k}+$$
$$\left.\left.3i\sqrt{5}\sum_{k=1}^{\infty}\frac{(-1)^k(100-x)^k x^{-k}}{k}\right)\right)\Big/$$
$$\left(\left(1+\sqrt{5}\right)\left(2\pi\left\lfloor\frac{\arg\left(\frac{10}{9}-x\right)}{2\pi}\right\rfloor-i\log(x)+i\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-x\right)^k x^{-k}}{k}\right)\right)\quad\text{for } x<0$$

$$\frac{6\left(-\left(-\log(100)+\psi_{\frac{9}{10}}^{(0)}(1)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\right)}{\log\left(\frac{10}{9}\right)}+\frac{1}{\phi}=$$

$$\left(2\left(8\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+6\sqrt{5}\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor-\right.\right.$$

$$4\,i\log(z_0)-3\,i\sqrt{5}\,\log(z_0)+3\,i\,\psi_{\frac{9}{10}}^{(0)}(1)+3\,i\sqrt{5}\,\psi_{\frac{9}{10}}^{(0)}(1)+$$

$$3\,i\,\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{2\,i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}\right)+$$

$$3\,i\sqrt{5}\,\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{2\,i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}\right)+$$

$$i\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}+3\,i\sum_{k=1}^{\infty}\frac{(-1)^k\,(100-z_0)^k\,z_0^{-k}}{k}+$$

$$\left.\left.3\,i\sqrt{5}\,\sum_{k=1}^{\infty}\frac{(-1)^k\,(100-z_0)^k\,z_0^{-k}}{k}\right)\right)\Bigg/$$

$$\left(\left(1+\sqrt{5}\right)\left(2\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor-i\log(z_0)+i\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}\right)\right)$$

$$\frac{6\left(-\left(-\log(100)+\psi_{\frac{9}{10}}^{(0)}(1)+\psi_{\frac{9}{10}}^{(0)}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\right)}{\log\left(\frac{10}{9}\right)}+\frac{1}{\phi}=$$

$$\left(2\left(\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+3\left\lfloor\frac{\arg(100-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\right.\right.$$

$$3\sqrt{5}\left\lfloor\frac{\arg(100-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+4\log(z_0)+3\sqrt{5}\log(z_0)+$$

$$\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\log(z_0)+3\left\lfloor\frac{\arg(100-z_0)}{2\pi}\right\rfloor\log(z_0)+$$

$$3\sqrt{5}\left\lfloor\frac{\arg(100-z_0)}{2\pi}\right\rfloor\log(z_0)-3\psi_{\frac{9}{10}}^{(0)}(1)-3\sqrt{5}\,\psi_{\frac{9}{10}}^{(0)}(1)-3\psi_{\frac{9}{10}}^{(0)}\left(\right.$$

$$\left.1-\frac{i\pi}{\log(z_0)+\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}\right)-$$

$$3\sqrt{5}\,\psi_{\frac{9}{10}}^{(0)}\left(\right.$$

$$\left.1-\frac{i\pi}{\log(z_0)+\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}}\right)-$$

$$\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}-3\sum_{k=1}^{\infty}\frac{(-1)^k(100-z_0)^k z_0^{-k}}{k}-$$

$$\left.\left.3\sqrt{5}\sum_{k=1}^{\infty}\frac{(-1)^k(100-z_0)^k z_0^{-k}}{k}\right)\right)\Big/$$

$$\left(\left(1+\sqrt{5}\right)\left(\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\log(z_0)+\left\lfloor\frac{\arg\left(\frac{10}{9}-z_0\right)}{2\pi}\right\rfloor\log(z_0)-\right.\right.$$

$$\left.\left.\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{10}{9}-z_0\right)^k z_0^{-k}}{k}\right)\right)$$

Integral representations:

$$\frac{6\left(-\left(-\log(100)+\psi^{(0)}_{\frac{9}{10}}(1)+\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\right)}{\log\left(\frac{10}{9}\right)}+\frac{1}{\phi}=$$

$$\frac{1}{1+\sqrt{5}\int_1^{\frac{10}{9}}\frac{1}{t}\,dt}\,2\left(\int_1^{\frac{10}{9}}\frac{1}{t}\,dt+3\int_1^{100}\frac{1}{t}\,dt+3\sqrt{5}\int_1^{100}\frac{1}{t}\,dt-3\psi^{(0)}_{\frac{9}{10}}(1)-\right.$$

$$\left.3\sqrt{5}\,\psi^{(0)}_{\frac{9}{10}}(1)-3\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\int_1^{\frac{10}{9}}\frac{1}{t}\,dt}\right)-3\sqrt{5}\,\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\int_1^{\frac{10}{9}}\frac{1}{t}\,dt}\right)\right)$$

$$\frac{6\left(-\left(-\log(100)+\psi^{(0)}_{\frac{9}{10}}(1)+\psi^{(0)}_{\frac{9}{10}}\left(1-\frac{i\pi}{\log\left(\frac{10}{9}\right)}\right)\right)\right)}{\log\left(\frac{10}{9}\right)}+\frac{1}{\phi}=$$

$$\left(2\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{9^s\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds+3\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{99^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds+\right.\right.$$

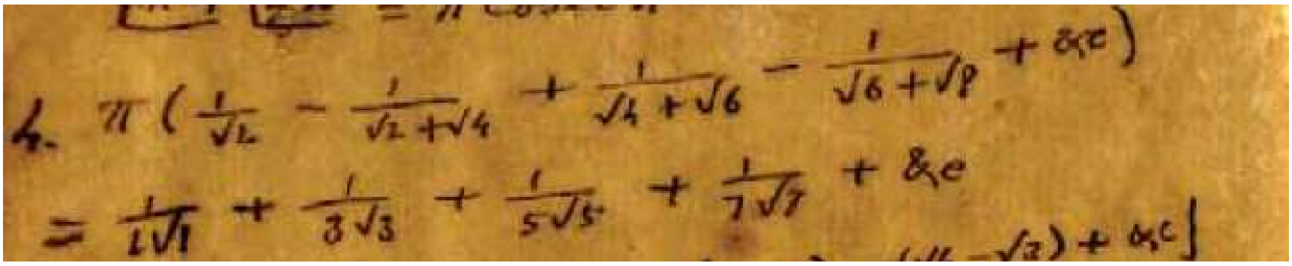
$$3\sqrt{5}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{99^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds-6\,i\,\pi\,\psi^{(0)}_{\frac{9}{10}}(1)-$$

$$6\,i\sqrt{5}\,\pi\,\psi^{(0)}_{\frac{9}{10}}(1)-6\,i\,\pi\,\psi^{(0)}_{\frac{9}{10}}\left(1+\frac{2\pi^2}{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{9^s\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}\right)-$$

$$\left.\left.6\,i\sqrt{5}\,\pi\,\psi^{(0)}_{\frac{9}{10}}\left(1+\frac{2\pi^2}{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{9^s\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}\right)\right)\right)\Big/$$

$$\left(1+\sqrt{5}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{9^s\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)\quad\text{for } -1<\gamma<0$$

Page 81



Pi *(1/(sqrt2)-1/(sqrt2+sqrt4)+1/(sqrt4+sqrt6)-1/(sqrt6+sqrt8))

Input:

$$\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)$$

Result:

$$\left(\frac{1}{\sqrt{2}}-\frac{1}{2+\sqrt{2}}+\frac{1}{2+\sqrt{6}}-\frac{1}{2\sqrt{2}+\sqrt{6}}\right)\pi$$

Decimal approximation:

1.412113673791598096338931391467032700409225206634342296658...

1.41211367379....

Property:

$\left(\frac{1}{\sqrt{2}}-\frac{1}{2+\sqrt{2}}+\frac{1}{2+\sqrt{6}}-\frac{1}{2\sqrt{2}+\sqrt{6}}\right)\pi$ is a transcendental number

Alternate forms:

$$\pi\left(\sqrt{6}-2\right)$$

$$\frac{2\pi}{2+\sqrt{6}}$$

$$\frac{2\sqrt{2}\,(1+\sqrt{2})\pi}{(2+\sqrt{2})\left(2+\sqrt{6}\right)}$$

Series representations:

$$\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)=$$
$$-\frac{\pi}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left((2-z_0)^k+(4-z_0)^k\right)z_0^{-k}}{k!}}+\frac{\pi}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left((4-z_0)^k+(6-z_0)^k\right)z_0^{-k}}{k!}}-\frac{\pi}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left((6-z_0)^k+(8-z_0)^k\right)z_0^{-k}}{k!}}+\frac{\pi}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}$$

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

$$\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)=$$

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

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

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

$$\frac{\pi}{\sum_{k=0}^{\infty}\frac{(-1)^k x^{-k}\left((6-x)^k\exp\left(i\pi\left\lfloor\frac{\arg(6-x)}{2\pi}\right\rfloor\right)+(8-x)^k\exp\left(i\pi\left\lfloor\frac{\arg(8-x)}{2\pi}\right\rfloor\right)\right)\left(-\frac{1}{2}\right)_k\sqrt{x}}{k!}}$$

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

$$\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)=$$

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

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

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

$$\pi\Bigg/\left(\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^k\left(-\frac{1}{2}\right)_k z_0^{1/2-k}\left((6-z_0)^k\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(6-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(6-z_0)/(2\pi)\rfloor}+(8-z_0)^k\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(8-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(8-z_0)/(2\pi)\rfloor}\right)\right)$$

1/(1sqrt1)+1/(3sqrt3)+1/(5sqrt5)+1/(7sqrt7)+...

1/(1sqrt1)+1/(3sqrt3)+1/(5sqrt5)+1/(7sqrt7)+1/(11sqrt11)+1/(13sqrt13)+1/(17sqrt17)+1/(19sqrt19)

Input:

$$\frac{1}{1\sqrt{1}}+\frac{1}{3\sqrt{3}}+\frac{1}{5\sqrt{5}}+\frac{1}{7\sqrt{7}}+\frac{1}{11\sqrt{11}}+\frac{1}{13\sqrt{13}}+\frac{1}{17\sqrt{17}}+\frac{1}{19\sqrt{19}}$$

Result:

$$1+\frac{1}{3\sqrt{3}}+\frac{1}{5\sqrt{5}}+\frac{1}{7\sqrt{7}}+\frac{1}{11\sqrt{11}}+\frac{1}{13\sqrt{13}}+\frac{1}{17\sqrt{17}}+\frac{1}{19\sqrt{19}}$$

Decimal approximation:

1.410973792493254865502532064755699580693444979832500007456...

1.41097379249…

Alternate forms:

$$\frac{1}{3}\sqrt{3}\,\frac{1}{3}+\frac{1}{5}\sqrt{5}\,\frac{1}{5}+\frac{1}{7}\sqrt{7}\,\frac{1}{7}+\frac{1}{11}\sqrt{11}\,\frac{1}{11}+\frac{1}{13}\sqrt{13}\,\frac{1}{13}+\frac{1}{17}\sqrt{17}\,\frac{1}{17}+\frac{1}{19}\sqrt{19}\,\frac{1}{19}+1$$

$$\frac{1}{23\,520\,996\,524\,025}\left(23\,520\,996\,524\,025+2\,613\,444\,058\,225\sqrt{3}+940\,839\,860\,961\sqrt{5}+480\,020\,337\,225\sqrt{7}+194\,388\,401\,025\sqrt{11}+139\,177\,494\,225\sqrt{13}+81\,387\,531\,225\sqrt{17}+65\,155\,115\,025\sqrt{19}\right)$$

$$\frac{1}{19\sqrt{19}}+\frac{1}{65\,155\,115\,025}\left(65\,155\,115\,025+7\,239\,457\,225\sqrt{3}+2\,606\,204\,601\sqrt{5}+1\,329\,696\,225\sqrt{7}+538\,472\,025\sqrt{11}+385\,533\,225\sqrt{13}+225\,450\,225\sqrt{17}\right)$$

From the previous expression, we obtain:

1/((((Pi *(1/(sqrt2)-1/(sqrt2+sqrt4)+1/(sqrt4+sqrt6)-1/(sqrt6+sqrt8))))))^1/64

Input:

$$\frac{1}{\sqrt[64]{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}}$$

Exact result:

$$\frac{1}{\sqrt[64]{\left(\frac{1}{\sqrt{2}} - \frac{1}{2+\sqrt{2}} + \frac{1}{2+\sqrt{6}} - \frac{1}{2\sqrt{2}+\sqrt{6}}\right)\pi}}$$

Decimal approximation:

0.99462251631343947038719807671684572580801451074391382328 8...

0.99462251631343947….. 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:

$$\frac{1}{\sqrt[64]{\left(\frac{1}{\sqrt{2}} - \frac{1}{2+\sqrt{2}} + \frac{1}{2+\sqrt{6}} - \frac{1}{2\sqrt{2}+\sqrt{6}}\right)\pi}}$$ is a transcendental number

Alternate forms:

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

$$\sqrt[64]{\frac{2+\sqrt{6}}{2\pi}}$$

$$\frac{\sqrt[64]{\frac{7+5\sqrt{2}+4\sqrt{3}+3\sqrt{6}}{(2+\sqrt{3})\pi}}}{\sqrt[128]{2}\sqrt[64]{1+\sqrt{2}}}$$

2log base 0.994622516313439 (((1/((((Pi *(1/(sqrt2)-1/(sqrt2+sqrt4)+1/(sqrt4+sqrt6)-1/(sqrt6+sqrt8))))))))-Pi+1/golden ratio

Input interpretation:

$$2\log_{0.994622516313439}\left(\frac{1}{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}\right)-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.4764413351...

125.4764413351... result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Alternative representation:

$$2\log_{0.9946225163134390000}\left(\frac{1}{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}\right)-\pi+\frac{1}{\phi}=$$
$$-\pi+\frac{1}{\phi}+\frac{2\log\left(\frac{1}{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}\right)}{\log(0.9946225163134390000)}$$

Series representations:

$$2\log_{0.994622516313439000}\left(\frac{1}{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi-\frac{2\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1}{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}\right)^k}{k}}{\log(0.994622516313439000)}$$

$$2\log_{0.994622516313439000}\left(\frac{1}{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1.0000000000000000}{\phi}-1.0000000000000000\,\pi+\log\left(\frac{1}{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}\right)\left(-370.92116546968772-2.0000000000000000\sum_{k=0}^{\infty}(-0.0053774836865610000)^k\,G(k)\right)$$

$$\text{for}\left(G(0)=0\text{ and }\frac{(-1)^k\,k}{2(1+k)(2+k)}+G(k)=\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

$$2\log_{0.994622516313439000}\left(\frac{1}{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1.0000000000000000}{\phi}-1.0000000000000000\,\pi+\log\left(\frac{1}{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}\right)\left(-370.92116546968772-2.0000000000000000\sum_{k=0}^{\infty}(-0.0053774836865610000)^k\,G(k)\right)$$

$$\text{for}\left(G(0)=0\text{ and }G(k)=\frac{(-1)^{1+k}\,k}{2(1+k)(2+k)}+\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

1/4 log base 0.994622516313439 (((1/((((Pi *(1/(sqrt2)-1/(sqrt2+sqrt4)+1/(sqrt4+sqrt6)-1/(sqrt6+sqrt8)))))))))+1/golden ratio

Input interpretation:

$$\frac{1}{4}\log_{0.994622516313439}\left(\frac{1}{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}\right)+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

16.61803398875...

