On the new mathematical connections between some Ramanujan formulas and various parameters of Particle Physics, ϕ and $\zeta(2)$. III

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Abstract

In this paper (part III) we describe and analyze new mathematical connections between some Ramanujan formulas and various parameters of Particle Physics, ϕ and $\zeta(2)$.

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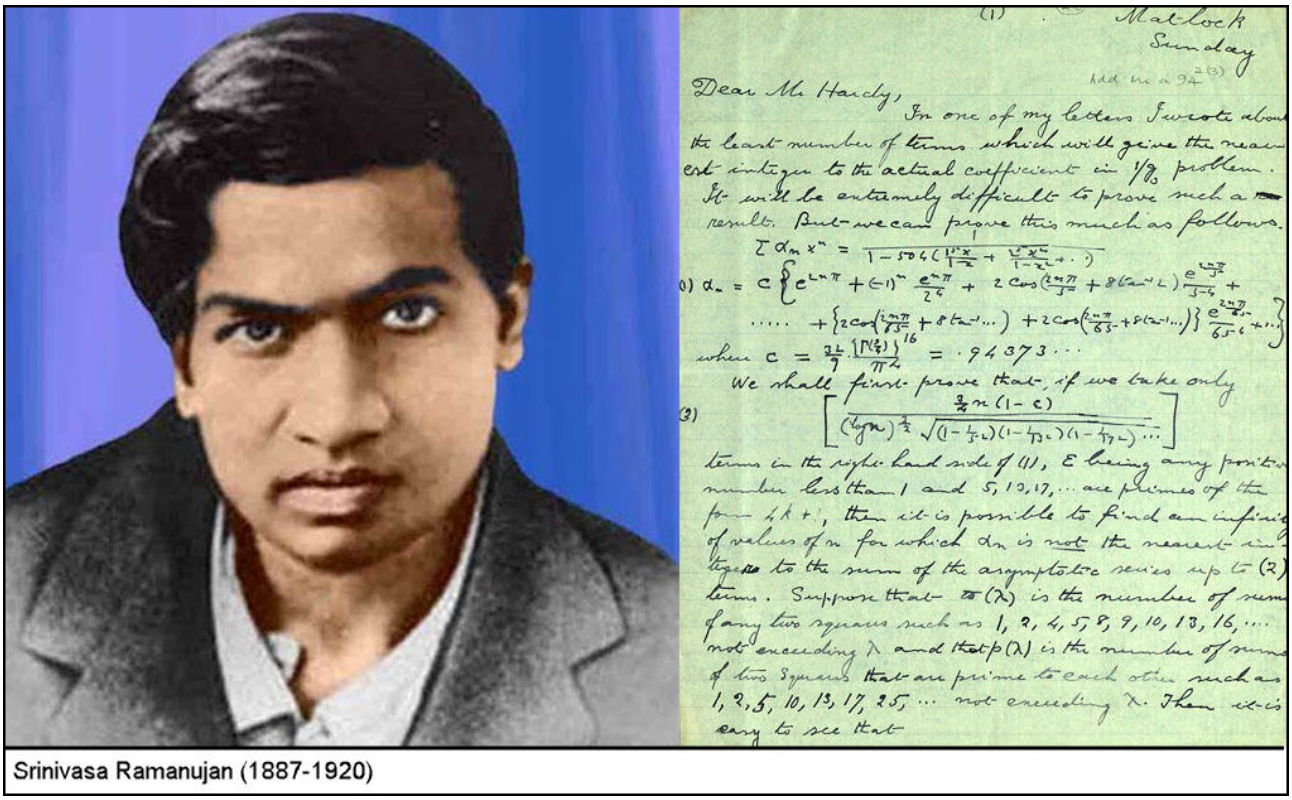


Srinivasa Ramanujan (1887-1920)