16.61803398... result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternative representation:

$$\frac{1}{4}\log_{0.9946225163134390000}\left(\frac{1}{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}\right)+\frac{1}{\phi}=\frac{1}{\phi}+\frac{\log\left(\frac{1}{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}\right)}{4\log(0.9946225163134390000)}$$

Series representations:

$$\frac{1}{4}\log_{0.9946225163134390000}\left(\frac{1}{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}\right)+\frac{1}{\phi}=\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1}{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}\right)^k}{k}}{4\log(0.9946225163134390000)}$$

$$\frac{1}{4}\log_{0.9946225163134390000}\left(\frac{1}{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}\right)+\frac{1}{\phi}=$$

$$\frac{1.0000000000000000}{\phi}+\log\left(\frac{1}{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}\right)\left(-46.36514568371096-0.25000000000000000\sum_{k=0}^{\infty}(-0.0053774836865610000)^k\,G(k)\right)$$

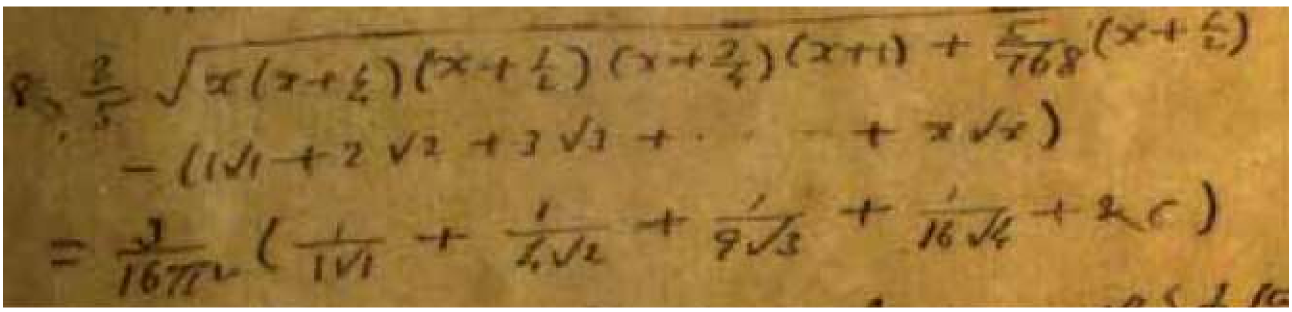
$$\text{for }\left(G(0)=0\text{ and }\frac{(-1)^k\,k}{2\,(1+k)\,(2+k)}+G(k)=\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

$$\frac{1}{4}\log_{0.9946225163134390000}\left(\frac{1}{\pi\left(\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{6}}-\frac{1}{\sqrt{6}+\sqrt{8}}\right)}\right)+\frac{1}{\phi}=$$

$$\frac{1}{4\,\phi}\left(4+\phi\log_{0.9946225163134390000}\left(1\Big/\left(\pi\left(-\frac{1}{\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left((2-z_0)^k+(4-z_0)^k\right)z_0^{-k}}{k!}}+\frac{1}{\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left((4-z_0)^k+(6-z_0)^k\right)z_0^{-k}}{k!}}-\frac{1}{\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left((6-z_0)^k+(8-z_0)^k\right)z_0^{-k}}{k!}}+\frac{1}{\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k\,z_0^{-k}}{k!}}\right)\right)\right)\right)$$

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

Page 82


8. $\frac{2}{5}\sqrt{x(x+\frac{1}{4})(x+\frac{1}{2})(x+\frac{3}{4})(x+1)}+\frac{5}{768}(x+\frac{1}{2})$

$-(1\sqrt{1}+2\sqrt{2}+3\sqrt{3}+\cdots+x\sqrt{x})$

$=\frac{3}{16\pi^2}\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}+\&c\right)$

3/(16Pi^2)*((((1/(1sqrt1)+1/(4sqrt2)+1/(9sqrt3)+1/(16sqrt4))))

Input:

$$\frac{3}{16\pi^2}\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)$$

Result:

$$\frac{3\left(\frac{33}{32}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}\right)}{16\pi^2}$$

Decimal approximation:

0.024168459675030997066368197518608237526403609954799171534...

0.024168459675…

Property:

$$\frac{3\left(\frac{33}{32}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}\right)}{16\pi^2}$$ is a transcendental number

Alternate forms:

$$\frac{891+108\sqrt{2}+32\sqrt{3}}{4608\pi^2}$$

$$\frac{\frac{99}{512}+\frac{3}{64\sqrt{2}}+\frac{1}{48\sqrt{3}}}{\pi^2}$$

$$\frac{297+4\sqrt{\frac{2}{3}\left(275+72\sqrt{6}\right)}}{1536\pi^2}$$

Series representations:

$$\frac{\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)3}{16\pi^2}=\frac{3}{16\pi^2\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(1-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}+\frac{3}{64\pi^2\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}+\frac{1}{48\pi^2\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}+\frac{3}{256\pi^2\exp\left(i\pi\left\lfloor\frac{\arg(4-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(4-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\quad\text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\frac{\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)3}{16\pi^2}=\frac{3\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor} z_0^{1/2(-1-\lfloor\arg(1-z_0)/(2\pi)\rfloor)}}{16\pi^2\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(1-z_0)^k z_0^{-k}}{k!}}+\frac{3\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor} z_0^{1/2(-1-\lfloor\arg(2-z_0)/(2\pi)\rfloor)}}{64\pi^2\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}+\frac{\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(3-z_0)/(2\pi)\rfloor} z_0^{1/2(-1-\lfloor\arg(3-z_0)/(2\pi)\rfloor)}}{48\pi^2\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}}+\frac{3\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} z_0^{1/2(-1-\lfloor\arg(4-z_0)/(2\pi)\rfloor)}}{256\pi^2\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(4-z_0)^k z_0^{-k}}{k!}}$$

$$\frac{\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)3}{16\pi^2}=$$

$$\left(9\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_1!\,k_2!\,k_3!}(-1)^{k_1+k_2+k_3}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-\frac{1}{2}\right)_{k_3}(1-z_0)^{k_1}(2-z_0)^{k_2}(3-z_0)^{k_3}z_0^{-k_1-k_2-k_3}+\right.$$
$$16\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_1!\,k_2!\,k_3!}(-1)^{k_1+k_2+k_3}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-\frac{1}{2}\right)_{k_3}(1-z_0)^{k_1}(2-z_0)^{k_2}(4-z_0)^{k_3}z_0^{-k_1-k_2-k_3}+$$
$$36\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_1!\,k_2!\,k_3!}(-1)^{k_1+k_2+k_3}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-\frac{1}{2}\right)_{k_3}(1-z_0)^{k_1}(3-z_0)^{k_2}(4-z_0)^{k_3}z_0^{-k_1-k_2-k_3}+$$
$$\left.144\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_1!\,k_2!\,k_3!}(-1)^{k_1+k_2+k_3}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-\frac{1}{2}\right)_{k_3}(2-z_0)^{k_1}(3-z_0)^{k_2}(4-z_0)^{k_3}z_0^{-k_1-k_2-k_3}\right)\Big/$$
$$\left(768\pi^2\sqrt{z_0}\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(1-z_0)^k z_0^{-k}}{k!}\right)\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(4-z_0)^k z_0^{-k}}{k!}\right)$$

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

1/((((3/(16Pi^2)*(((((1/(1sqrt1)+1/(4sqrt2)+1/(9sqrt3)+1/(16sqrt4)))))))) * 18 +29

Input:

$$\frac{1}{\frac{3}{16\pi^2}\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}\times 18+29$$

Result:

$$29+\frac{96\pi^2}{\frac{33}{32}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}}$$

Decimal approximation:

773.77232897867390643667286210169614129866277480697021609 94...

773.772328978… result very near to the rest mass of Charged rho meson 775.4

Property:

$$29+\frac{96\pi^2}{\frac{33}{32}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}}$$ is a transcendental number

Alternate forms:

$$\frac{1}{65\,415\,603\,433}\left(6\,302\,136\,462\,336\,\pi^2-770\,010\,624\,000\sqrt{2}\,\pi^2-240\,098\,770\,944\sqrt{3}\,\pi^2+56\,757\,583\,872\sqrt{6}\,\pi^2+1\,897\,052\,499\,557\right)$$

$$29+\frac{82\,944\,\pi^2}{891+108\sqrt{2}+32\sqrt{3}}$$

$$29+\frac{1}{65\,415\,603\,433}27\,648\left(227\,941\,857-27\,850\,500\sqrt{2}-32\sqrt{3\left(81\,877\,519\,849-34\,819\,011\,216\sqrt{2}\right)}\right)\pi^2$$

Series representations:

$$\frac{18}{\frac{3\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}{16\pi^2}}+29=$$

$$29+(96\pi^2)\Bigg/\left(\frac{1}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(1-z_0)^k z_0^{-k}}{k!}}+\frac{1}{4\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}+\frac{1}{9\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}}+\frac{1}{16\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(4-z_0)^k z_0^{-k}}{k!}}\right)$$

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

$$\frac{18}{\frac{3\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}{16\pi^2}}+29=$$

$$29+\left(96\pi^2\right)\Big/\left(\frac{1}{\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(1-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}+\frac{1}{4\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}+\frac{1}{9\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}+\frac{1}{16\exp\left(i\pi\left\lfloor\frac{\arg(4-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(4-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right) \text{ for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\frac{18}{\frac{3\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}{16\pi^2}}+29=$$

$$29+\left(96\pi^2\right)\Big/\left(\frac{\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor}z_0^{1/2(-1-\lfloor\arg(1-z_0)/(2\pi)\rfloor)}}{\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(1-z_0)^k z_0^{-k}}{k!}}+\frac{\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}z_0^{1/2(-1-\lfloor\arg(2-z_0)/(2\pi)\rfloor)}}{4\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}+\frac{\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(3-z_0)/(2\pi)\rfloor}z_0^{1/2(-1-\lfloor\arg(3-z_0)/(2\pi)\rfloor)}}{9\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}}+\frac{\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor}z_0^{1/2(-1-\lfloor\arg(4-z_0)/(2\pi)\rfloor)}}{16\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(4-z_0)^k z_0^{-k}}{k!}}\right)$$

((((3/(16Pi^2)*(((((1/(1sqrt1)+1/(4sqrt2)+1/(9sqrt3)+1/(16sqrt4)))))))))^1/512

Input:

$$\sqrt[512]{\frac{3}{16\pi^2}\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}$$

Exact result:

$$\frac{\sqrt[512]{3\left(\frac{33}{32}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}\right)}}{\sqrt[128]{2}\ \sqrt[256]{\pi}}$$

Decimal approximation:

0.9927554573826858709075187782130894235767328755864353998 89...

0.99275545738… result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Property:

$$\frac{\sqrt[512]{3\left(\frac{33}{32}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}\right)}}{\sqrt[128]{2}\ \sqrt[256]{\pi}}$$ is a transcendental number

Alternate forms:

$$\frac{\sqrt[512]{891+108\sqrt{2}+32\sqrt{3}}}{2^{9/512}\ \sqrt[256]{3\pi}}$$

$$\frac{\sqrt[512]{72\sqrt{3}+\sqrt{2}\left(32+297\sqrt{3}\right)}}{2^{19/1024}\times 3^{3/1024}\ \sqrt[256]{\pi}}$$

All 512th roots of (3 (33/32 + 1/(4 sqrt(2)) + 1/(9 sqrt(3))))/(16 π^2):

$$\frac{\sqrt[512]{3\left(\frac{33}{32}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}\right)}\ e^{0}}{\sqrt[128]{2}\ \sqrt[256]{\pi}} \approx 0.992755 \text{ (real, principal root)}$$

$$\frac{\sqrt[512]{3\left(\frac{33}{32}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}\right)}\ e^{(i\pi)/256}}{\sqrt[128]{2}\ \sqrt[256]{\pi}} \approx 0.992681+0.012183\,i$$

$$\frac{\sqrt[512]{3\left(\frac{33}{32}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}\right)}\ e^{(i\pi)/128}}{\sqrt[128]{2}\ \sqrt[256]{\pi}} \approx 0.992456+0.024363\,i$$

$$\frac{\sqrt[512]{3\left(\frac{33}{32}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}\right)}\ e^{(3i\pi)/256}}{\sqrt[128]{2}\ \sqrt[256]{\pi}} \approx 0.992083+0.036541\,i$$

$$\frac{\sqrt[512]{3\left(\frac{33}{32}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}\right)}\ e^{(i\pi)/64}}{\sqrt[128]{2}\ \sqrt[256]{\pi}} \approx 0.991560+0.048712\,i$$

Series representations:

$$\sqrt[512]{\frac{\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)3}{16\pi^2}} = \frac{1}{\sqrt[128]{2}}\sqrt[512]{3}\left(\frac{1}{\pi^2}\left(\frac{1}{\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(1-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}} + \frac{1}{4\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}} + \frac{1}{9\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}} + \frac{1}{16\exp\left(i\pi\left\lfloor\frac{\arg(4-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(4-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right)\right)^{(1/512)}$$

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

$$\sqrt[512]{\frac{\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)3}{16\pi^2}} =$$

$$\frac{1}{\sqrt[128]{2}}\sqrt[512]{3}\left(\frac{1}{\pi^2}\left(\frac{\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor} z_0^{-1/2-1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor}}{\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(1-z_0)^k z_0^{-k}}{k!}}+\frac{\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor} z_0^{-1/2-1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}}{4\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}+\frac{\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(3-z_0)/(2\pi)\rfloor} z_0^{-1/2-1/2\lfloor\arg(3-z_0)/(2\pi)\rfloor}}{9\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}}+\frac{\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor} z_0^{-1/2-1/2\lfloor\arg(4-z_0)/(2\pi)\rfloor}}{16\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(4-z_0)^k z_0^{-k}}{k!}}\right)\right)\hat{}\,(1/512)$$

$$\sqrt[512]{\frac{\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)3}{16\pi^2}} =$$

$$\frac{1}{\sqrt[64]{2}\ \sqrt[512]{3}}\left(\left(\left(9\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_1!\,k_2!\,k_3!}(-1)^{k_1+k_2+k_3}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-\frac{1}{2}\right)_{k_3}(1-z_0)^{k_1}(2-z_0)^{k_2}(3-z_0)^{k_3}z_0^{-k_1-k_2-k_3}+\right.\right.\right.$$
$$16\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_1!\,k_2!\,k_3!}(-1)^{k_1+k_2+k_3}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-\frac{1}{2}\right)_{k_3}(1-z_0)^{k_1}(2-z_0)^{k_2}(4-z_0)^{k_3}z_0^{-k_1-k_2-k_3}+$$
$$36\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_1!\,k_2!\,k_3!}(-1)^{k_1+k_2+k_3}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-\frac{1}{2}\right)_{k_3}(1-z_0)^{k_1}(3-z_0)^{k_2}(4-z_0)^{k_3}z_0^{-k_1-k_2-k_3}+$$
$$144\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_1!\,k_2!\,k_3!}(-1)^{k_1+k_2+k_3}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left.\left(-\frac{1}{2}\right)_{k_3}(2-z_0)^{k_1}(3-z_0)^{k_2}(4-z_0)^{k_3}z_0^{-k_1-k_2-k_3}\right)\Bigg/$$
$$\left(\pi^2\sqrt{z_0}\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(1-z_0)^k z_0^{-k}}{k!}\right)\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)\left.\left.\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(4-z_0)^k z_0^{-k}}{k!}\right)\right)\hat{}$$
$$\left.(1/512)\right)\quad \text{for not } ((z_0\in\mathbb{R} \text{ and } -\infty<z_0\leq 0))$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,ds}{(2\,\pi\,i)\,\Gamma(-a)} \quad \text{for } (0<\gamma<-\operatorname{Re}(a) \text{ and } |\arg(z)|<\pi)$$

1/4 log base 0.9927554573826 ((((3/(16Pi^2)*((((1/(1sqrt1)+1/(4sqrt2)+1/(9sqrt3)+1/(16sqrt4))))))))))-Pi+1/golden ratio

Input interpretation:

$$\frac{1}{4}\log_{0.9927554573826}\left(\frac{3}{16\pi^2}\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)\right)-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.47644133...

125.47644133... result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Alternative representation:

$$\frac{1}{4}\log_{0.99275545738260000}\left(\frac{3\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}{16\pi^2}\right)-\pi+\frac{1}{\phi}=-\pi+\frac{1}{\phi}+\frac{\log\left(\frac{3\left(\frac{1}{\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}{16\pi^2}\right)}{4\log(0.99275545738260000)}$$

Series representations:

$$\frac{1}{4}\log_{0.99275545738260000}\left(\frac{3\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}{16\pi^2}\right)-\pi+\frac{1}{\phi}=\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\frac{144}{\sqrt{1}}+\frac{36}{\sqrt{2}}+\frac{16}{\sqrt{3}}+\frac{9}{\sqrt{4}}}{768\pi^2}\right)^k}{k}}{4\log(0.99275545738260000)}$$

$$\frac{1}{4}\log_{0.99275545738260000}\left(\frac{3\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}{16\pi^2}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{3\left(\frac{1}{\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}{16\pi^2}\right)^k}{k}}{4\log(0.99275545738260000)}$$

$$\frac{1}{4}\log_{0.99275545738260000}\left(\frac{3\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}{16\pi^2}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1.00000000000000}{\phi}-1.00000000000000\,\pi+\log\left(\frac{3\left(\frac{1}{\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}{16\pi^2}\right)\left(-34.3837348095031-0.250000000000000\sum_{k=0}^{\infty}(-0.00724454261740000)^k\,G(k)\right)$$

$$\text{for }\left(G(0)=0\text{ and }\frac{(-1)^k\,k}{2(1+k)(2+k)}+G(k)=\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

1/32 log base 0.9927554573826 ((((3/(16Pi^2)*(((((1/(1sqrt1)+1/(4sqrt2)+1/(9sqrt3)+1/(16sqrt4))))))))))+1/golden ratio

Input interpretation:

$$\frac{1}{32}\log_{0.9927554573826}\left(\frac{3}{16\pi^2}\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)\right)+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

16.618033989...

16.618033989… result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternative representation:

$$\frac{1}{32}\log_{0.99275545738260000}\left(\frac{3\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}{16\pi^2}\right)+\frac{1}{\phi}=\frac{1}{\phi}+\frac{\log\left(\frac{3\left(\frac{1}{\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}{16\pi^2}\right)}{32\log(0.99275545738260000)}$$

Series representations:

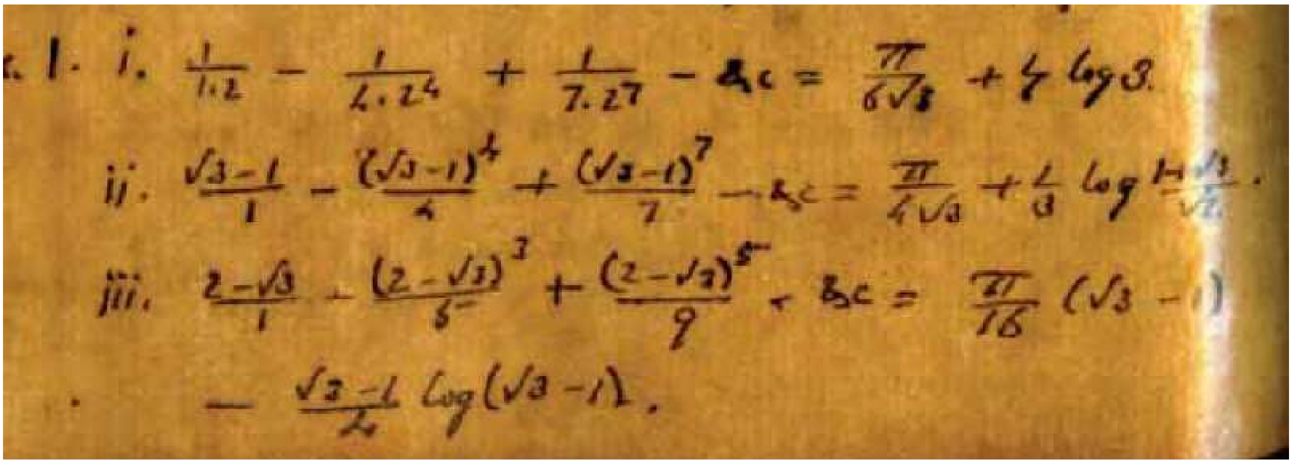
$$\frac{1}{32}\log_{0.99275545738260000}\left(\frac{3\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}{16\pi^2}\right)+\frac{1}{\phi}=\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\frac{144}{\sqrt{1}}+\frac{36}{\sqrt{2}}+\frac{16}{\sqrt{3}}+\frac{9}{\sqrt{4}}}{768\pi^2}\right)^k}{k}}{32\log(0.99275545738260000)}$$

$$\frac{1}{32}\log_{0.99275545738260000}\left(\frac{3\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}{16\pi^2}\right)+\frac{1}{\phi}=\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{3\left(\frac{1}{\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}{16\pi^2}\right)^k}{k}}{32\log(0.99275545738260000)}$$

$$\frac{1}{32}\log_{0.99275545738260000}\left(\frac{3\left(\frac{1}{1\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}{16\pi^2}\right)+\frac{1}{\phi}=\frac{1.00000000000000}{\phi}+\log\left(\frac{3\left(\frac{1}{\sqrt{1}}+\frac{1}{4\sqrt{2}}+\frac{1}{9\sqrt{3}}+\frac{1}{16\sqrt{4}}\right)}{16\pi^2}\right)\left(-4.2979668511879-0.0312500000000000\sum_{k=0}^{\infty}(-0.00724454261740000)^k\,G(k)\right)$$

$$\text{for }\left(G(0)=0\text{ and }\frac{(-1)^k\,k}{2(1+k)(2+k)}+G(k)=\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

Page 97



1. i. $\frac{1}{1.2} - \frac{1}{4.2^4} + \frac{1}{7.2^7} - \&c = \frac{\pi}{6\sqrt{3}} + \frac{1}{6}\log 3.$

ii. $\frac{\sqrt{3}-1}{1} - \frac{(\sqrt{3}-1)^4}{4} + \frac{(\sqrt{3}-1)^7}{7} - \&c = \frac{\pi}{4\sqrt{3}} + \frac{1}{3}\log\frac{1+\sqrt{3}}{\sqrt{2}}.$

iii. $\frac{2-\sqrt{3}}{1} - \frac{(2-\sqrt{3})^3}{5} + \frac{(2-\sqrt{3})^5}{9} - \&c = \frac{\pi}{18}(\sqrt{3}-1) - \frac{\sqrt{3}-1}{2}\log(\sqrt{3}-1).$

1/2 - 1/(4*2^4) + 1/(7*2^7)

Input:

$$\frac{1}{2} - \frac{1}{4\times 2^4} + \frac{1}{7\times 2^7}$$

Exact result:

$$\frac{435}{896}$$

Decimal approximation:

0.48549107142857142857142857142857142857142857142857142857 1...

0.4854910714….

Pi/(6sqrt3) + 1/6 ln 3

Input:

$$\frac{\pi}{6\sqrt{3}} + \frac{1}{6}\log(3)$$

log(x) is the natural logarithm

Exact result:

$$\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}$$

Decimal approximation:

0.485401942150387923664887249094113572821926134319248337884...

0.48540194215…..

Alternate forms:

$$\frac{1}{18}\left(\sqrt{3}\,\pi+\log(27)\right)$$

$$\frac{1}{18}\left(\sqrt{3}\,\pi+3\log(3)\right)$$

$$\frac{\pi+\sqrt{3}\,\log(3)}{6\sqrt{3}}$$

Alternative representations:

$$\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}=\frac{\log_e(3)}{6}+\frac{\pi}{6\sqrt{3}}$$

$$\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}=\frac{1}{6}\log(a)\log_a(3)+\frac{\pi}{6\sqrt{3}}$$

$$\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}=\frac{2}{6}\coth^{-1}(2)+\frac{\pi}{6\sqrt{3}}$$

Series representations:

$$\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}=\frac{\pi}{6\sqrt{3}}+\frac{\log(8)}{18}-\frac{1}{6}\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k}{k}$$

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

$$\frac{\pi}{6\sqrt{3}} + \frac{\log(3)}{6} = \frac{\pi}{6\sqrt{3}} + \frac{1}{6}\left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor \log\left(\frac{1}{z_0}\right) + \frac{\log(z_0)}{6} + \frac{1}{6}\left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor \log(z_0) - \frac{1}{6}\sum_{k=1}^{\infty}\frac{(-1)^k (3-z_0)^k z_0^{-k}}{k}$$

Integral representations:

$$\frac{\pi}{6\sqrt{3}} + \frac{\log(3)}{6} = \frac{\pi}{6\sqrt{3}} + \frac{1}{6}\int_1^3 \frac{1}{t}\,dt$$

$$\frac{\pi}{6\sqrt{3}} + \frac{\log(3)}{6} = \frac{\pi}{6\sqrt{3}} - \frac{i}{12\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{2^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1 < \gamma < 0$$

11/10^3-6/(((5ln(((Pi/(6sqrt3) + 1/6 ln 3))))))

Where 11 is a Lucas number

Input:

$$\frac{11}{10^3} - \frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}} + \frac{1}{6}\log(3)\right)}$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{11}{1000} - \frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}} + \frac{\log(3)}{6}\right)}$$

Decimal approximation:

1.671260862433822004010256676269847702707273749287869588882...

1.67126086243… result practically equal to the value of the formula:

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

that is the holographic proton mass (N. Haramein)

Alternate forms:

$$\frac{11}{1000}-\frac{6}{5\log\left(\frac{1}{18}\left(\sqrt{3}\,\pi+\log(27)\right)\right)}$$

$$\frac{11}{1000}-\frac{6}{5\left(\log\left(\frac{1}{2}\left(\sqrt{3}\,\pi+3\log(3)\right)\right)-2\log(3)\right)}$$

$$\frac{11\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)-1200}{1000\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}$$

Alternative representations:

$$\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}=-\frac{6}{5\log_e\left(\frac{\log(3)}{6}+\frac{\pi}{6\sqrt{3}}\right)}+\frac{11}{10^3}$$

$$\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}=-\frac{6}{5\log(a)\log_a\left(\frac{\log(3)}{6}+\frac{\pi}{6\sqrt{3}}\right)}+\frac{11}{10^3}$$

$$\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}=\frac{-6}{-5\,\mathrm{Li}_1\left(1-\frac{\log(3)}{6}-\frac{\pi}{6\sqrt{3}}\right)}+\frac{11}{10^3}$$

Series representations:

$$\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}=\frac{11}{1000}+\frac{6}{5\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{18}\right)^k\left(-18+\sqrt{3}\,\pi+\log(27)\right)^k}{k}}$$

$$\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}=$$

$$\frac{11}{1000}+\frac{6\,i}{10\pi\left\lfloor\frac{\arg\left(\sqrt{3}\,\pi-18x+\log(27)\right)}{2\pi}\right\rfloor-5\,i\left(\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{18}\right)^k x^{-k}\left(\sqrt{3}\,\pi-18x+\log(27)\right)^k}{k}\right)}$$

for $x<0$

$$\frac{11}{10^3} - \frac{6}{5 \log\left(\frac{\pi}{6\sqrt{3}} + \frac{\log(3)}{6}\right)} =$$

$$\frac{11}{1000} - 6 \Bigg/ \left(5 \left(\log(z_0) + \left\lfloor \frac{\arg(\sqrt{3}\,\pi + \log(27) - 18 z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{\left(-\frac{1}{18}\right)^k (\sqrt{3}\,\pi + \log(27) - 18 z_0)^k z_0^{-k}}{k}\right)\right)$$

Integral representation:

$$\frac{11}{10^3} - \frac{6}{5 \log\left(\frac{\pi}{6\sqrt{3}} + \frac{\log(3)}{6}\right)} = \frac{11}{1000} - \frac{6}{5 \int_1^{\frac{1}{18}(\sqrt{3}\,\pi + \log(27))} \frac{1}{t}\, dt}$$

And:

10^3* (((11/10^3-6/(((5ln(((Pi/(6sqrt3) + 1/6 ln 3)))))))))+sqrt2

Input:

$$10^3 \left(\frac{11}{10^3} - \frac{6}{5 \log\left(\frac{\pi}{6\sqrt{3}} + \frac{1}{6}\log(3)\right)}\right) + \sqrt{2}$$

log(x) is the natural logarithm

Exact result:

$$\sqrt{2} + 1000 \left(\frac{11}{1000} - \frac{6}{5 \log\left(\frac{\pi}{6\sqrt{3}} + \frac{\log(3)}{6}\right)}\right)$$

Decimal approximation:

1672.675075996195099059058364994057400785843421163246536955...

1672.675075996… result practically equal to the rest mass of Omega baryon 1672.45

Alternate forms:

$$11 + \sqrt{2} - \frac{1200}{\log\left(\frac{1}{18}(\sqrt{3}\,\pi + \log(27))\right)}$$

$$11+\sqrt{2}-\frac{1200}{\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}$$

$$11+\sqrt{2}-\frac{1200}{\log\left(\frac{1}{2}\left(\sqrt{3}\,\pi+3\log(3)\right)\right)-2\log(3)}$$

Alternative representations:

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}=10^3\left(-\frac{6}{5\log_e\left(\frac{\log(3)}{6}+\frac{\pi}{6\sqrt{3}}\right)}+\frac{11}{10^3}\right)+\sqrt{2}$$

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}=$$
$$10^3\left(-\frac{6}{5\log(a)\log_a\left(\frac{\log(3)}{6}+\frac{\pi}{6\sqrt{3}}\right)}+\frac{11}{10^3}\right)+\sqrt{2}$$

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}=10^3\left(\frac{-6}{-5\,\mathrm{Li}_1\left(1-\frac{\log(3)}{6}-\frac{\pi}{6\sqrt{3}}\right)}+\frac{11}{10^3}\right)+\sqrt{2}$$

Series representations:

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}=11+\sqrt{2}+\frac{1200}{\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{18}\right)^k\left(-18+\sqrt{3}\,\pi+\log(27)\right)^k}{k}}$$

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}=11+\sqrt{2}+$$
$$\frac{1200\,i}{2\pi\left\lfloor\frac{\arg\left(\sqrt{3}\,\pi-18x+\log(27)\right)}{2\pi}\right\rfloor-i\left(\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{18}\right)^k x^{-k}\left(\sqrt{3}\,\pi-18x+\log(27)\right)^k}{k}\right)}\quad\text{for } x<0$$

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}=$$

$$11+\sqrt{2}-1200\Bigg/\left(\log(z_0)+\left\lfloor\frac{\arg(\sqrt{3}\,\pi+\log(27)-18\,z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{18}\right)^k(\sqrt{3}\,\pi+\log(27)-18\,z_0)^k\,z_0^{-k}}{k}\right)$$

Integral representation:

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}=11+\sqrt{2}-\frac{1200}{\int_1^{\frac{1}{18}(\sqrt{3}\,\pi+\log(27))}\frac{1}{t}\,dt}$$

10^3* (((11/10^3-6/(((5ln(((Pi/(6sqrt3) + 1/6 ln 3))))))))+sqrt2+(47+7+2)

Where 2, 7 and 47 are Lucas numbers

Input:

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{1}{6}\log(3)\right)}\right)+\sqrt{2}+(47+7+2)$$

$\log(x)$ is the natural logarithm

Exact result:

$$56+\sqrt{2}+1000\left(\frac{11}{1000}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)$$

Decimal approximation:

1728.675075996195099059058364994057400785843421163246536955...

1728.6750759….

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

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

Alternate forms:

$$67+\sqrt{2}-\frac{1200}{\log\left(\frac{1}{18}\left(\sqrt{3}\,\pi+\log(27)\right)\right)}$$

$$67+\sqrt{2}-\frac{1200}{\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}$$

$$67+\sqrt{2}-\frac{1200}{\log\left(\frac{1}{2}\left(\sqrt{3}\,\pi+3\log(3)\right)\right)-2\log(3)}$$

Alternative representations:

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}+(47+7+2)=$$
$$56+10^3\left(-\frac{6}{5\log_e\left(\frac{\log(3)}{6}+\frac{\pi}{6\sqrt{3}}\right)}+\frac{11}{10^3}\right)+\sqrt{2}$$

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}+(47+7+2)=$$
$$56+10^3\left(-\frac{6}{5\log(a)\log_a\left(\frac{\log(3)}{6}+\frac{\pi}{6\sqrt{3}}\right)}+\frac{11}{10^3}\right)+\sqrt{2}$$

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}+(47+7+2)=$$
$$56+10^3\left(\frac{-6}{-5\,\text{Li}_1\left(1-\frac{\log(3)}{6}-\frac{\pi}{6\sqrt{3}}\right)}+\frac{11}{10^3}\right)+\sqrt{2}$$

Series representations:

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}+(47+7+2)=$$
$$67+\sqrt{2}+\frac{1200}{\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{18}\right)^k\left(-18+\sqrt{3}\,\pi+\log(27)\right)^k}{k}}$$

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}+(47+7+2)=67+\sqrt{2}+$$
$$\frac{1200\,i}{2\pi\left\lfloor\frac{\arg\left(\sqrt{3}\,\pi-18\,x+\log(27)\right)}{2\pi}\right\rfloor-i\left(\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{18}\right)^k x^{-k}\left(\sqrt{3}\,\pi-18\,x+\log(27)\right)^k}{k}\right)}\quad \text{for } x<0$$

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}+(47+7+2)=$$
$$67+\sqrt{2}-1200\Bigg/\left(\log(z_0)+\left\lfloor\frac{\arg\left(\sqrt{3}\,\pi+\log(27)-18\,z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\right.$$
$$\left.\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{18}\right)^k\left(\sqrt{3}\,\pi+\log(27)-18\,z_0\right)^k z_0^{-k}}{k}\right)$$

Integral representation:

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}+(47+7+2)=67+\sqrt{2}-\frac{1200}{\int_1^{\frac{1}{18}\left(\sqrt{3}\,\pi+\log(27)\right)}\frac{1}{t}\,dt}$$

10^3* (((11/10^3-6/(((5ln(((Pi/(6sqrt3) + 1/6 ln 3)))))))))+sqrt2+123-11

Where 2, 11 and 123 are Lucas numbers

Input:

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{1}{6}\log(3)\right)}\right)+\sqrt{2}+123-11$$

$\log(x)$ is the natural logarithm

Exact result:

$$112+\sqrt{2}+1000\left(\frac{11}{1000}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)$$

Decimal approximation:

1784.675075996195099059058364994057400785843421163246536955...

1784.675075996…. result in the range of the hypothetical mass of Gluino (gluino = 1785.16 GeV).