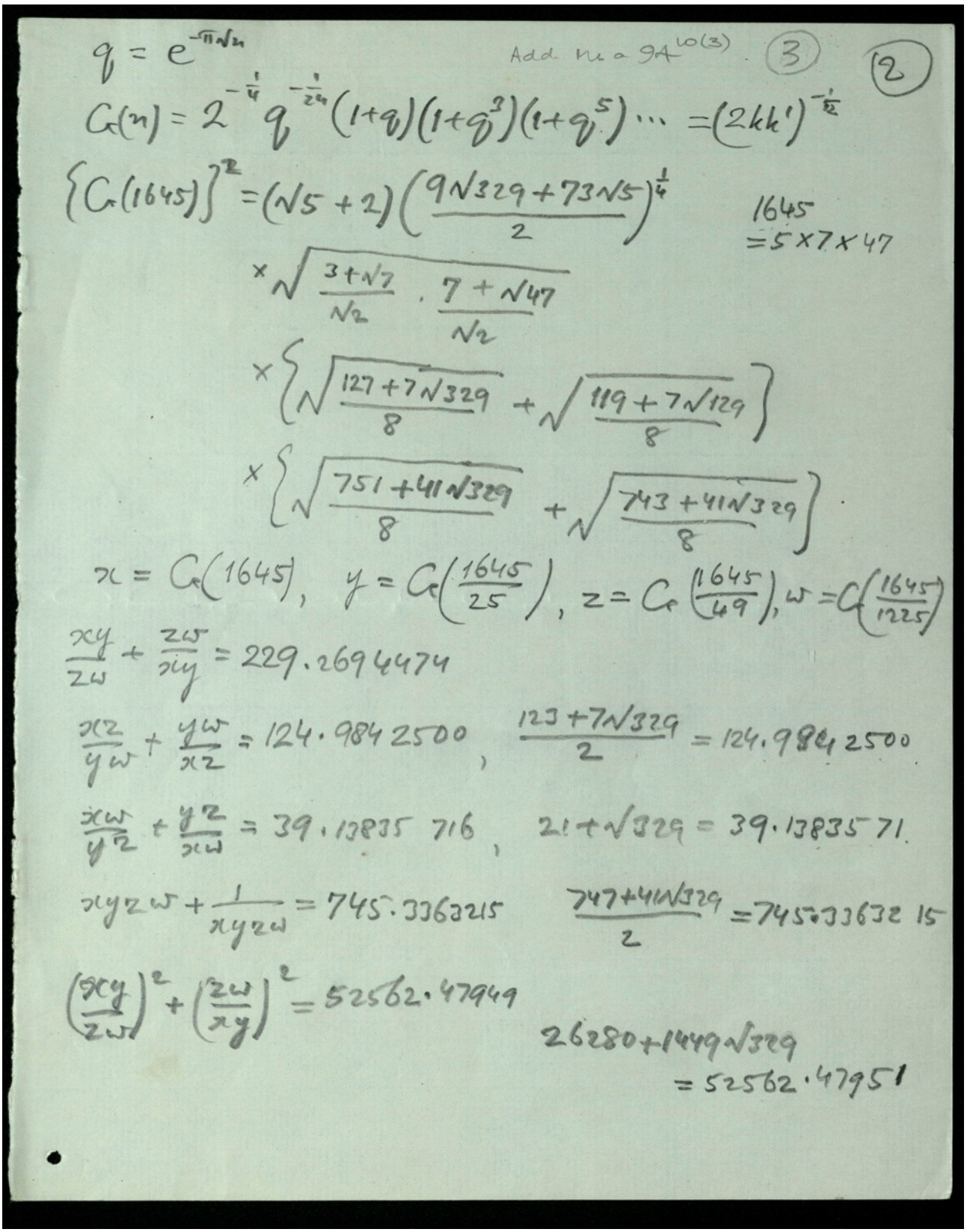
https://the-1000-year-view.com/2020/04/25/ramanujan-and-me/

We want to highlight that the development of the various equations was carried out according an our possible logical and original interpretation

For more information on the data entered for the development of the various equations, see the "Observations" section.

From:

https://www.trin.cam.ac.uk/library/wren-digital-library/modern-manuscripts/ramanujan/



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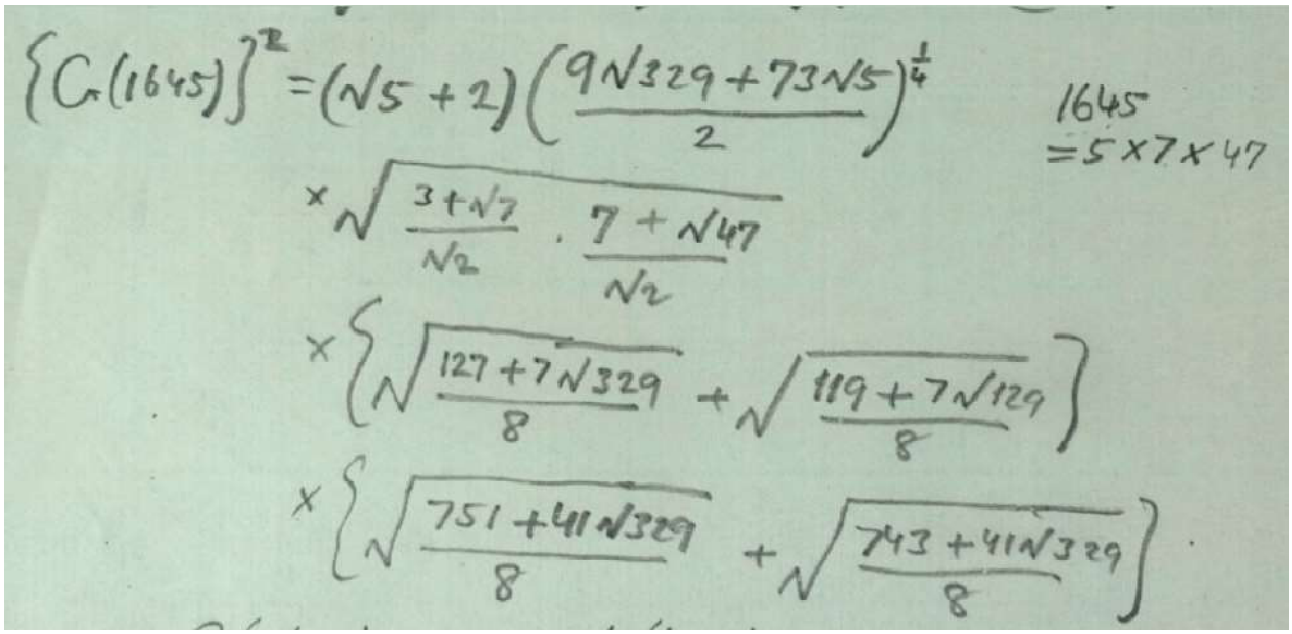