Alternate forms:

$$123+\sqrt{2}-\frac{1200}{\log\left(\frac{1}{18}\left(\sqrt{3}\,\pi+\log(27)\right)\right)}$$

$$123+\sqrt{2}-\frac{1200}{\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}$$

$$123+\sqrt{2}-\frac{1200}{\log\left(\frac{1}{2}\left(\sqrt{3}\,\pi+3\log(3)\right)\right)-2\log(3)}$$

Alternative representations:

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}+123-11=$$
$$112+10^3\left(-\frac{6}{5\log_e\left(\frac{\log(3)}{6}+\frac{\pi}{6\sqrt{3}}\right)}+\frac{11}{10^3}\right)+\sqrt{2}$$

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}+123-11=$$
$$112+10^3\left(-\frac{6}{5\log(a)\log_a\left(\frac{\log(3)}{6}+\frac{\pi}{6\sqrt{3}}\right)}+\frac{11}{10^3}\right)+\sqrt{2}$$

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}+123-11=$$
$$112+10^3\left(\frac{-6}{-5\,\text{Li}_1\left(1-\frac{\log(3)}{6}-\frac{\pi}{6\sqrt{3}}\right)}+\frac{11}{10^3}\right)+\sqrt{2}$$

Series representations:

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}+123-11=$$
$$123+\sqrt{2}+\frac{1200}{\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{18}\right)^k\left(-18+\sqrt{3}\,\pi+\log(27)\right)^k}{k}}$$

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}+123-11=123+\sqrt{2}+$$
$$\frac{1200\,i}{2\pi\left\lfloor\frac{\arg\left(\sqrt{3}\,\pi-18\,x+\log(27)\right)}{2\pi}\right\rfloor-i\left(\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{18}\right)^k x^{-k}\left(\sqrt{3}\,\pi-18\,x+\log(27)\right)^k}{k}\right)}\quad\text{for } x<0$$

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}+123-11=$$
$$123+\sqrt{2}-1200\Bigg/\left(\log(z_0)+\left\lfloor\frac{\arg\left(\sqrt{3}\,\pi+\log(27)-18\,z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{18}\right)^k\left(\sqrt{3}\,\pi+\log(27)-18\,z_0\right)^k z_0^{-k}}{k}\right)$$

Integral representation:

$$10^3\left(\frac{11}{10^3}-\frac{6}{5\log\left(\frac{\pi}{6\sqrt{3}}+\frac{\log(3)}{6}\right)}\right)+\sqrt{2}+123-11=123+\sqrt{2}-\frac{1200}{\int_1^{\frac{1}{18}\left(\sqrt{3}\,\pi+\log(27)\right)}\frac{1}{t}\,dt}$$

Now, we have that:

(2-sqrt3)/1 – ((2-sqrt3)^3)/5 + ((2-sqrt3)^5)/9

Input:

$$\frac{2-\sqrt{3}}{1} - \frac{1}{5}\left(2-\sqrt{3}\right)^3 + \frac{1}{9}\left(2-\sqrt{3}\right)^5$$

Result:

$$2-\sqrt{3} - \frac{1}{5}\left(2-\sqrt{3}\right)^3 + \frac{1}{9}\left(2-\sqrt{3}\right)^5$$

Decimal approximation:

0.2642550838160485484730831969309308793249107246908111115704...

0.264255083…

Alternate forms:

$$\frac{1}{45}\left(1666 - 955\sqrt{3}\right)$$

$$\frac{1666}{45} - \frac{191}{3\sqrt{3}}$$

$$\frac{1666}{45} - \frac{209}{3\sqrt{3}} + 2\sqrt{3}$$

Minimal polynomial:

$$2025x^2 - 149\,940\,x + 39\,481$$

Pi/16 (sqrt3-1)-(sqrt3-1)/4 ln(sqrt3-1)

Input:

$$\frac{\pi}{16}\left(\sqrt{3}-1\right) - \left(\frac{1}{4}\left(\sqrt{3}-1\right)\right)\log\left(\sqrt{3}-1\right)$$

log(x) is the natural logarithm

Exact result:

$$\frac{1}{16}\left(\sqrt{3}-1\right)\pi - \frac{1}{4}\left(\sqrt{3}-1\right)\log\left(\sqrt{3}-1\right)$$

Decimal approximation:

0.2008204822801817653625200976970218881509571772454584567 69...

0.2008204822…

Alternate forms:

$$\frac{1}{16}\left(\sqrt{3}-1\right)\left(\pi-4\log\left(\sqrt{3}-1\right)\right)$$

$$-\frac{\pi}{16}+\frac{\sqrt{3}\,\pi}{16}+\frac{1}{4}\log\left(\sqrt{3}-1\right)-\frac{1}{4}\sqrt{3}\log\left(\sqrt{3}-1\right)$$

Alternative representations:

$$\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)=-\frac{1}{4}\log_e\left(-1+\sqrt{3}\right)\left(-1+\sqrt{3}\right)+\frac{1}{16}\pi\left(-1+\sqrt{3}\right)$$

$$\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)=-\frac{1}{4}\log(a)\log_a\left(-1+\sqrt{3}\right)\left(-1+\sqrt{3}\right)+\frac{1}{16}\pi\left(-1+\sqrt{3}\right)$$

$$\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)=\frac{1}{4}\text{Li}_1\left(2-\sqrt{3}\right)\left(-1+\sqrt{3}\right)+\frac{1}{16}\pi\left(-1+\sqrt{3}\right)$$

Series representations:

$$\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)=\frac{1}{16}\left(-1+\sqrt{3}\right)\left(\pi+4\sum_{k=1}^{\infty}\frac{(-1)^k\left(-2+\sqrt{3}\right)^k}{k}\right)$$

$$\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)=\frac{1}{16}\left(-1+\sqrt{3}\right)\left(\pi-8i\pi\left\lfloor\frac{\arg\left(-1+\sqrt{3}-x\right)}{2\pi}\right\rfloor-4\log(x)+4\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\sqrt{3}-x\right)^k x^{-k}}{k}\right)\quad\text{for } x<0$$

$$\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)=\frac{1}{16}\left(-1+\sqrt{3}\right)\pi-\frac{1}{4}\left(-1+\sqrt{3}\right)\left(2i\pi\left\lfloor\frac{\arg\left(-1+\sqrt{3}-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\sqrt{3}-x\right)^k x^{-k}}{k}\right)\quad\text{for } x<0$$

Integral representation:

$$\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)=\frac{1}{16}\left(-1+\sqrt{3}\right)\left(\pi-4\int_{1}^{-1+\sqrt{3}}\frac{1}{t}\,dt\right)$$

colog(((Pi/16 (sqrt3-1)-(sqrt3-1)/4 ln(sqrt3-1)))

Input:

$$-\log\left(\frac{\pi}{16}\left(\sqrt{3}-1\right)-\left(\frac{1}{4}\left(\sqrt{3}-1\right)\right)\log\left(\sqrt{3}-1\right)\right)$$

$\log(x)$ is the natural logarithm

Exact result:

$$-\log\left(\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\left(\sqrt{3}-1\right)\log\left(\sqrt{3}-1\right)\right)$$

Decimal approximation:

1.605343892979195304559844988372774680397405899482994315954...

1.6053438929…. result very near to the elementary charge

Alternate forms:

$$-\log\left(\frac{1}{16}\left(\sqrt{3}-1\right)\left(\pi-4\log\left(\sqrt{3}-1\right)\right)\right)$$

$$\log(16)-\log\left(\left(\sqrt{3}-1\right)\left(\pi-4\log\left(\sqrt{3}-1\right)\right)\right)$$

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

Alternative representations:

$$-\log\left(\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)\right)=-\log_e\left(-\frac{1}{4}\log\left(-1+\sqrt{3}\right)\left(-1+\sqrt{3}\right)+\frac{1}{16}\pi\left(-1+\sqrt{3}\right)\right)$$

$$-\log\left(\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)\right)=-\log(a)\log_a\left(-\frac{1}{4}\log\left(-1+\sqrt{3}\right)\left(-1+\sqrt{3}\right)+\frac{1}{16}\pi\left(-1+\sqrt{3}\right)\right)$$

$$-\log\left(\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)\right)=$$
$$\text{Li}_1\left(1+\frac{1}{4}\log\left(-1+\sqrt{3}\right)\left(-1+\sqrt{3}\right)-\frac{1}{16}\pi\left(-1+\sqrt{3}\right)\right)$$

Series representations:

$$-\log\left(\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)\right)=$$
$$\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1}{16}\left(-1+\sqrt{3}\right)\pi-\frac{1}{4}\left(-1+\sqrt{3}\right)\log\left(-1+\sqrt{3}\right)\right)^k}{k}$$

$$-\log\left(\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)\right)=$$
$$-2i\pi\left\lfloor\frac{\arg\left(\frac{1}{16}\left(-1+\sqrt{3}\right)\pi-x-\frac{1}{4}\left(-1+\sqrt{3}\right)\log\left(-1+\sqrt{3}\right)\right)}{2\pi}\right\rfloor-\log(x)+$$
$$\sum_{k=1}^{\infty}\frac{(-1)^k x^{-k}\left(\frac{1}{16}\left(-1+\sqrt{3}\right)\pi-x-\frac{1}{4}\left(-1+\sqrt{3}\right)\log\left(-1+\sqrt{3}\right)\right)^k}{k}\quad\text{for } x<0$$

$$-\log\left(\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)\right)=-2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor-$$
$$\log(z_0)+\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{1}{16}\left(-1+\sqrt{3}\right)\pi-\frac{1}{4}\left(-1+\sqrt{3}\right)\log\left(-1+\sqrt{3}\right)-z_0\right)^k z_0^{-k}}{k}$$

Integral representation:

$$-\log\left(\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)\right)=-\int_1^{\frac{1}{16}\left(-1+\sqrt{3}\right)\left(\pi-4\log\left(-1+\sqrt{3}\right)\right)}\frac{1}{t}\,dt$$

((Pi/16 (sqrt3-1)-(sqrt3-1)/4 ln(sqrt3-1)))^1/256

Input:

$$\sqrt[256]{\frac{\pi}{16}\left(\sqrt{3}-1\right)-\left(\frac{1}{4}\left(\sqrt{3}-1\right)\right)\log\left(\sqrt{3}-1\right)}$$

$\log(x)$ is the natural logarithm

Exact result:

$$\sqrt[256]{\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\left(\sqrt{3}-1\right)\log\left(\sqrt{3}-1\right)}$$

Decimal approximation:

0.9937487463172384340638297371839821053498848864758386955558...

0.9937487463172… result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Alternate forms:

$$\frac{\sqrt[256]{\left(\sqrt{3}-1\right)\left(\pi-4\log\left(\sqrt{3}-1\right)\right)}}{\sqrt[64]{2}}$$

$$\sqrt[256]{\frac{1}{16}\left(\sqrt{3}-1\right)\pi+\frac{1}{4}\left(1-\sqrt{3}\right)\log\left(\sqrt{3}-1\right)}$$

All 256th roots of 1/16 (sqrt(3) - 1) π - 1/4 (sqrt(3) - 1) log(sqrt(3) - 1):

$$e^0\sqrt[256]{\frac{1}{16}\left(\sqrt{3}-1\right)\pi+\frac{1}{4}\left(1-\sqrt{3}\right)\log\left(\sqrt{3}-1\right)}\approx 0.993749$$ (real, principal root)

$$e^{(i\pi)/128}\sqrt[256]{\frac{1}{16}\left(\sqrt{3}-1\right)\pi+\frac{1}{4}\left(1-\sqrt{3}\right)\log\left(\sqrt{3}-1\right)}\approx 0.993449+0.024388\,i$$

$$e^{(i\pi)/64}\sqrt[256]{\frac{1}{16}\left(\sqrt{3}-1\right)\pi+\frac{1}{4}\left(1-\sqrt{3}\right)\log\left(\sqrt{3}-1\right)}\approx 0.992552+0.048761\,i$$

$$e^{(3 i \pi)/128} \sqrt[256]{\frac{1}{16}\left(\sqrt{3}-1\right)\pi+\frac{1}{4}\left(1-\sqrt{3}\right)\log\left(\sqrt{3}-1\right)} \approx 0.991056+0.07310 i$$

$$e^{(i \pi)/32} \sqrt[256]{\frac{1}{16}\left(\sqrt{3}-1\right)\pi+\frac{1}{4}\left(1-\sqrt{3}\right)\log\left(\sqrt{3}-1\right)} \approx 0.988964+0.09740 i$$

Alternative representations:

$$\sqrt[256]{\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)} = \sqrt[256]{-\frac{1}{4}\log_e\left(-1+\sqrt{3}\right)\left(-1+\sqrt{3}\right)+\frac{1}{16}\pi\left(-1+\sqrt{3}\right)}$$

$$\sqrt[256]{\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)} = \sqrt[256]{-\frac{1}{4}\log(a)\log_a\left(-1+\sqrt{3}\right)\left(-1+\sqrt{3}\right)+\frac{1}{16}\pi\left(-1+\sqrt{3}\right)}$$

$$\sqrt[256]{\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)} = \sqrt[256]{\frac{1}{4}\operatorname{Li}_1\left(2-\sqrt{3}\right)\left(-1+\sqrt{3}\right)+\frac{1}{16}\pi\left(-1+\sqrt{3}\right)}$$

Series representations:

$$\sqrt[256]{\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)} = \frac{\sqrt[256]{-1+\sqrt{3}}\ \sqrt[256]{\pi+4\sum_{k=1}^{\infty}\frac{(-1)^k\left(-2+\sqrt{3}\right)^k}{k}}}{\sqrt[64]{2}}$$

$$\sqrt[256]{\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)} = \left(\frac{1}{16}\left(-1+\sqrt{3}\right)\pi-\frac{1}{4}\left(-1+\sqrt{3}\right)\left(2 i \pi\left\lfloor\frac{\arg\left(-1+\sqrt{3}-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\sqrt{3}-x\right)^k x^{-k}}{k}\right)\right)^{\wedge}(1/256) \quad \text{for } x<0$$

$$\sqrt[256]{\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)} = \frac{1}{\sqrt[64]{2}}$$
$$\sqrt[256]{-1+\sqrt{3}}\left(\pi-4\left(\log(z_0)+\left\lfloor\frac{\arg(-1+\sqrt{3}-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(-1+\sqrt{3}-z_0)^k z_0^{-k}}{k}\right)\right)^\wedge(1/256)$$

Integral representation:

$$\sqrt[256]{\frac{1}{16}\left(\sqrt{3}-1\right)\pi-\frac{1}{4}\log\left(\sqrt{3}-1\right)\left(\sqrt{3}-1\right)} = \frac{\sqrt[256]{-1+\sqrt{3}}\ \sqrt[256]{\pi-4\int_1^{-1+\sqrt{3}}\frac{1}{t}\,dt}}{\sqrt[64]{2}}$$

1/2 * log base 0.9937487463172 ((Pi/16 (sqrt3-1)-(sqrt3-1)/4 ln(sqrt3-1)))-Pi+1/golden ratio

Input interpretation:

$$\frac{1}{2}\log_{0.9937487463172}\left(\frac{\pi}{16}\left(\sqrt{3}-1\right)-\left(\frac{1}{4}\left(\sqrt{3}-1\right)\right)\log\left(\sqrt{3}-1\right)\right)-\pi+\frac{1}{\phi}$$

$\log(x)$ is the natural logarithm

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

ϕ is the golden ratio

Result:

125.47644133...