(sqrt5+2) (1/2*(9sqrt329+73sqrt5))^(1/4) * ((1/sqrt2(3+sqrt7)*1/sqrt2(7+sqrt47))^0.5 * (((1/8(127+7sqrt329))^0.5+(1/8(119+7sqrt129))^0.5))) * (((1/8(751+41sqrt329))^0.5+(1/8(743+41sqrt329))^0.5))

Input:

$$\left(\sqrt{5}+2\right)\sqrt[4]{\frac{1}{2}\left(9\sqrt{329}+73\sqrt{5}\right)}\left(\sqrt{\frac{1}{\sqrt{2}}\left(3+\sqrt{7}\right)\times\frac{1}{\sqrt{2}}\left(7+\sqrt{47}\right)}\left(\sqrt{\frac{1}{8}\left(127+7\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(119+7\sqrt{129}\right)}\right)\right)\left(\sqrt{\frac{1}{8}\left(751+41\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(743+41\sqrt{329}\right)}\right)$$

Exact result:

$$\frac{1}{2^{3/4}}\left(2+\sqrt{5}\right)\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(119+7\sqrt{129}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(127+7\sqrt{329}\right)}\right)\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(743+41\sqrt{329}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(751+41\sqrt{329}\right)}\right)$$

Decimal approximation:

27444.177836407149994463258964841419096708554419370283421 02...

27444.1778364…

Alternate forms:

$$\frac{1}{8\times 2^{3/4}}\left(2+\sqrt{5}\right)\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\ \sqrt[4]{73\sqrt{5}+9\sqrt{329}}\left(\sqrt{7\left(17+\sqrt{129}\right)}+\sqrt{127+7\sqrt{329}}\right)\left(\sqrt{743+41\sqrt{329}}+\sqrt{751+41\sqrt{329}}\right)$$

$$\frac{1}{16\times 2^{3/4}}\left(2+\sqrt{5}\right)\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\ \sqrt[4]{73\sqrt{5}+9\sqrt{329}}\left(\sqrt{14\left(17+\sqrt{129}\right)}+\sqrt{254+14\sqrt{329}}\right)\left(\sqrt{1486+82\sqrt{329}}+\sqrt{1502+82\sqrt{329}}\right)$$

$$\frac{1}{8\times 2^{3/4}}\left(2+\sqrt{5}\right)\sqrt[4]{73\sqrt{5}+9\sqrt{329}}\ \sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)\left(743+41\sqrt{329}\right)}\left(\sqrt{7\left(17+\sqrt{129}\right)}+\sqrt{127+7\sqrt{329}}\right)+\frac{1}{8\times 2^{3/4}}\left(2+\sqrt{5}\right)\sqrt[4]{73\sqrt{5}+9\sqrt{329}}\ \sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)\left(751+41\sqrt{329}\right)}\left(\sqrt{7\left(17+\sqrt{129}\right)}+\sqrt{127+7\sqrt{329}}\right)$$

From which:

((((sqrt5+2) (1/2(9sqrt329+73sqrt5))^(1/4) ((1/sqrt2(3+sqrt7) 1/sqrt2(7+sqrt47))^0.5
(((1/8(127+7sqrt329))^0.5+(1/8(119+7sqrt129))^0.5)))
(((1/8(751+41sqrt329))^0.5+(1/8(743+41sqrt329))^0.5)))))^1/21

Input:

$$\left(\left(\sqrt{5}+2\right)\sqrt[4]{\frac{1}{2}\left(9\sqrt{329}+73\sqrt{5}\right)}\left(\sqrt{\frac{1}{\sqrt{2}}\left(3+\sqrt{7}\right)\left(\frac{1}{\sqrt{2}}\left(7+\sqrt{47}\right)\right)}\left(\sqrt{\frac{1}{8}\left(127+7\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(119+7\sqrt{129}\right)}\right)\left(\sqrt{\frac{1}{8}\left(751+41\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(743+41\sqrt{329}\right)}\right)\right)\right)\text{^}(1/21)$$

Exact result:

$$\frac{1}{\sqrt[28]{2}}\sqrt[42]{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\sqrt[84]{73\sqrt{5}+9\sqrt{329}}\left(\left(2+\sqrt{5}\right)\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(119+7\sqrt{129}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(127+7\sqrt{329}\right)}\right)\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(743+41\sqrt{329}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(751+41\sqrt{329}\right)}\right)\right)\text{^}(1/21)$$

Decimal approximation:

1.626877199510399804643485953912501474594888819042310243636…

1.6268771995…

Alternate form:

$$\frac{1}{2^{5/28}}\sqrt[42]{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\sqrt[84]{73\sqrt{5}+9\sqrt{329}}\left(\left(2+\sqrt{5}\right)\left(\sqrt{7\left(17+\sqrt{129}\right)}+\sqrt{127+7\sqrt{329}}\right)\left(\sqrt{743+41\sqrt{329}}+\sqrt{751+41\sqrt{329}}\right)\right)\text{^}(1/21)$$

All 21st roots of ((2 + sqrt(5)) sqrt((3 + sqrt(7)) (7 + sqrt(47))) (73 sqrt(5) + 9 sqrt(329))^(1/4) (1/2 sqrt(1/2 (119 + 7 sqrt(129))) + 1/2 sqrt(1/2 (127 + 7 sqrt(329)))) (1/2 sqrt(1/2 (743 + 41 sqrt(329))) + 1/2 sqrt(1/2 (751 + 41 sqrt(329)))))/2^(3/4):

$$\frac{1}{\sqrt[28]{2}}\sqrt[42]{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\ \sqrt[84]{73\sqrt{5}+9\sqrt{329}}$$
$$\left(\left(2+\sqrt{5}\right)\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(119+7\sqrt{129}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(127+7\sqrt{329}\right)}\right)\right.$$
$$\left.\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(743+41\sqrt{329}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(751+41\sqrt{329}\right)}\right)\right)\text{^}$$
$(1/21)\,e^{0} \approx 1.62688$ (real, principal root)

$$\frac{1}{\sqrt[28]{2}}\sqrt[42]{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\ \sqrt[84]{73\sqrt{5}+9\sqrt{329}}$$
$$\left(\left(2+\sqrt{5}\right)\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(119+7\sqrt{129}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(127+7\sqrt{329}\right)}\right)\right.$$
$$\left.\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(743+41\sqrt{329}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(751+41\sqrt{329}\right)}\right)\right)\text{^}$$
$(1/21)\,e^{(2i\pi)/21} \approx 1.55460 + 0.4795\,i$

$$\frac{1}{\sqrt[28]{2}}\sqrt[42]{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\ \sqrt[84]{73\sqrt{5}+9\sqrt{329}}$$
$$\left(\left(2+\sqrt{5}\right)\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(119+7\sqrt{129}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(127+7\sqrt{329}\right)}\right)\right.$$
$$\left.\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(743+41\sqrt{329}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(751+41\sqrt{329}\right)}\right)\right)\text{^}$$
$(1/21)\,e^{(4i\pi)/21} \approx 1.3442 + 0.9165\,i$

$$\frac{1}{\sqrt[28]{2}}\sqrt[42]{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\ \sqrt[84]{73\sqrt{5}+9\sqrt{329}}$$
$$\left(\left(2+\sqrt{5}\right)\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(119+7\sqrt{129}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(127+7\sqrt{329}\right)}\right)\right.$$
$$\left.\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(743+41\sqrt{329}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(751+41\sqrt{329}\right)}\right)\right)\text{^}$$
$(1/21)\,e^{(2i\pi)/7} \approx 1.0143 + 1.2719\,i$

$$\frac{1}{\sqrt[28]{2}}\sqrt[42]{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\ \sqrt[84]{73\sqrt{5}+9\sqrt{329}}$$
$$\left(\left(2+\sqrt{5}\right)\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(119+7\sqrt{129}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(127+7\sqrt{329}\right)}\right)\right.$$
$$\left.\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(743+41\sqrt{329}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(751+41\sqrt{329}\right)}\right)\right)^{\wedge}$$
$$(1/21)\,e^{(8\,i\,\pi)/21}\approx 0.5944+1.51442\,i$$

1/16[((sqrt5+2)(1/2*(9sqrt329+73sqrt5))^(1/4)((1/sqrt2(3+sqrt7)*1/sqrt2(7+sqrt47))^0.5(((1/8(127+7sqrt329))^0.5+(1/8(119+7sqrt129))^0.5)))(((1/8(751+41sqrt329))^0.5+(1/8(743+41sqrt329))^0.5)))]+13

Input:

$$\frac{1}{16}\left(\left(\sqrt{5}+2\right)\sqrt[4]{\frac{1}{2}\left(9\sqrt{329}+73\sqrt{5}\right)}\left(\sqrt{\frac{1}{\sqrt{2}}\left(3+\sqrt{7}\right)\times\frac{1}{\sqrt{2}}\left(7+\sqrt{47}\right)}\right.\right.$$
$$\left.\left(\sqrt{\frac{1}{8}\left(127+7\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(119+7\sqrt{129}\right)}\right)\right)$$
$$\left.\left(\sqrt{\frac{1}{8}\left(751+41\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(743+41\sqrt{329}\right)}\right)\right)+13$$

Exact result:

$$13+\frac{1}{16\times 2^{3/4}}\left(2+\sqrt{5}\right)\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}$$
$$\sqrt[4]{73\sqrt{5}+9\sqrt{329}}\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(119+7\sqrt{129}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(127+7\sqrt{329}\right)}\right)$$
$$\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(743+41\sqrt{329}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(751+41\sqrt{329}\right)}\right)$$

Decimal approximation:

1728.261114775446874653953685302588693544284651210642713814...