125.47644133… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Alternative representations:

$$\frac{1}{2}\log_{0.99374874631720000}\left(\frac{1}{16}\pi\left(\sqrt{3}-1\right)-\frac{1}{4}\left(\sqrt{3}-1\right)\log\left(\sqrt{3}-1\right)\right)-\pi+\frac{1}{\phi}=$$
$$-\pi+\frac{1}{2}\log_{0.99374874631720000}\left(-\frac{1}{4}\log_e\left(-1+\sqrt{3}\right)\left(-1+\sqrt{3}\right)+\frac{1}{16}\pi\left(-1+\sqrt{3}\right)\right)+\frac{1}{\phi}$$

$$\frac{1}{2}\log_{0.99374874631720000}\left(\frac{1}{16}\pi\left(\sqrt{3}-1\right)-\frac{1}{4}\left(\sqrt{3}-1\right)\log\left(\sqrt{3}-1\right)\right)-\pi+\frac{1}{\phi}=$$
$$-\pi+\frac{1}{\phi}+\frac{\log\left(-\frac{1}{4}\log\left(-1+\sqrt{3}\right)\left(-1+\sqrt{3}\right)+\frac{1}{16}\pi\left(-1+\sqrt{3}\right)\right)}{2\log(0.99374874631720000)}$$

$$\frac{1}{2}\log_{0.99374874631720000}\left(\frac{1}{16}\pi\left(\sqrt{3}-1\right)-\frac{1}{4}\left(\sqrt{3}-1\right)\log\left(\sqrt{3}-1\right)\right)-\pi+\frac{1}{\phi}=$$
$$-\pi+\frac{1}{2}\log_{0.99374874631720000}\left(-\frac{1}{4}\log(a)\log_a\left(-1+\sqrt{3}\right)\left(-1+\sqrt{3}\right)+\frac{1}{16}\pi\left(-1+\sqrt{3}\right)\right)+\frac{1}{\phi}$$

Series representations:

$$\frac{1}{2}\log_{0.99374874631720000}\left(\frac{1}{16}\pi\left(\sqrt{3}-1\right)-\frac{1}{4}\left(\sqrt{3}-1\right)\log\left(\sqrt{3}-1\right)\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1}{16}\pi\left(-1+\sqrt{3}\right)-\frac{1}{4}\log\left(-1+\sqrt{3}\right)\left(-1+\sqrt{3}\right)\right)^k}{k}}{2\log(0.99374874631720000)}$$

$$\frac{1}{2}\log_{0.99374874631720000}\left(\frac{1}{16}\pi\left(\sqrt{3}-1\right)-\frac{1}{4}\left(\sqrt{3}-1\right)\log\left(\sqrt{3}-1\right)\right)-\pi+\frac{1}{\phi}=$$
$$-\frac{1}{2\phi}\left(-2+2\phi\pi-\phi\log_{0.99374874631720000}\left(\frac{1}{16}\left(-1+\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\left(\pi+4\sum_{k=1}^{\infty}\frac{(-1)^k\left(-2+\sqrt{3}\right)^k}{k}\right)\right)\right) \text{ for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\frac{1}{2}\log_{0.99374874631720000}\left(\frac{1}{16}\pi\left(\sqrt{3}-1\right)-\frac{1}{4}\left(\sqrt{3}-1\right)\log\left(\sqrt{3}-1\right)\right)-\pi+\frac{1}{\phi}=$$
$$-\frac{1}{2\phi}\left(-2+2\phi\pi-\phi\log_{0.99374874631720000}\left(\frac{1}{16}\pi\left(-1+\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(3-z_0)/(2\pi)\rfloor} z_0^{1/2(1+\lfloor\arg(3-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right)+\frac{1}{4}\left(\sum_{k=1}^{\infty}\frac{(-1)^k\left(-2+\sqrt{3}\right)^k}{k}\right)\left(-1+\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(3-z_0)/(2\pi)\rfloor} z_0^{1/2(1+\lfloor\arg(3-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right)\right)\right)$$

Integral representation:

$$\frac{1}{2}\log_{0.99374874631720000}\left(\frac{1}{16}\pi\left(\sqrt{3}-1\right)-\frac{1}{4}\left(\sqrt{3}-1\right)\log\left(\sqrt{3}-1\right)\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+\frac{1}{2}\log_{0.99374874631720000}\left(\frac{1}{16}\left(\pi-4\int_1^{-1+\sqrt{3}}\frac{1}{t}\,dt\right)\left(-1+\sqrt{3}\right)\right)$$

1/16 * log base 0.9937487463172 ((Pi/16 (sqrt3-1)-(sqrt3-1)/4 ln(sqrt3-1)))+1/golden ratio

Input interpretation:

$$\frac{1}{16}\log_{0.9937487463172}\left(\frac{\pi}{16}\left(\sqrt{3}-1\right)-\left(\frac{1}{4}\left(\sqrt{3}-1\right)\right)\log\left(\sqrt{3}-1\right)\right)+\frac{1}{\phi}$$

Result:

16.618033989...

16.618033989… result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternative representations:

$$\frac{1}{16}\log_{0.99374874631720000}\left(\frac{1}{16}\pi\left(\sqrt{3}-1\right)-\frac{1}{4}\left(\sqrt{3}-1\right)\log\left(\sqrt{3}-1\right)\right)+\frac{1}{\phi}=$$
$$\frac{1}{16}\log_{0.99374874631720000}\left(-\frac{1}{4}\log_e\left(-1+\sqrt{3}\right)\left(-1+\sqrt{3}\right)+\frac{1}{16}\pi\left(-1+\sqrt{3}\right)\right)+\frac{1}{\phi}$$

$$\frac{1}{16}\log_{0.99374874631720000}\left(\frac{1}{16}\pi\left(\sqrt{3}-1\right)-\frac{1}{4}\left(\sqrt{3}-1\right)\log\left(\sqrt{3}-1\right)\right)+\frac{1}{\phi}=$$
$$\frac{1}{\phi}+\frac{\log\left(-\frac{1}{4}\log\left(-1+\sqrt{3}\right)\left(-1+\sqrt{3}\right)+\frac{1}{16}\pi\left(-1+\sqrt{3}\right)\right)}{16\log(0.99374874631720000)}$$

$$\frac{1}{16}\log_{0.99374874631720000}\left(\frac{1}{16}\pi\left(\sqrt{3}-1\right)-\frac{1}{4}\left(\sqrt{3}-1\right)\log\left(\sqrt{3}-1\right)\right)+\frac{1}{\phi}=$$
$$\frac{1}{16}\log_{0.99374874631720000}\left(-\frac{1}{4}\log(a)\log_a\left(-1+\sqrt{3}\right)\left(-1+\sqrt{3}\right)+\frac{1}{16}\pi\left(-1+\sqrt{3}\right)\right)+\frac{1}{\phi}$$

Series representations:

$$\frac{1}{16}\log_{0.99374874631720000}\left(\frac{1}{16}\pi\left(\sqrt{3}-1\right)-\frac{1}{4}\left(\sqrt{3}-1\right)\log\left(\sqrt{3}-1\right)\right)+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1}{16}\pi\left(-1+\sqrt{3}\right)-\frac{1}{4}\log\left(-1+\sqrt{3}\right)\left(-1+\sqrt{3}\right)\right)^k}{k}}{16\log(0.99374874631720000)}$$

$$\frac{1}{16}\log_{0.99374874631720000}\left(\frac{1}{16}\pi\left(\sqrt{3}-1\right)-\frac{1}{4}\left(\sqrt{3}-1\right)\log\left(\sqrt{3}-1\right)\right)+\frac{1}{\phi}=$$
$$\frac{1}{16\phi}\left(16+\phi\log_{0.99374874631720000}\left(\frac{1}{16}\left(-1+\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\left(\pi+4\sum_{k=1}^{\infty}\frac{(-1)^k\left(-2+\sqrt{3}\right)^k}{k}\right)\right)\right) \text{ for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\frac{1}{16}\log_{0.99374874631720000}\left(\frac{1}{16}\pi\left(\sqrt{3}-1\right)-\frac{1}{4}\left(\sqrt{3}-1\right)\log\left(\sqrt{3}-1\right)\right)+\frac{1}{\phi}=$$

$$\frac{1}{16\phi}\left(16+\phi\log_{0.99374874631720000}\left(\frac{1}{16}\pi\left(-1+\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(3-z_0)/(2\pi)\rfloor} z_0^{1/2(1+\lfloor\arg(3-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right)+\frac{1}{4}\left(\sum_{k=1}^{\infty}\frac{(-1)^k\left(-2+\sqrt{3}\right)^k}{k}\right)\left(-1+\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(3-z_0)/(2\pi)\rfloor} z_0^{1/2(1+\lfloor\arg(3-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right)\right)\right)$$

Integral representation:

$$\frac{1}{16}\log_{0.99374874631720000}\left(\frac{1}{16}\pi\left(\sqrt{3}-1\right)-\frac{1}{4}\left(\sqrt{3}-1\right)\log\left(\sqrt{3}-1\right)\right)+\frac{1}{\phi}=$$

$$\frac{1}{\phi}+\frac{1}{16}\log_{0.99374874631720000}\left(\frac{1}{16}\left(\pi-4\int_1^{-1+\sqrt{3}}\frac{1}{t}\,dt\right)\left(-1+\sqrt{3}\right)\right)$$

Now, we have:

(sqrt3-1)/1 – ((sqrt3-1)^4)/4 + ((sqrt3-1)^7)/7

Input:

$$\frac{\sqrt{3}-1}{1}-\frac{1}{4}\left(\sqrt{3}-1\right)^4+\frac{1}{7}\left(\sqrt{3}-1\right)^7$$

Result:

$$-1+\sqrt{3}-\frac{1}{4}\left(\sqrt{3}-1\right)^4+\frac{1}{7}\left(\sqrt{3}-1\right)^7$$

Decimal approximation:

0.67634902107177965006614599523309560003404387616688114060 8...

0.67634902107…

Alternate forms:

$$\frac{3}{7}\left(121\sqrt{3}-208\right)$$

$$\frac{363\sqrt{3}}{7} - \frac{624}{7}$$

$$\frac{1}{7}\left(363\sqrt{3} - 624\right)$$

Minimal polynomial:

$$49x^2 + 8736x - 5931$$

Pi/(4sqrt3)+1/3 ln (((1+sqrt3)/sqrt2))

Input:

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

$\log(x)$ is the natural logarithm

Decimal approximation:

0.6729428238793572474193606222952003404088468906011045571 87...

0.672942823879…

Alternate forms:

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

$$\frac{1}{12}\left(\sqrt{3}\,\pi + \log\left(7+4\sqrt{3}\right)\right)$$

$$\frac{1}{12}\left(\sqrt{3}\,\pi - \log(4) + 4\log\left(1+\sqrt{3}\right)\right)$$

Alternative representations:

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

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

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

Series representations:

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

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

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

Integral representations:

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

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

1/10^27*(((1+ Pi/(4sqrt3)+1/3 ln (((1+sqrt3)/sqrt2)))))

Input:

$$\frac{1}{10^{27}}\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)$$

log(x) is the natural logarithm

Exact result:

$$\frac{1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

Decimal approximation:

1.672942823879357247419360622295200340408846890601 1045... × 10^{-27}

1.672942823…*10^{-27} result practically equal to the proton mass

Alternate forms:

$$\frac{12+\sqrt{3}\,\pi+\log(7+4\sqrt{3})}{12\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

$$\frac{1+\frac{\pi}{4\sqrt{3}}+\frac{1}{6}\log(2+\sqrt{3})}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

$$\frac{12+\sqrt{3}\,\pi+4\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)}{12\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

Alternative representations:

$$\frac{1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)}{10^{27}}=\frac{1+\frac{1}{3}\log_e\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)+\frac{\pi}{4\sqrt{3}}}{10^{27}}$$

$$\frac{1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)}{10^{27}}=\frac{1+\frac{1}{3}\log(a)\log_a\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)+\frac{\pi}{4\sqrt{3}}}{10^{27}}$$

$$\frac{1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)}{10^{27}}=\frac{1-\frac{1}{3}\operatorname{Li}_1\left(1-\frac{1+\sqrt{3}}{\sqrt{2}}\right)+\frac{\pi}{4\sqrt{3}}}{10^{27}}$$

Integral representations:

$$\frac{1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)}{10^{27}} = \frac{1}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000} + \frac{\pi}{4\,000\,000\,000\,000\,000\,000\,000\,000\,000\sqrt{3}} + \frac{1}{3\,000\,000\,000\,000\,000\,000\,000\,000\,000}\int_1^{\frac{1+\sqrt{3}}{\sqrt{2}}}\frac{1}{t}\,dt$$

$$\frac{1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)}{10^{27}} = \frac{1}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000} + \frac{\pi}{4\,000\,000\,000\,000\,000\,000\,000\,000\,000\sqrt{3}} - \frac{i}{6\,000\,000\,000\,000\,000\,000\,000\,000\,000\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\left(\frac{2}{-2+\sqrt{2}+\sqrt{6}}\right)^s\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

10^3* (((1+ Pi/(4sqrt3)+1/3 ln (((1+sqrt3)/sqrt2)))))

Input:

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

log(x) is the natural logarithm

Exact result:

$$1000\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)$$

Decimal approximation:

1672.942823879357247419360622295200340408846890601104557187...

1672.942823879…. result practically equal to the rest mass of Omega baryon 1672.45

Alternate forms:

$$\frac{250}{3}\left(12+\sqrt{3}\,\pi+\log\left(7+4\sqrt{3}\right)\right)$$

$$1000\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{6}\log\left(2+\sqrt{3}\right)\right)$$

$$1000 + \frac{250\,\pi}{\sqrt{3}} - \frac{500\log(2)}{3} + \frac{1000}{3}\log\left(1+\sqrt{3}\right)$$

Alternative representations:

$$10^3\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right) = 10^3\left(1+\frac{1}{3}\log_e\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)+\frac{\pi}{4\sqrt{3}}\right)$$

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

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

Series representations:

$$10^3\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right) = 1000+\frac{250\,\pi}{\sqrt{3}}-\frac{1000}{3}\sum_{k=1}^{\infty}\frac{\left(1-\sqrt{\frac{3}{2}}-\frac{1}{\sqrt{2}}\right)^k}{k}$$

$$10^3\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right) = 1000+\frac{250\,\pi}{\sqrt{3}}+\frac{2000}{3}\,i\,\pi\left\lfloor\frac{\arg\left(\sqrt{\frac{3}{2}}+\frac{1}{\sqrt{2}}-x\right)}{2\,\pi}\right\rfloor+$$
$$\frac{1000\log(x)}{3}-\frac{1000}{3}\sum_{k=1}^{\infty}\frac{(-1)^k\left(\sqrt{\frac{3}{2}}+\frac{1}{\sqrt{2}}-x\right)^k x^{-k}}{k}\quad\text{for } x<0$$

$$10^3\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right) = 1000+\frac{250\,\pi}{\sqrt{3}}+\frac{2000}{3}\,i\,\pi\left\lfloor\frac{\arg\left(\frac{1+\sqrt{3}}{\sqrt{2}}-x\right)}{2\,\pi}\right\rfloor+$$
$$\frac{1000\log(x)}{3}-\frac{1000}{3}\sum_{k=1}^{\infty}\frac{(-1)^k\left(\sqrt{\frac{3}{2}}+\frac{1}{\sqrt{2}}-x\right)^k x^{-k}}{k}\quad\text{for } x<0$$

Integral representations:

$$10^3\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right) = 1000+\frac{250\,\pi}{\sqrt{3}}+\frac{1000}{3}\int_1^{\frac{1+\sqrt{3}}{\sqrt{2}}}\frac{1}{t}\,dt$$

$$10^3\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right) =$$

$$1000+\frac{250\pi}{\sqrt{3}}-\frac{500\,i}{3\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\left(\frac{2}{-2+\sqrt{2}+\sqrt{6}}\right)^s\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

10^3* (((1+ Pi/(4sqrt3)+1/3 ln (((1+sqrt3)/sqrt2))))) + (47+7+2)

Input:

$$10^3\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)+(47+7+2)$$

log(x) is the natural logarithm

Exact result:

$$56+1000\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)$$

Decimal approximation:

1728.942823879357247419360622295200340408846890601104557187...

1728.9428238…

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

Alternate forms:

$$1056+\frac{250\pi}{\sqrt{3}}+\frac{500}{3}\log\left(2+\sqrt{3}\right)$$

$$1056+\frac{250\pi}{\sqrt{3}}-\frac{500\log(2)}{3}+\frac{1000}{3}\log\left(1+\sqrt{3}\right)$$

$$1056+\frac{250\pi}{\sqrt{3}}+\frac{1000}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)$$

Alternative representations:

$$10^3\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)+(47+7+2)=$$
$$56+10^3\left(1+\frac{1}{3}\log_e\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)+\frac{\pi}{4\sqrt{3}}\right)$$

$$10^3\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)+(47+7+2)=$$
$$56+10^3\left(1+\frac{1}{3}\log(a)\log_a\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)+\frac{\pi}{4\sqrt{3}}\right)$$

$$10^3\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)+(47+7+2)=$$
$$56+10^3\left(1-\frac{1}{3}\operatorname{Li}_1\left(1-\frac{1+\sqrt{3}}{\sqrt{2}}\right)+\frac{\pi}{4\sqrt{3}}\right)$$

Series representations:

$$10^3\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)+(47+7+2)=$$
$$1056+\frac{250\pi}{\sqrt{3}}-\frac{1000}{3}\sum_{k=1}^{\infty}\frac{\left(1-\sqrt{\frac{3}{2}}-\frac{1}{\sqrt{2}}\right)^k}{k}$$

$$10^3\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)+(47+7+2)=$$
$$1056+\frac{250\pi}{\sqrt{3}}+\frac{2000}{3}i\pi\left\lfloor\frac{\arg\left(\sqrt{\frac{3}{2}}+\frac{1}{\sqrt{2}}-x\right)}{2\pi}\right\rfloor+$$
$$\frac{1000\log(x)}{3}-\frac{1000}{3}\sum_{k=1}^{\infty}\frac{(-1)^k\left(\sqrt{\frac{3}{2}}+\frac{1}{\sqrt{2}}-x\right)^k x^{-k}}{k}\quad\text{for } x<0$$

$$10^3\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)+(47+7+2)=$$
$$1056+\frac{250\pi}{\sqrt{3}}+\frac{2000}{3}i\pi\left\lfloor\frac{\arg\left(\frac{1+\sqrt{3}}{\sqrt{2}}-x\right)}{2\pi}\right\rfloor+\frac{1000\log(x)}{3}-$$
$$\frac{1000}{3}\sum_{k=1}^{\infty}\frac{(-1)^k\left(\sqrt{\frac{3}{2}}+\frac{1}{\sqrt{2}}-x\right)^k x^{-k}}{k}\quad\text{for } x<0$$

Integral representations:

$$10^3\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)+(47+7+2)=1056+\frac{250\pi}{\sqrt{3}}+\frac{1000}{3}\int_1^{\frac{1+\sqrt{3}}{\sqrt{2}}}\frac{1}{t}\,dt$$

$$10^3\left(1+\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)+(47+7+2)=$$
$$1056+\frac{250\pi}{\sqrt{3}}-\frac{500i}{3\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\left(\frac{2}{-2+\sqrt{2}+\sqrt{6}}\right)^s\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\quad\text{for } -1<\gamma<0$$

(((Pi/(4sqrt3)+1/3 ln (((1+sqrt3)/sqrt2))))^1/64

Input:

$$\sqrt[64]{\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)}$$

$\log(x)$ is the natural logarithm

Decimal approximation:

0.993830129336892848481245596425518566332174439394912164630...

0.9938301293…. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Alternate forms:

$$\frac{\sqrt[64]{\frac{1}{3}\left(\sqrt{3}\,\pi+\cosh^{-1}(7)\right)}}{\sqrt[32]{2}}$$

$$\sqrt[64]{\frac{\pi}{4\sqrt{3}}+\frac{1}{6}\log\left(2+\sqrt{3}\right)}$$

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

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

All 64th roots of π/(4 sqrt(3)) + 1/3 log((1 + sqrt(3))/sqrt(2)):

$$e^0\sqrt[64]{\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)} \approx 0.993830 \text{ (real, principal root)}$$

$$e^{(i\pi)/32}\sqrt[64]{\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)} \approx 0.989045+0.09741\,i$$

$$e^{(i\pi)/16}\sqrt[64]{\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)} \approx 0.97473+0.19389\,i$$

$$e^{(3i\pi)/32}\sqrt[64]{\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)} \approx 0.95104+0.28849\,i$$

$$e^{(i\pi)/8}\sqrt[64]{\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)}\approx 0.91818+0.38032\,i$$

Alternative representations:

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

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

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

Series representations:

$$\sqrt[64]{\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)}=\sqrt[64]{\frac{\pi}{4\sqrt{3}}-\frac{1}{3}\sum_{k=1}^{\infty}\frac{\left(1-\frac{1+\sqrt{3}}{\sqrt{2}}\right)^k}{k}}$$

$$\sqrt[64]{\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)}=$$
$$\sqrt[64]{\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\left(2\,i\,\pi\left\lfloor\frac{\arg\left(\frac{1+\sqrt{3}}{\sqrt{2}}-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\sqrt{\frac{3}{2}}+\frac{1}{\sqrt{2}}-x\right)^k x^{-k}}{k}\right)}\quad\text{for } x<0$$

$$\sqrt[64]{\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)}=\left(\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\left(2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\right.\right.$$
$$\left.\left.\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\sqrt{\frac{3}{2}}+\frac{1}{\sqrt{2}}-z_0\right)^k z_0^{-k}}{k}\right)\right)\hat{}\,(1/64)$$

Integral representations:

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

$$\sqrt[64]{\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)}=\sqrt[64]{\frac{\pi}{4\sqrt{3}}-\frac{i}{6\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\left(-1+\frac{1+\sqrt{3}}{\sqrt{2}}\right)^{-s}\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}$$

for $-1<\gamma<0$

2 log base 0.9938301293368 (((((Pi/(4sqrt3)+1/3 ln (((1+sqrt3)/sqrt2))))))-Pi+1/golden ratio

Input interpretation:

$$2\log_{0.9938301293368}\left(\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)-\pi+\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

125.47644133...

125.47644133… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Alternative representations:

$$2\log_{0.99383012933680000}\left(\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)-\pi+\frac{1}{\phi}=$$
$$-\pi+2\log_{0.99383012933680000}\left(\frac{1}{3}\log_e\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)+\frac{\pi}{4\sqrt{3}}\right)+\frac{1}{\phi}$$

$$2\log_{0.99383012933680000}\left(\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)-\pi+\frac{1}{\phi}=$$
$$-\pi+\frac{1}{\phi}+\frac{2\log\left(\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)+\frac{\pi}{4\sqrt{3}}\right)}{\log(0.99383012933680000)}$$

$$2\log_{0.99383012933680000}\left(\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)-\pi+\frac{1}{\phi}=$$
$$-\pi+2\log_{0.99383012933680000}\left(\frac{1}{3}\log(a)\log_a\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)+\frac{\pi}{4\sqrt{3}}\right)+\frac{1}{\phi}$$

Series representations:

$$2\log_{0.99383012933680000}\left(\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi-\frac{2\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)+\frac{\pi}{4\sqrt{3}}\right)^k}{k}}{\log(0.99383012933680000)}$$

$$2\log_{0.99383012933680000}\left(\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)-\pi+\frac{1}{\phi}=-\frac{1}{\phi}\left(-1+\phi\,\pi-\right.$$
$$2\,\phi\log_{0.99383012933680000}\left(\frac{\pi}{4\exp\left(i\,\pi\left\lfloor\frac{\arg(3-x)}{2\,\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}-\right.$$
$$\left.\left.\frac{1}{3}\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1+\sqrt{3}}{\sqrt{2}}\right)^k}{k}\right)\right)\text{ for }(x\in\mathbb{R}\text{ and }x<0)$$

$$2\log_{0.99383012933680000}\left(\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)-\pi+\frac{1}{\phi}=$$
$$-\frac{1}{\phi}\left(-1+\phi\,\pi-2\,\phi\log_{0.99383012933680000}\left(-\frac{1}{3}\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1+\sqrt{3}}{\sqrt{2}}\right)^k}{k}+\right.\right.$$
$$\left.\left.\frac{\pi\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(3-z_0)/(2\pi)\rfloor}z_0^{1/2(-1-\lfloor\arg(3-z_0)/(2\pi)\rfloor)}}{4\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}}\right)\right)$$

Integral representations:

$$2\log_{0.99383012933680000}\left(\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+2\log_{0.99383012933680000}\left(\frac{1}{3}\int_1^{\frac{1+\sqrt{3}}{\sqrt{2}}}\frac{1}{t}\,dt+\frac{\pi}{4\sqrt{3}}\right)$$

$$2\log_{0.9938301293368000}\left(\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi+2\log_{0.9938301293368000}\left(\frac{1}{6 i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)\left(-1+\frac{1+\sqrt{3}}{\sqrt{2}}\right)^{-s}}{\Gamma(1-s)}\,ds+\frac{\pi}{4\sqrt{3}}\right) \quad \text{for } -1<\gamma<0$$

Note that, this result, the dilaton mass calculated as a type of Higgs boson, is ALWAYS linked to the golden ratio. Indeed, we have that:

2 log base 0.9938301293368 (((((Pi/(4sqrt3)+1/3 ln (((1+sqrt3)/sqrt2)))))))-Pi+1/x = 125.47644133

Input interpretation:

$$2\log_{0.9938301293368}\left(\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)-\pi+\frac{1}{x}=125.47644133$$

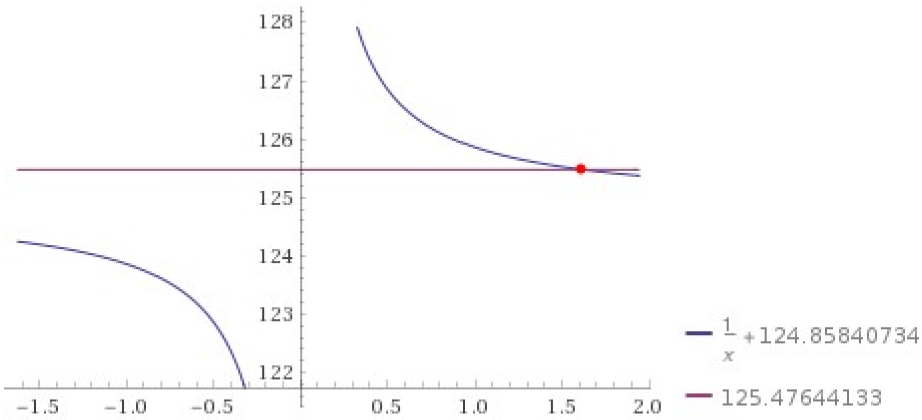
log(x) is the natural logarithm

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

Result:

$$\frac{1}{x}+124.85840734=125.47644133$$

Plot:



Alternate form assuming x is real:

$$\frac{1.6180340}{x}=1.0000000$$

Alternate form:

$$\frac{124.8584073\,(1.0000000000\,x + 0.008009072206)}{x} = 125.47644133$$

Alternate form assuming x is positive:

$1.0000000\,x = 1.6180340$ (for $x \neq 0$)

Solution:

$x \approx 1.6180340$

1.6180340 = golden ratio

1/4 log base 0.9938301293368 (((((Pi/(4sqrt3)+1/3 ln (((1+sqrt3)/sqrt2)))))))+1/golden ratio

Input interpretation:

$$\frac{1}{4}\log_{0.9938301293368}\left(\frac{\pi}{4\sqrt{3}} + \frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right) + \frac{1}{\phi}$$

ϕ is the golden ratio

Result:

16.618033989...

16.61803398… result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternative representations:

$$\frac{1}{4}\log_{0.99383012933680000}\left(\frac{\pi}{4\sqrt{3}} + \frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right) + \frac{1}{\phi} = \frac{1}{4}\log_{0.99383012933680000}\left(\frac{1}{3}\log_e\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right) + \frac{\pi}{4\sqrt{3}}\right) + \frac{1}{\phi}$$

$$\frac{1}{4}\log_{0.99383012933680000}\left(\frac{\pi}{4\sqrt{3}} + \frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right) + \frac{1}{\phi} = \frac{1}{\phi} + \frac{\log\left(\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right) + \frac{\pi}{4\sqrt{3}}\right)}{4\log(0.99383012933680000)}$$

$$\frac{1}{4}\log_{0.99383012933680000}\left(\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)+\frac{1}{\phi}=$$
$$\frac{1}{4}\log_{0.99383012933680000}\left(\frac{1}{3}\log(a)\log_a\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)+\frac{\pi}{4\sqrt{3}}\right)+\frac{1}{\phi}$$

Series representations:

$$\frac{1}{4}\log_{0.99383012933680000}\left(\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)+\frac{\pi}{4\sqrt{3}}\right)^k}{k}}{4\log(0.99383012933680000)}$$

$$\frac{1}{4}\log_{0.99383012933680000}\left(\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)+\frac{1}{\phi}=$$
$$\frac{1}{4\phi}\left(4+\phi\log_{0.99383012933680000}\left(\frac{\pi}{4\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}-\frac{1}{3}\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1+\sqrt{3}}{\sqrt{2}}\right)^k}{k}\right)\right)\quad\text{for }(x\in\mathbb{R}\text{ and }x<0)$$

$$\frac{1}{4}\log_{0.99383012933680000}\left(\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)+\frac{1}{\phi}=$$
$$\frac{1}{4\phi}\left(4+\phi\log_{0.99383012933680000}\left(-\frac{1}{3}\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1+\sqrt{3}}{\sqrt{2}}\right)^k}{k}+\frac{\pi\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(3-z_0)/(2\pi)\rfloor}z_0^{1/2(-1-\lfloor\arg(3-z_0)/(2\pi)\rfloor)}}{4\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}}\right)\right)$$

Integral representations:

$$\frac{1}{4}\log_{0.99383012933680000}\left(\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)+\frac{1}{\phi}=$$
$$\frac{1}{\phi}+\frac{1}{4}\log_{0.99383012933680000}\left(\frac{1}{3}\int_1^{\frac{1+\sqrt{3}}{\sqrt{2}}}\frac{1}{t}\,dt+\frac{\pi}{4\sqrt{3}}\right)$$

$$\frac{1}{4}\log_{0.993830129336800000}\left(\frac{\pi}{4\sqrt{3}}+\frac{1}{3}\log\left(\frac{1+\sqrt{3}}{\sqrt{2}}\right)\right)+\frac{1}{\phi}=$$

$$\frac{1}{\phi}+\frac{1}{4}\log_{0.993830129336800000}\left(\frac{1}{6\,i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)\left(-1+\frac{1+\sqrt{3}}{\sqrt{2}}\right)^{-s}}{\Gamma(1-s)}\,ds+\frac{\pi}{4\sqrt{3}}\right)$$

for $-1<\gamma<0$

Ramanujan mathematics applied to the physics and cosmology

From:

Trans-Planckian Censorship and the Swampland

Alek Bedroya and Cumrun Vafa
Jefferson Physical Laboratory, Harvard University, Cambridge, MA 02138, USA
arXiv:1909.11063v2 [hep-th] 15 Oct 2019

points as well, as long as it is sufficiently unstable quantum mechanically. We find that in a meta-stable dS point is compatible with TCC as long as its lifetime T is bounded by

$$T\leq\frac{1}{H}\log\frac{M_p}{H} \tag{1.1}$$

where H is the Hubble parameter and is related to the cosmological constant by $\frac{(d-1)(d-2)}{2}H^2=V=\Lambda$ in d spacetime dimensions. Also, for unstable critical points, we find a condition similar to the refined dS conjecture which puts a bound on $|V''|/V$ [6]. Moreover, we find that for any expansionary period of the universe for matter with equation of state $w\geq-1$, measurement of H will give an upper bound to the age of the observed universe. The upper bound is the same as the (1.1) with H being the measured value of the Hubble parameter at time T after the expansion started.

where we used the Friedmann equation $(d-1)(d-2)H_i^2/2=V_{max}$. According to (B.4), the above expression is less than $\Delta\phi$. Therefore, for these initial conditions, $\phi\in[\phi_0,\phi_0+\Delta\phi]$ for every $t\leq c\sqrt{2/|V''|_{max}}$. If we set $t=c\sqrt{2/|V''|_{max}}$, from (2.4) we find

Now we use the inequality (B.1) that we just proved to obtain a result for quadratic potentials. Suppose the quadratic potential $V(\phi)$ has local maximum $V(\phi_0) = V_0$ and second derivative $-|V''|$ over a field range $[\phi_0, \phi_0 + \sqrt{\frac{2(1-c)V_0}{|V''|}}]$ for some $0 \leq c \leq 1$. This field range corresponds to the potential range $[V_{\min}, V_0]$ where $V_{\min} = cV_0$. Let k be positive number smaller than 1. We can weaken the (B.1) by multiplying the right hand side of the second inequality by k as

$$\Delta\phi < \frac{B_1(d)B_2(d)^{\frac{3}{4}}V_{max}^{\frac{d-1}{4}}V_{min}^{\frac{3}{4}}\ln\left(\frac{B_3(d)}{\sqrt{V_{min}}}\right)^{\frac{1}{2}}}{V_{min}B_2(d) - |V''|_{max}\ln\left(\frac{B_3(d)}{\sqrt{V_{min}}}\right)^2}, \quad or \quad \frac{|V''|_{max}}{V_{min}} \geq kB_2(d)\ln\left(\frac{B_3(d)}{\sqrt{V_{min}}}\right)^{-2}. \tag{B.18}$$

If

$$H_0 = 71\frac{km/s}{mpc} = 2.3x10^{-18}s^{-1}$$

$$t_H = \frac{1}{2.3x10^{-18}s^{-1}} = 13.8x10^9\,years$$

We have that, for d = 4:

V_{max} = ((((4-1)(4-2) (2.3e-18)^2)))/2

Input interpretation:

$$\frac{1}{2}\left((4-1)(4-2)\left(2.3\times10^{-18}\right)^2\right)$$

Result:

1.587×10^{-35}

$1.587 * 10^{-35} = V_{max} = V_0$

For

$0 \leq c \leq 1$. c = 1/8 = 0.125, we obtain:

$V_{min} = c * V_0 = c * V_{max}$ = 1/8 * (((((((4-1)(4-2) (2.3e-18)^2)))/2)))

Input interpretation:

$$\frac{1}{8}\left(\frac{1}{2}\left((4-1)(4-2)\left(2.3\times10^{-18}\right)^2\right)\right)$$

Result:

1.98375×10^{-36}

$1.98375 * 10^{-36} = V_{min}$

Suppose we have a quadratic potential given by

$$V(\phi) = \frac{V''(\phi_0)}{2}(\phi \quad \phi_0)^2 \mid V(\phi_0), \tag{4.2}$$

where $V''(\phi_0) < 0$. In [7], for the case of $d = 4$, it was shown that a gaussian probability distribution centered at $\phi = \phi_0$ solves the Fokker-Planck equation describing the evolution of quantum fluctuations. That result could be easily generalized to the following solution for any dimension $d > 2$.

$$Pr[\phi = \phi_c; t] \propto \exp\left[-\frac{\phi_c^2}{2\sigma(t)^2}\right], \tag{4.3}$$

where

$$\sigma(t) = \frac{\sqrt{d \quad 1}H^2(e^{\frac{2|V''(\phi_0)|t}{(d-1)H}} \quad 1)^{1/2}}{2\pi\sqrt{2|V''(\phi_0)|}}. \tag{4.4}$$

Now we use the inequality (B.1) that we just proved to obtain a result for quadratic potentials. Suppose the quadratic potential $V(\phi)$ has local maximum $V(\phi_0) = V_0$ and second derivative $-|V''|$ over a field range $[\phi_0, \phi_0 + \sqrt{\frac{2(1-c)V_0}{|V''|}}]$ for some $0 \leq c \leq 1$. This field range corresponds to the potential range $[V_{\min}, V_0]$ where $V_{\min} = cV_0$. Let k be positive number smaller than 1. We can weaken the (B.1) by multiplying the right hand side of the second inequality by k as

where $V_{max} = V(\phi_0)$ and $V_{min} = V(\phi_0 + \Delta\phi)$ are respectively the maximum and the minimum of V over $\phi \in [\phi_0, \Delta\phi]$, and $B_1(d)$, $B_2(d)$, and $B_3(d)$ are $O(1)$ numbers given byä

Now, from:

$$B_1(d) = \frac{\Gamma(\frac{d+1}{2})^{\frac{1}{2}} 2^{1+\frac{d}{4}}}{\pi^{\frac{d-1}{4}}((d-1)(d-2))^{\frac{d-1}{4}}},$$

$$B_2(d) = \frac{4}{(d-1)(d-2)},$$

$$B_3(d) = \sqrt{\frac{(d-1)(d-2)}{2}}.$$

We obtain:

((((gamma (((5/2)^1/2)) 2^2)))) / ((Pi^(3/4) ((4-1)(4-2))^(3/4)))

Input:

$$\frac{\Gamma\left(\sqrt{\frac{5}{2}}\right)\times 2^2}{\pi^{3/4}\,((4-1)(4-2))^{3/4}}$$

$\Gamma(x)$ is the gamma function

Exact result:

$$\frac{2\sqrt[4]{2}\,\Gamma\left(\sqrt{\frac{5}{2}}\right)}{(3\pi)^{3/4}}$$

Decimal approximation:

0.394203368273179051333918767928334148165287494722133931228...

0.394203368273…. = $B_1(d)$

Alternate form:

$$\frac{2\left(\frac{2}{3\pi}\right)^{3/4}\sqrt{\frac{5}{2}}\,!}{\sqrt{5}}$$

$n!$ is the factorial function

Alternative representations:

$$\frac{\Gamma\left(\sqrt{\frac{5}{2}}\right)2^2}{\pi^{3/4}\,((4-1)(4-2))^{3/4}} = \frac{4\,e^{-\log G\left(\sqrt{5/2}\right)+\log G\left(1+\sqrt{5/2}\right)}}{6^{3/4}\,\pi^{3/4}}$$

$$\frac{\Gamma\left(\sqrt{\frac{5}{2}}\right)2^2}{\pi^{3/4}\,((4-1)(4-2))^{3/4}} = \frac{4\,G\left(1+\sqrt{\frac{5}{2}}\right)}{G\left(\sqrt{\frac{5}{2}}\right)\left(6^{3/4}\,\pi^{3/4}\right)}$$

$$\frac{\Gamma\left(\sqrt{\frac{5}{2}}\right)2^2}{\pi^{3/4}\,((4-1)(4-2))^{3/4}} = \frac{4\left(-1+\sqrt{\frac{5}{2}}\right)!}{6^{3/4}\,\pi^{3/4}}$$

Series representations:

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

$$\frac{\Gamma\left(\sqrt{\frac{5}{2}}\right)2^2}{\pi^{3/4}\,((4-1)(4-2))^{3/4}} = \frac{2\sqrt[4]{2}}{(3\pi)^{3/4}\sum_{k=1}^{\infty}\left(\frac{5}{2}\right)^{k/2} c_k}$$

$$\text{for}\left(c_1 = 1 \text{ and } c_2 = 1 \text{ and } c_k = \frac{\gamma\, c_{-1+k} + \sum_{j=1}^{-2+k}(-1)^{1+j+k}\, c_j\, \zeta(-j+k)}{-1+k}\right)$$

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

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

Integral representations:

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

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

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

$$B_2(d) = \frac{4}{(d-1)(d-2)},$$

4/(4-1)(4-2)

Input:

$$\frac{4}{(4-1)(4-2)}$$

Exact result:

$$\frac{2}{3}$$

Decimal approximation:

0.6666666666666666666666666666666666666666666666666666666666...

Repeating decimal:

$0.\overline{6}$ (period 1)

0.666666…. = $B_2(d)$

$$B_3(d) = \sqrt{\frac{(d-1)(d-2)}{2}}.$$

(((((4-1)(4-2))/2)))^1/2

Input:

$$\sqrt{\frac{1}{2}((4-1)(4-2))}$$

Result:

$$\sqrt{3}$$

Decimal approximation:

1.7320508075688772935274463415058723669428052538103806280558...

1.7320508075688….. = $B_3(d)$

All 2nd roots of 3:

$\sqrt{3}\, e^0 \approx 1.73205$ (real, principal root)

$\sqrt{3}\, e^{i\pi} \approx -1.7321$ (real root)

Now, we have that:

$$D(V_0, d) = \frac{c^{\frac{1}{2}} B_2(d)^{\frac{1}{2}} B_1(d)^2 V_0^{\frac{d-2}{2}}}{4(1-c)} \ln\left(\frac{B_3(d)}{\sqrt{cV_0}}\right)^{-1}$$

For c = 1/8 ; $1.587 * 10^{-35} = V_{max} = V_0$; 0.394203368273…. = $B_1(d)$;

0.666666…. = $B_2(d)$; 1.7320508075688….. = $B_3(d)$, we obtain:

sqrt(0.125) * sqrt(0.666666) * (0.394203368273)^2 * (1.587e-35) * 1/(4(1-0.125)) * ln (((1.7320508075688) / (sqrt(0.125*0.394203368273)))^-1

Input interpretation:

$$\sqrt{0.125}\ \sqrt{0.666666} \times 0.394203368273^2 \times 1.587 \times 10^{-35} \times \frac{1}{4(1-0.125)} \log\left(\frac{1}{\frac{1.7320508075688}{\sqrt{0.125 \times 0.394203368273}}}\right)$$

log(x) is the natural logarithm

Result:

$-4.17887... \times 10^{-37}$

-4.17887…*10^{-37}

Now, we have that:

$$[\bar{\phi}, \dot{\bar{\phi}}] = \frac{i}{\frac{\pi^{d-1/2}}{\Gamma((d+1)/2)}\left(\frac{1}{H}\right)^{d-1}},$$

i/ ((((((Pi^(4-1/2))/((gamma (5/2))) * (1/(2.3e-18))^3))))

Input interpretation:

$$\frac{i}{\frac{\pi^{4-1/2}}{\Gamma\left(\frac{5}{2}\right)}\left(\frac{1}{2.3 \times 10^{-18}}\right)^3}$$

Γ(x) is the gamma function

i is the imaginary unit

Result:

$2.94303... \times 10^{-55}\ i$

Polar coordinates:

$r = 2.94303 \times 10^{-55}$ (radius), $\theta = 90°$ (angle)

2.94303…*10^-55

And:

$$\delta\phi_i\delta\dot{\phi}_i \geq \frac{\Gamma((d+1)/2)H^{d-1}}{2\pi^{d-1/2}}.$$

(((gamma (((5/2)))))) * ((((2.3e-18)^3))) * 1 / ((2Pi^(4-1/2)))

Input interpretation:

$$\Gamma\left(\frac{5}{2}\right)(2.3\times 10^{-18})^3\times\frac{1}{2\,\pi^{4-1/2}}$$

$\Gamma(x)$ is the gamma function

Result:

$1.47152\ldots\times 10^{-55}$

1.47152…*10^-55

We note that:

[1/ ((((((Pi^(4-1/2))/((gamma (5/2))) * (1/(2.3e-18))^3)))))] *1/[(((gamma (((5/2)))))) * ((((2.3e-18)^3))) * 1 / ((2Pi^(4-1/2)))]

Input interpretation:

$$\frac{1}{\frac{\pi^{4-1/2}}{\Gamma\left(\frac{5}{2}\right)}\left(\frac{1}{2.3\times 10^{-18}}\right)^3}\times\frac{1}{\Gamma\left(\frac{5}{2}\right)(2.3\times 10^{-18})^3\times\frac{1}{2\,\pi^{4-1/2}}}$$

$\Gamma(x)$ is the gamma function

Result:

2

2 result equal to the graviton spin

Or:

(((gamma (((5/2)))))) * ((((2.3e-18)^3))) * 1 / ((2Pi^(4-1/2))) *1/((((i/ ((((((Pi^(4-1/2))*1/((gamma (5/2))) * (1/(2.3e-18))^3)))))))))

Input interpretation:

$$\Gamma\left(\frac{5}{2}\right)(2.3\times 10^{-18})^3\times\frac{1}{2\,\pi^{4-1/2}}\times\frac{1}{\frac{i}{\pi^{4-1/2}\times\frac{1}{\Gamma\left(\frac{5}{2}\right)}\left(\frac{1}{2.3\times 10^{-18}}\right)^3}}$$

$\Gamma(x)$ is the gamma function

i is the imaginary unit

Result:

$-0.5\, i$

Polar coordinates:

$r = 0.5$ (radius), $\theta = -90°$ (angle)

0.5 = 1/2   result equal to the electron spin

From:

EVALUATIONS OF RAMANUJAN-WEBER CLASS INVARIANT g_n

S.Bhargava 1 , K. R. Vasuki and B. R. Srivatsa Kumar

2000 Mathematics subject classification: 11F20, 11Y99

Then

$$(i) \quad \lambda_n \lambda_{1/n} = 1, \tag{2.17}$$

$$(ii) \quad \lambda_1 = 1, \tag{2.18}$$

and

$$(iii) \quad \lambda_n = g_{2n}. \tag{2.19}$$

Theorem 3.3. We have

$$(i) \quad g_{28} = 2^{1/8}\left(3+\sqrt{7}\right)^{1/4} = g_{1/7}^{-1},$$

and

$$(ii) \quad g_7 = 2^{-3/8}\left(3+\sqrt{7}\right)^{1/4} = g_{4/7}^{-1}.$$

2^(1/8) (3+sqrt7)^1/4

Input:

$\sqrt[8]{2}\ \sqrt[4]{3+\sqrt{7}}$

Decimal approximation:

1.680966991582255116285078686572690826334508255159186986821...

1.6809669915…

Alternate form:

$\sqrt[4]{2}\,\sqrt[8]{8+3\sqrt{7}}$

Minimal polynomial:

$x^{16}-64x^{8}+16$

$$(iv)\qquad 32\left[(\lambda_n\lambda_{121n})^{10}+\frac{1}{(\lambda_n\lambda_{121n})^{10}}\right]+352\left[(\lambda_n\lambda_{121n})^{8}+\frac{1}{(\lambda_n\lambda_{121n})^{8}}\right]$$
$$+1672\left[(\lambda_n\lambda_{121n})^{6}+\frac{1}{(\lambda_n\lambda_{121n})^{6}}\right]+4576\left[(\lambda_n\lambda_{121n})^{4}+\frac{1}{(\lambda_n\lambda_{121n})^{4}}\right]$$
$$+8096\left[(\lambda_n\lambda_{121n})^{2}+\frac{1}{(\lambda_n\lambda_{121n})^{2}}\right]+9744=\left(\frac{\lambda_{121n}}{\lambda_n}\right)^{12}+\left(\frac{\lambda_n}{\lambda_{121n}}\right)^{12},\qquad (2.23)$$

32*((1.68096699^10+1/(1.68096699^10)))+352(((1.68096699^8+1/(1.68096699^8)))+1672((1.68096699^6+1/(1.68096699)^6))+4576(((1.68096699^4+1/(1.68096699)^4)))+8096(1.68096699^2+1/(1.68096699)^2)))+9744

Input interpretation:

$$32\left(1.68096699^{10}+\frac{1}{1.68096699^{10}}\right)+352\left(\left(1.68096699^{8}+\frac{1}{1.68096699^{8}}\right)+1672\left(1.68096699^{6}+\frac{1}{1.68096699^{6}}\right)+4576\left(1.68096699^{4}+\frac{1}{1.68096699^{4}}\right)+8096\left(1.68096699^{2}+\frac{1}{1.68096699^{2}}\right)\right)+9744$$

Result:

$3.54656055435111249952510626904885558099066308363952005\ldots\times 10^{7}$

$3.5465605543511124\ldots*10^{7}$

(1/1.68096699)^12+(1.68096699)^12

Input interpretation:

$$\left(\frac{1}{1.68096699}\right)^{12} + 1.68096699^{12}$$

Result:

508.993102449316119645207482147983056469742818067805559735 7...

508.9931024…

3.5465605543511124995251062690488555809906630836395 2005 × 10^7 / 508.99310244931611964520748214798305646974281806780555973 57

Input interpretation:

$$\frac{3.5465605543511124995251062690488555809906630836395 2005\times 10^7}{508.993102449316119645207482147983056469742818067805559735 7}$$

Result:

69677.96886214715420907906626923031642213207440652315556235...

69677.9688621…

(69677.9688621471542)*1/128 – 48

Input interpretation:

$$69\,677.9688621471542\times\frac{1}{128}-48$$

Result:

496.3591317355246421875

496.3591317… result concerning the dimension of the gauge group of type I string theory that is 496.

(69677.9688621471542)+64^2-322+29+11

Input interpretation:

$69677.9688621471542 + 64^2 - 322 + 29 + 11$

Result:

73491.9688621471542

73491.968862…

Thence, we have the following mathematical connections:

$$(69677.9688621471542 + 64^2 - 322 + 29 + 11) = 73491.968... \Rightarrow$$

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

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

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

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

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

$$= 73491.788325481187105491595720422205480251957265634133987 00...$$

$$= 73491.7883254... \Rightarrow$$

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

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

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

From:

STRING THEORY VOLUME II - Superstring Theory and Beyond
JOSEPH POLCHINSKI
Institute for Theoretical Physics - University of California at Santa Barbara
CAMBRIDGE UNIVERSITY PRESS
Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo
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11.2 The $SO(32)$ and $E_8 \times E_8$ heterotic strings 53

Table 11.2. *Low-lying heterotic string states.*

m^2	NS	R	$\tilde{\text{NS}}$	$\tilde{\text{R}}$
$-4/\alpha'$	$(\mathbf{1},\mathbf{1})$	-	-	-
0	$(\mathbf{8}_v,\mathbf{1})+(\mathbf{1},\mathbf{496})$	-	$\mathbf{8}_v$	$\mathbf{8}$

is the type I supergravity multiplet. The product

$$(\mathbf{1},\mathbf{496}) \times (\mathbf{8}_v + \mathbf{8}) = (\mathbf{8}_v,\mathbf{496}) + (\mathbf{8},\mathbf{496}) \qquad (11.2.18)$$

is an $N = 1$ gauge multiplet in the adjoint of $SO(32)$. The latter is therefore a gauge symmetry in spacetime.