1728.26111477…

This result is very near to the mass of candidate glueball **$f_0(1710)$ scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Alternate forms:

$$\frac{1}{512}\left(6656+\left(2+\sqrt{5}\right)\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\right.$$
$$\sqrt[4]{2\left(73\sqrt{5}+9\sqrt{329}\right)}\left(\sqrt{14\left(17+\sqrt{129}\right)}+\sqrt{254+14\sqrt{329}}\right)$$
$$\left.\left(\sqrt{1486+82\sqrt{329}}+\sqrt{1502+82\sqrt{329}}\right)\right)$$

$$\frac{1}{256}\left(3328+2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}\right.$$
$$\sqrt{7\left(17+\sqrt{129}\right)\left(14546+5491\sqrt{7}+2119\sqrt{47}+802\sqrt{329}\right)}+$$
$$2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{35\left(17+\sqrt{129}\right)\left(14546+5491\sqrt{7}+2119\sqrt{47}+802\sqrt{329}\right)}+$$
$$2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{7\left(17+\sqrt{129}\right)\left(14630+5519\sqrt{7}+2131\sqrt{47}+806\sqrt{329}\right)}+$$
$$2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{35\left(17+\sqrt{129}\right)\left(14630+5519\sqrt{7}+2131\sqrt{47}+806\sqrt{329}\right)}+$$
$$4\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{923587+348627\sqrt{7}+134543\sqrt{47}+50919\sqrt{329}}+$$
$$2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{5\left(923587+348627\sqrt{7}+134543\sqrt{47}+50919\sqrt{329}\right)}+$$
$$4\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{928557+350503\sqrt{7}+135267\sqrt{47}+51193\sqrt{329}}+$$
$$2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\left.\sqrt{5\left(928557+350503\sqrt{7}+135267\sqrt{47}+51193\sqrt{329}\right)}\right)$$

$$13+\frac{1}{64}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{7\left(17+\sqrt{129}\right)\left(14546+5491\sqrt{7}+2119\sqrt{47}+802\sqrt{329}\right)}+\frac{1}{128}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{35\left(17+\sqrt{129}\right)\left(14546+5491\sqrt{7}+2119\sqrt{47}+802\sqrt{329}\right)}+\frac{1}{64}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{7\left(17+\sqrt{129}\right)\left(14630+5519\sqrt{7}+2131\sqrt{47}+806\sqrt{329}\right)}+\frac{1}{128}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{35\left(17+\sqrt{129}\right)\left(14630+5519\sqrt{7}+2131\sqrt{47}+806\sqrt{329}\right)}+\frac{1}{32}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{923587+348627\sqrt{7}+134543\sqrt{47}+50919\sqrt{329}}+\frac{1}{64}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{5\left(923587+348627\sqrt{7}+134543\sqrt{47}+50919\sqrt{329}\right)}+\frac{1}{32}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{928557+350503\sqrt{7}+135267\sqrt{47}+51193\sqrt{329}}+\frac{1}{64}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{5\left(928557+350503\sqrt{7}+135267\sqrt{47}+51193\sqrt{329}\right)}$$

((1/16[((sqrt5+2)(1/2(9sqrt329+73sqrt5))^(1/4)((1/sqrt2(3+sqrt7)1/sqrt2(7+sqrt47))^0.5((1/8(127+7sqrt329))^0.5+(1/8(119+7sqrt129))^0.5))((1/8(751+41sqrt329))^0.5+(1/8(743+41sqrt329))^0.5))]+13))^1/15

Input:

$$\left(\frac{1}{16}\left(\left(\sqrt{5}+2\right)\sqrt[4]{\frac{1}{2}\left(9\sqrt{329}+73\sqrt{5}\right)}\left(\sqrt{\frac{1}{\sqrt{2}}\left(3+\sqrt{7}\right)\times\frac{1}{\sqrt{2}}\left(7+\sqrt{47}\right)}\left(\sqrt{\frac{1}{8}\left(127+7\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(119+7\sqrt{129}\right)}\right)\right)\left(\sqrt{\frac{1}{8}\left(751+41\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(743+41\sqrt{329}\right)}\right)\right)+13\right)\text{^}(1/15)$$

Exact result:

$$\left(13+\frac{1}{16\times 2^{3/4}}\left(2+\sqrt{5}\right)\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(119+7\sqrt{129}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(127+7\sqrt{329}\right)}\right)\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(743+41\sqrt{329}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(751+41\sqrt{329}\right)}\right)\right)\text{^}(1/15)$$

Decimal approximation:

1.643768387296018312106776882434167603027087881120356969922...

$1.6437683872\ldots \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Alternate forms:

$$\frac{1}{2^{3/5}}\left(\left(6656+\left(2+\sqrt{5}\right)\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\sqrt[4]{2\left(73\sqrt{5}+9\sqrt{329}\right)}\left(\sqrt{14\left(17+\sqrt{129}\right)}+\sqrt{254+14\sqrt{329}}\right)\left(\sqrt{1486+82\sqrt{329}}+\sqrt{1502+82\sqrt{329}}\right)\right)\text{^}(1/15)\right)$$

$$\frac{1}{2^{8/15}}\left(\left(3328+2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}\right.\right.$$
$$\sqrt{7\left(17+\sqrt{129}\right)\left(14546+5491\sqrt{7}+2119\sqrt{47}+802\sqrt{329}\right)}+$$
$$2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{35\left(17+\sqrt{129}\right)\left(14546+5491\sqrt{7}+2119\sqrt{47}+802\sqrt{329}\right)}+$$
$$2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{7\left(17+\sqrt{129}\right)\left(14630+5519\sqrt{7}+2131\sqrt{47}+806\sqrt{329}\right)}+$$
$$2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{35\left(17+\sqrt{129}\right)\left(14630+5519\sqrt{7}+2131\sqrt{47}+806\sqrt{329}\right)}+$$
$$4\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{923587+348627\sqrt{7}+134543\sqrt{47}+50919\sqrt{329}}+$$
$$2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{5\left(923587+348627\sqrt{7}+134543\sqrt{47}+50919\sqrt{329}\right)}+$$
$$4\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{928557+350503\sqrt{7}+135267\sqrt{47}+51193\sqrt{329}}+$$
$$2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\left.\left.\sqrt{5\left(928557+350503\sqrt{7}+135267\sqrt{47}+51193\sqrt{329}\right)}\right)\text{^}(1/15)\right)$$

$$\frac{1}{2^{8/15}}\left(\left(3328+2\sqrt[4]{2\left(73\sqrt{5}+9\sqrt{329}\right)}\right.\right.$$
$$\sqrt{7\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)\left(17+\sqrt{129}\right)\left(743+41\sqrt{329}\right)}+$$
$$\sqrt[4]{2\left(73\sqrt{5}+9\sqrt{329}\right)}$$
$$\sqrt{35\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)\left(17+\sqrt{129}\right)\left(743+41\sqrt{329}\right)}+$$
$$2\sqrt[4]{2\left(73\sqrt{5}+9\sqrt{329}\right)}$$
$$\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)\left(127+7\sqrt{329}\right)\left(743+41\sqrt{329}\right)}+$$
$$\sqrt[4]{2\left(73\sqrt{5}+9\sqrt{329}\right)}$$
$$\sqrt{5\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)\left(127+7\sqrt{329}\right)\left(743+41\sqrt{329}\right)}+$$
$$2\sqrt[4]{2\left(73\sqrt{5}+9\sqrt{329}\right)}$$
$$\sqrt{7\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)\left(17+\sqrt{129}\right)\left(751+41\sqrt{329}\right)}+$$
$$\sqrt[4]{2\left(73\sqrt{5}+9\sqrt{329}\right)}$$
$$\sqrt{35\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)\left(17+\sqrt{129}\right)\left(751+41\sqrt{329}\right)}+$$
$$2\sqrt[4]{2\left(73\sqrt{5}+9\sqrt{329}\right)}$$
$$\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)\left(127+7\sqrt{329}\right)\left(751+41\sqrt{329}\right)}+$$
$$\sqrt[4]{2\left(73\sqrt{5}+9\sqrt{329}\right)}$$
$$\left.\left.\sqrt{5\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)\left(127+7\sqrt{329}\right)\left(751+41\sqrt{329}\right)}\right)\text{^}(1/15)\right)$$

1/144[((sqrt5+2)(1/2*(9sqrt329+73sqrt5))^(1/4)
((1/sqrt2(3+sqrt7)1/sqrt2(7+sqrt47))^0.5
(((1/8(127+7sqrt329))^0.5+(1/8(119+7sqrt129))^0.5)))(((1/8(751+41sqrt329))^0.5+(
1/8(743+41sqrt329))^0.5)))]-47-4

Input:

$$\frac{1}{144}\left(\left(\sqrt{5}+2\right)\sqrt[4]{\frac{1}{2}\left(9\sqrt{329}+73\sqrt{5}\right)}\left(\left(\sqrt{\frac{1}{\sqrt{2}}\left(3+\sqrt{7}\right)\times\frac{1}{\sqrt{2}}\left(7+\sqrt{47}\right)}\left(\sqrt{\frac{1}{8}\left(127+7\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(119+7\sqrt{129}\right)}\right)\right)\left(\sqrt{\frac{1}{8}\left(751+41\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(743+41\sqrt{329}\right)}\right)\right)\right)-47-4$$

Exact result:

$$\frac{1}{144\times 2^{3/4}}\left(2+\sqrt{5}\right)\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(119+7\sqrt{129}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(127+7\sqrt{329}\right)}\right)\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(743+41\sqrt{329}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(751+41\sqrt{329}\right)}\right)-51$$

Decimal approximation:

139.584568308382986072661520589176521504920516801182523757 1...