496 * 16 = 8*496 + 8*496 = 7936; 7936/16 = 496

The chiral fields of $N = 1$ supergravity with gauge group g are the gravitino **56**, a neutral fermion **8'**, and an **8** gaugino in the adjoint representation, for total anomaly

$$\hat{I}_1 = \hat{I}_{56}(R_2) - \hat{I}_8(R_2) + \hat{I}_8(F_2, R_2)$$
$$= \frac{1}{1440}\left\{-\mathrm{Tr_a}(F_2^6) + \frac{1}{48}\mathrm{Tr_a}(F_2^2)\mathrm{Tr_a}(F_2^4) - \frac{[\mathrm{Tr_a}(F_2^2)]^3}{14400}\right\}$$
$$+(n-496)\left\{\frac{\mathrm{tr}(R_2^6)}{725760} + \frac{\mathrm{tr}(R_2^4)\mathrm{tr}(R_2^2)}{552960} + \frac{[\mathrm{tr}(R_2^2)]^3}{1327104}\right\} + \frac{Y_4 X_8}{768}\ . \tag{12.2.27}$$

Here

$$Y_4 = \mathrm{tr}(R_2^2) - \frac{1}{30}\mathrm{Tr_a}(F_2^2)\ , \tag{12.2.28a}$$

$$X_8 = \mathrm{tr}(R_2^4) + \frac{[\mathrm{tr}(R_2^2)]^2}{4} - \frac{\mathrm{Tr_a}(F_2^2)\mathrm{tr}(R_2^2)}{30} + \frac{\mathrm{Tr_a}(F_2^4)}{3} - \frac{[\mathrm{Tr_a}(F_2^2)]^2}{900}\ . \tag{12.2.28b}$$

1/1440(-1+1/48-1/14400)+(((1-1/30)*(1+1/4-1/30+1/3-1/900)*1/768))

Input:

$$\frac{1}{1440}\left(-1+\frac{1}{48}-\frac{1}{14\,400}\right)+\left(1-\frac{1}{30}\right)\left(1+\frac{1}{4}-\frac{1}{30}+\frac{1}{3}-\frac{1}{900}\right)\times\frac{1}{768}$$

Exact result:

$$\frac{13}{10\,240}$$

Decimal form:

0.00126953125

0.00126953125

1/(((1/1440(-1+1/48-1/14400)+(((1-1/30)*(1+1/4-1/30+1/3-1/900)*1/768)))))

Input:

$$\frac{1}{\frac{1}{1440}\left(-1+\frac{1}{48}-\frac{1}{14400}\right)+\left(1-\frac{1}{30}\right)\left(1+\frac{1}{4}-\frac{1}{30}+\frac{1}{3}-\frac{1}{900}\right)\times\frac{1}{768}}$$

Exact result:

$$\frac{10\,240}{13}$$

Decimal approximation:

787.6923076923076923076923076923076923076923076923076923076...

787.692307… result in the range of the rest mass of Omega meson 782.65

1/(2Pi)*1/(((1/1440(-1+1/48-1/14400)+(((1-1/30)*(1+1/4-1/30+1/3-1/900)*1/768)))))

Input:

$$\frac{1}{2\pi}\times\frac{1}{\frac{1}{1440}\left(-1+\frac{1}{48}-\frac{1}{14400}\right)+\left(1-\frac{1}{30}\right)\left(1+\frac{1}{4}-\frac{1}{30}+\frac{1}{3}-\frac{1}{900}\right)\times\frac{1}{768}}$$

Result:

$$\frac{5120}{13\pi}$$

Decimal approximation:

125.3651244046929414056438259180420820948359055678672334750...

125.3651244… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Property:

$\frac{5120}{13\pi}$ is a transcendental number

Alternative representations:

$$\frac{1}{\left(\frac{-1+\frac{1}{48}-\frac{1}{14400}}{1440}+\frac{1}{768}\left(1-\frac{1}{30}\right)\left(1+\frac{1}{4}-\frac{1}{30}+\frac{1}{3}-\frac{1}{900}\right)\right)(2\pi)}=$$

$$\frac{1}{(360\,°)\left(\frac{1}{768}\left(1-\frac{1}{30}\right)\left(\frac{4}{3}+\frac{1}{4}-\frac{1}{30}-\frac{1}{900}\right)+\frac{-1+\frac{1}{48}-\frac{1}{14400}}{1440}\right)}$$

$$\frac{1}{\left(\frac{-1+\frac{1}{48}-\frac{1}{14400}}{1440}+\frac{1}{768}\left(1-\frac{1}{30}\right)\left(1+\frac{1}{4}-\frac{1}{30}+\frac{1}{3}-\frac{1}{900}\right)\right)(2\pi)} = -\frac{1}{(2\,i\log(-1))\left(\frac{1}{768}\left(1-\frac{1}{30}\right)\left(\frac{4}{3}+\frac{1}{4}-\frac{1}{30}-\frac{1}{900}\right)+\frac{-1+\frac{1}{48}-\frac{1}{14400}}{1440}\right)}$$

$$\frac{1}{\left(\frac{-1+\frac{1}{48}-\frac{1}{14400}}{1440}+\frac{1}{768}\left(1-\frac{1}{30}\right)\left(1+\frac{1}{4}-\frac{1}{30}+\frac{1}{3}-\frac{1}{900}\right)\right)(2\pi)} = \frac{1}{\left(2\cos^{-1}(-1)\right)\left(\frac{1}{768}\left(1-\frac{1}{30}\right)\left(\frac{4}{3}+\frac{1}{4}-\frac{1}{30}-\frac{1}{900}\right)+\frac{-1+\frac{1}{48}-\frac{1}{14400}}{1440}\right)}$$

Series representations:

$$\frac{1}{\left(\frac{-1+\frac{1}{48}-\frac{1}{14400}}{1440}+\frac{1}{768}\left(1-\frac{1}{30}\right)\left(1+\frac{1}{4}-\frac{1}{30}+\frac{1}{3}-\frac{1}{900}\right)\right)(2\pi)} = \frac{1280}{13\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}$$

$$\frac{1}{\left(\frac{-1+\frac{1}{48}-\frac{1}{14400}}{1440}+\frac{1}{768}\left(1-\frac{1}{30}\right)\left(1+\frac{1}{4}-\frac{1}{30}+\frac{1}{3}-\frac{1}{900}\right)\right)(2\pi)} = \frac{1280}{13\sum_{k=0}^{\infty}\frac{(-1)^{1+k}\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}}$$

$$\frac{1}{\left(\frac{-1+\frac{1}{48}-\frac{1}{14400}}{1440}+\frac{1}{768}\left(1-\frac{1}{30}\right)\left(1+\frac{1}{4}-\frac{1}{30}+\frac{1}{3}-\frac{1}{900}\right)\right)(2\pi)} = \frac{5120}{13\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)}$$

Integral representations:

$$\frac{1}{\left(\frac{-1+\frac{1}{48}-\frac{1}{14400}}{1440}+\frac{1}{768}\left(1-\frac{1}{30}\right)\left(1+\frac{1}{4}-\frac{1}{30}+\frac{1}{3}-\frac{1}{900}\right)\right)(2\pi)} = \frac{1280}{13\int_0^1\sqrt{1-t^2}\,dt}$$

$$\frac{1}{\left(\frac{-1+\frac{1}{48}-\frac{1}{14400}}{1440}+\frac{1}{768}\left(1-\frac{1}{30}\right)\left(1+\frac{1}{4}-\frac{1}{30}+\frac{1}{3}-\frac{1}{900}\right)\right)(2\pi)} = \frac{2560}{13\int_0^{\infty}\frac{1}{1+t^2}\,dt}$$

$$\frac{1}{\left(\frac{-1+\frac{1}{48}-\frac{1}{14400}}{1440}+\frac{1}{768}\left(1-\frac{1}{30}\right)\left(1+\frac{1}{4}-\frac{1}{30}+\frac{1}{3}-\frac{1}{900}\right)\right)(2\pi)} = \frac{2560}{13\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt}$$

(((1/1440(-1+1/48-1/14400)+(((1-1/30)*(1+1/4-1/30+1/3-1/900)*1/768)))))^1/4096

Input:

$$\sqrt[4096]{\frac{1}{1440}\left(-1+\frac{1}{48}-\frac{1}{14400}\right)+\left(1-\frac{1}{30}\right)\left(1+\frac{1}{4}-\frac{1}{30}+\frac{1}{3}-\frac{1}{900}\right)\times\frac{1}{768}}$$

Result:

$$\frac{\sqrt[4096]{\frac{13}{5}}}{2^{11/4096}}$$

Decimal approximation:

0.998373124715361463734496936500441896498740668311999305568...

0.9983731247… result very near to the value of the following Rogers-Ramanujan continued fraction:

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

Alternate form:

$$\frac{1}{10}\sqrt[4096]{13}\;2^{4085/4096}\times 5^{4095/4096}$$

All 4096th roots of 13/10240:

$$\frac{\sqrt[4096]{\frac{13}{5}}\;e^0}{2^{11/4096}} \approx 0.9983731 \text{ (real, principal root)}$$

$$\frac{\sqrt[4096]{\frac{13}{5}}\;e^{(i\pi)/2048}}{2^{11/4096}} \approx 0.9983720 + 0.0015315\,i$$

$$\frac{\sqrt[4096]{\frac{13}{5}}\, e^{(i\pi)/1024}}{2^{11/4096}} \approx 0.9983684 + 0.0030630\, i$$

$$\frac{\sqrt[4096]{\frac{13}{5}}\, e^{(3i\pi)/2048}}{2^{11/4096}} \approx 0.9983626 + 0.0045944\, i$$

$$\frac{\sqrt[4096]{\frac{13}{5}}\, e^{(i\pi)/512}}{2^{11/4096}} \approx 0.9983543 + 0.006126\, i$$

From:

ANOMALY CANCELLATIONS IN SUPERSYMMETRIC D = 10 GAUGE THEORY AND SUPERSTRING THEORY

Michael B. GREEN
Queen Mary College, University of London, London E1 4NS, UK
and California Institute of Technology, Pasadena, CA 91125, USA
and
John H. SCHWARZ
California Institute of Technology, Pasadena, CA 91125, USA
Received 10 September 1984

Now:

$$-[\tfrac{1}{32} + (n-496)/13824]\ (\mathrm{tr}\, R^2)^3$$
$$-[\tfrac{1}{8} + (n-496)/5760]\ \mathrm{tr}\, R^2\ \mathrm{tr}\, R^4$$
$$-[(n-496)/7560]\ \mathrm{tr}\, R^6. \qquad (20)$$

In this expression we have included the contributions of one left-handed spin 3/2 gravitino and one right-handed spin 1/2 field from the supergravity sector and n left-handed spin 1/2 fields from the matter sector, which only depends on the dimension of the gauge group.

The last term in eq. (20) corresponds to an anomaly of the form $\int \omega^1_{10\mathrm{L}}$, which cannot be cancelled by adding local terms to the action. Therefore 496 left-handed spin 1/2 fields are needed in the matter sector in order that it vanish. Remarkably, since the dimension of the adjoint representation of SO(32) or $E_8 \times E_8$ is 496, the cancellation occurs for either of these gauge groups. The anomalies associated with the first two terms of eq, (20) can be cancelled (putting $n = 496$) by adding to the effective action for SO(32) or $E_8 \times E_8$

$$S_2 = -c \int [\tfrac{1}{32} B (\mathrm{tr}\, R^2)^2 + \tfrac{1}{8} B \,\mathrm{tr}\, R^4 + \tfrac{1}{12} \omega^0_{3\mathrm{L}} \omega^0_{7\mathrm{L}}] \,. \tag{21}$$

For n = 496, from (20), we obtain:

$$-[\tfrac{1}{32} + (n-496)/13824] \, (\mathrm{tr}\, R^2)^3$$

$$- [\tfrac{1}{8} + (n-496)/5760] \; \mathrm{tr}\, R^2 \;\; \mathrm{tr}\, R^4$$

$$- [(n-496)/7560] \; \mathrm{tr}\, R^6 .$$

-(1/32+0)*(trace R^2)^3-(1/8+0)*trace R^2 trace R^4 -0*trace R^6

Input:

$$-\left(\frac{1}{32}+0\right)(\mathrm{Tr}[R]^2)^3 - \left(\left(\frac{1}{8}+0\right)\mathrm{Tr}[\mathrm{Tr}[R^2]]\right) R^4 - 0\,\mathrm{Tr}[R]^6$$

Result:

$$-\frac{1}{8} R^4 \,\mathrm{Tr}[\mathrm{Tr}[R^2]] - \frac{1}{32}\mathrm{Tr}[R]^6$$

Without tr, we obtain:

-(1/32+0)*(R^2)^3-(1/8+0)* R^2 R^4 -0* R^6

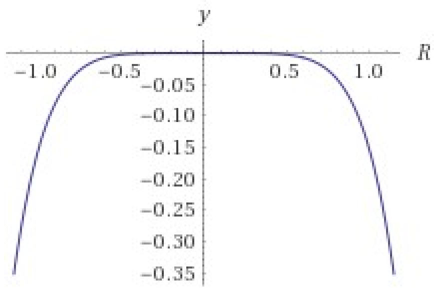
Input:

$$-\left(\frac{1}{32}+0\right)(R^2)^3 - \left(\left(\frac{1}{8}+0\right) R^2\right) R^4 - 0\,R^6$$

Result:

$$-\frac{5 R^6}{32}$$

Plot:



Geometric figure:

line

Root:

$R = 0$

Polynomial discriminant:

$\Delta = 0$

Property as a function:

Parity

even

Derivative:

$$\frac{d}{dR}\left(-\left(\frac{1}{32}+0\right)(R^2)^3-\left(\left(\frac{1}{8}+0\right)R^2\right)R^4-0\,R^6\right)=-\frac{15\,R^5}{16}$$

Indefinite integral:

$$\int -\frac{5\,R^6}{32}\,dR = -\frac{5\,R^7}{224} + \text{constant}$$

Global maximum:

$$\max\left\{-\left(\frac{1}{32}+0\right)(R^2)^3-\left(\left(\frac{1}{8}+0\right)R^2\right)R^4-0\,R^6\right\}=0 \text{ at } R=0$$

For R = 2, we obtain:

-(5 2^6)/32

Input:

$$-\frac{1}{32}\left(5\times 2^6\right)$$

Result:

-10

-10

For R = -8, we obtain:

Input:

$$-\frac{1}{32}\left(5\times(-1)\times 8^6\right)$$

Result:

40 960

40960 = 64^2 * 10 = 4096 * 10

2sqrt((1/10*-(5 *-8^6)/32))-Pi+1/golden ratio

Input:

$$2\sqrt{\frac{1}{10}\left(-\frac{1}{32}\left(5\times(-1)\times 8^6\right)\right)}-\pi+\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

$$\frac{1}{\phi}+128-\pi$$

Decimal approximation:

125.4764413351601016097419434510861352335231397804306570411...

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

Property:

$128+\frac{1}{\phi}-\pi$ is a transcendental number

Alternate forms:

$$\frac{1}{2}\left(255+\sqrt{5}-2\pi\right)$$

$$-\frac{-128\,\phi+\pi\,\phi-1}{\phi}$$

$$\frac{(128-\pi)\,\phi+1}{\phi}$$

Series representations:

$$2\sqrt{-\frac{5(-1)8^6}{32\times 10}}-\pi+\frac{1}{\phi}=128+\frac{1}{\phi}-4\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

$$2\sqrt{-\frac{5(-1)8^6}{32\times 10}}-\pi+\frac{1}{\phi}=128+\frac{1}{\phi}+\sum_{k=0}^{\infty}\frac{4(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}$$

$$2\sqrt{-\frac{5(-1)8^6}{32\times 10}}-\pi+\frac{1}{\phi}=128+\frac{1}{\phi}-\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)$$

Integral representations:

$$2\sqrt{-\frac{5(-1)8^6}{32\times 10}}-\pi+\frac{1}{\phi}=128+\frac{1}{\phi}-4\int_0^1\sqrt{1-t^2}\,dt$$

$$2\sqrt{-\frac{5(-1)8^6}{32\times 10}}-\pi+\frac{1}{\phi}=128+\frac{1}{\phi}-2\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt$$

$$2\sqrt{-\frac{5(-1)8^6}{32\times 10}}-\pi+\frac{1}{\phi}=128+\frac{1}{\phi}-2\int_0^{\infty}\frac{1}{1+t^2}\,dt$$

And also, we obtain:

((((-1/(((-(5*2^6)/32)))))))^1/4096

Input:

$$\sqrt[4096]{\frac{-1}{-\frac{1}{32}\left(5\times 2^6\right)}}$$

Result:

$$\frac{1}{\sqrt[4096]{10}}$$

Decimal approximation:

0.999438003415553196029626790600195415941545113970308718879...

0.999438003… result very near to the value of the following Rogers-Ramanujan continued fraction:

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

Alternate form:

$$\frac{10^{4095/4096}}{10}$$

All 4096th roots of 1/10:

$$\frac{e^0}{\sqrt[4096]{10}}\approx 0.99943800 \quad \text{(real, principal root)}$$

$$\frac{e^{(i\pi)/2048}}{\sqrt[4096]{10}}\approx 0.99943683+0.0015331\,i$$

$$\frac{e^{(i\pi)/1024}}{\sqrt[4096]{10}}\approx 0.99943330+0.0030662\,i$$

$$\frac{e^{(3i\pi)/2048}}{\sqrt[4096]{10}}\approx 0.99942742+0.0045993\,i$$

$$\frac{e^{(i\pi)/512}}{\sqrt[4096]{10}}\approx 0.99941919+0.006132\,i$$

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