139.5845683…. result practically equal to the rest mass of Pion meson 139.57 MeV

Alternate forms:

$$\frac{1}{2304\times 2^{3/4}}\left(2+\sqrt{5}\right)\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}\left(\sqrt{14\left(17+\sqrt{129}\right)}+\sqrt{254+14\sqrt{329}}\right)\left(\sqrt{1486+82\sqrt{329}}+\sqrt{1502+82\sqrt{329}}\right)-51$$

$$\frac{1}{2304}\left(-117504+2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}\right.$$
$$\sqrt{7\left(17+\sqrt{129}\right)\left(14546+5491\sqrt{7}+2119\sqrt{47}+802\sqrt{329}\right)}+$$
$$2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{35\left(17+\sqrt{129}\right)\left(14546+5491\sqrt{7}+2119\sqrt{47}+802\sqrt{329}\right)}+$$
$$2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{7\left(17+\sqrt{129}\right)\left(14630+5519\sqrt{7}+2131\sqrt{47}+806\sqrt{329}\right)}+$$
$$2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{35\left(17+\sqrt{129}\right)\left(14630+5519\sqrt{7}+2131\sqrt{47}+806\sqrt{329}\right)}+$$
$$4\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{923587+348627\sqrt{7}+134543\sqrt{47}+50919\sqrt{329}}+$$
$$2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{5\left(923587+348627\sqrt{7}+134543\sqrt{47}+50919\sqrt{329}\right)}+$$
$$4\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{928557+350503\sqrt{7}+135267\sqrt{47}+51193\sqrt{329}}+$$
$$2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\left.\sqrt{5\left(928557+350503\sqrt{7}+135267\sqrt{47}+51193\sqrt{329}\right)}\right)$$

$$-51+\frac{1}{576}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{7\left(17+\sqrt{129}\right)\left(14546+5491\sqrt{7}+2119\sqrt{47}+802\sqrt{329}\right)}+\frac{1}{1152}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{35\left(17+\sqrt{129}\right)\left(14546+5491\sqrt{7}+2119\sqrt{47}+802\sqrt{329}\right)}+\frac{1}{576}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{7\left(17+\sqrt{129}\right)\left(14630+5519\sqrt{7}+2131\sqrt{47}+806\sqrt{329}\right)}+\frac{1}{1152}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{35\left(17+\sqrt{129}\right)\left(14630+5519\sqrt{7}+2131\sqrt{47}+806\sqrt{329}\right)}+\frac{1}{288}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{923587+348627\sqrt{7}+134543\sqrt{47}+50919\sqrt{329}}+\frac{1}{576}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{5\left(923587+348627\sqrt{7}+134543\sqrt{47}+50919\sqrt{329}\right)}+\frac{1}{288}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{928557+350503\sqrt{7}+135267\sqrt{47}+51193\sqrt{329}}+\frac{1}{576}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{5\left(928557+350503\sqrt{7}+135267\sqrt{47}+51193\sqrt{329}\right)}$$

1/144[((sqrt5+2)(1/2*(9sqrt329+73sqrt5))^(1/4)((1/sqrt2(3+sqrt7)1/sqrt2(7+sqrt47))^0.5(((1/8(127+7sqrt329))^0.5+(1/8(119+7sqrt129))^0.5)))(((1/8(751+41sqrt329))^0.5+(1/8(743+41sqrt329))^0.5)))]-47-18

Input:

$$\frac{1}{144}\left(\left(\sqrt{5}+2\right)\sqrt[4]{\frac{1}{2}\left(9\sqrt{329}+73\sqrt{5}\right)}\left(\sqrt{\frac{1}{\sqrt{2}}\left(3+\sqrt{7}\right)\times\frac{1}{\sqrt{2}}\left(7+\sqrt{47}\right)}\left(\sqrt{\frac{1}{8}\left(127+7\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(119+7\sqrt{129}\right)}\right)\right)\left(\sqrt{\frac{1}{8}\left(751+41\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(743+41\sqrt{329}\right)}\right)\right)-47-18$$

Exact result:

$$\frac{1}{144\times 2^{3/4}}\left(2+\sqrt{5}\right)\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(119+7\sqrt{129}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(127+7\sqrt{329}\right)}\right)\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(743+41\sqrt{329}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(751+41\sqrt{329}\right)}\right)-65$$

Decimal approximation:

125.584568308382986072661520589176521504920516801182523757 1...

125.5845683… result very near to the Higgs boson mass 125.18 GeV

Alternate forms:

$$\frac{1}{2304\times 2^{3/4}}\left(2+\sqrt{5}\right)\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}\left(\sqrt{14\left(17+\sqrt{129}\right)}+\sqrt{254+14\sqrt{329}}\right)\left(\sqrt{1486+82\sqrt{329}}+\sqrt{1502+82\sqrt{329}}\right)-65$$

$$\frac{1}{2304}\left(-149760+2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}\right.$$
$$\sqrt{7\left(17+\sqrt{129}\right)\left(14546+5491\sqrt{7}+2119\sqrt{47}+802\sqrt{329}\right)}+$$
$$2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{35\left(17+\sqrt{129}\right)\left(14546+5491\sqrt{7}+2119\sqrt{47}+802\sqrt{329}\right)}+$$
$$2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{7\left(17+\sqrt{129}\right)\left(14630+5519\sqrt{7}+2131\sqrt{47}+806\sqrt{329}\right)}+$$
$$2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{35\left(17+\sqrt{129}\right)\left(14630+5519\sqrt{7}+2131\sqrt{47}+806\sqrt{329}\right)}+$$
$$4\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{923587+348627\sqrt{7}+134543\sqrt{47}+50919\sqrt{329}}+$$
$$2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{5\left(923587+348627\sqrt{7}+134543\sqrt{47}+50919\sqrt{329}\right)}+$$
$$4\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{928557+350503\sqrt{7}+135267\sqrt{47}+51193\sqrt{329}}+$$
$$2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\left.\sqrt{5\left(928557+350503\sqrt{7}+135267\sqrt{47}+51193\sqrt{329}\right)}\right)$$

$$-65+\frac{1}{576}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{7\left(17+\sqrt{129}\right)\left(14546+5491\sqrt{7}+2119\sqrt{47}+802\sqrt{329}\right)}+\frac{1}{1152}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{35\left(17+\sqrt{129}\right)\left(14546+5491\sqrt{7}+2119\sqrt{47}+802\sqrt{329}\right)}+\frac{1}{576}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{7\left(17+\sqrt{129}\right)\left(14630+5519\sqrt{7}+2131\sqrt{47}+806\sqrt{329}\right)}+\frac{1}{1152}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{35\left(17+\sqrt{129}\right)\left(14630+5519\sqrt{7}+2131\sqrt{47}+806\sqrt{329}\right)}+\frac{1}{288}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{923587+348627\sqrt{7}+134543\sqrt{47}+50919\sqrt{329}}+\frac{1}{576}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{5\left(923587+348627\sqrt{7}+134543\sqrt{47}+50919\sqrt{329}\right)}+\frac{1}{288}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{928557+350503\sqrt{7}+135267\sqrt{47}+51193\sqrt{329}}+\frac{1}{576}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}\sqrt{5\left(928557+350503\sqrt{7}+135267\sqrt{47}+51193\sqrt{329}\right)}$$

e[(sqrt5+2)(1/2*(9sqrt329+73sqrt5))^(1/4) ((1/sqrt2(3+sqrt7)*1/sqrt2(7+sqrt47))^0.5 (((1/8(127+7sqrt329))^0.5+(1/8(119+7sqrt129))^0.5))) (((1/8(751+41sqrt329))^0.5+(1/8(743+41sqrt329))^0.5))]-1024-89

Input:

$$e\left(\left(\left(\sqrt{5}+2\right)\sqrt[4]{\frac{1}{2}\left(9\sqrt{329}+73\sqrt{5}\right)}\right)\left(\sqrt{\frac{1}{\sqrt{2}}\left(3+\sqrt{7}\right)\times\frac{1}{\sqrt{2}}\left(7+\sqrt{47}\right)}\left(\sqrt{\frac{1}{8}\left(127+7\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(119+7\sqrt{129}\right)}\right)\left(\sqrt{\frac{1}{8}\left(751+41\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(743+41\sqrt{329}\right)}\right)\right)-1024-89$$

Exact result:

$$\frac{1}{2^{3/4}}\left(2+\sqrt{5}\right)\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(119+7\sqrt{129}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(127+7\sqrt{329}\right)}\right)\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(743+41\sqrt{329}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(751+41\sqrt{329}\right)}\right)e-1113$$

Decimal approximation:

73488.009909704031713402882618707071945200782563471299551 65...

73488.0099097…

Property:

$$-1113+\frac{1}{2^{3/4}}\left(2+\sqrt{5}\right)\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(119+7\sqrt{129}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(127+7\sqrt{329}\right)}\right)\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(743+41\sqrt{329}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(751+41\sqrt{329}\right)}\right)e$$

is a transcendental number

Alternate forms:

$$\frac{1}{32}\left(\left(2+\sqrt{5}\right)\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\right.$$
$$\sqrt[4]{2\left(73\sqrt{5}+9\sqrt{329}\right)}\left(\sqrt{14\left(17+\sqrt{129}\right)}+\sqrt{254+14\sqrt{329}}\right)$$
$$\left.\left(\sqrt{1486+82\sqrt{329}}+\sqrt{1502+82\sqrt{329}}\right)e-35\,616\right)$$

$$\frac{1}{8\times 2^{3/4}}\left(2+\sqrt{5}\right)\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}$$
$$\sqrt[4]{73\sqrt{5}+9\sqrt{329}}\left(\sqrt{7\left(17+\sqrt{129}\right)}+\sqrt{127+7\sqrt{329}}\right)$$
$$\left(\sqrt{743+41\sqrt{329}}+\sqrt{751+41\sqrt{329}}\right)e-1113$$

$$\frac{1}{16}\left(-17808+2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}\right.$$
$$\sqrt{7\left(17+\sqrt{129}\right)\left(14546+5491\sqrt{7}+2119\sqrt{47}+802\sqrt{329}\right)}\,e+$$
$$2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{35\left(17+\sqrt{129}\right)\left(14546+5491\sqrt{7}+2119\sqrt{47}+802\sqrt{329}\right)}\,e+$$
$$2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{7\left(17+\sqrt{129}\right)\left(14630+5519\sqrt{7}+2131\sqrt{47}+806\sqrt{329}\right)}\,e+$$
$$2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{35\left(17+\sqrt{129}\right)\left(14630+5519\sqrt{7}+2131\sqrt{47}+806\sqrt{329}\right)}\,e+$$
$$4\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{923587+348627\sqrt{7}+134543\sqrt{47}+50919\sqrt{329}}\,e+$$
$$2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{5\left(923587+348627\sqrt{7}+134543\sqrt{47}+50919\sqrt{329}\right)}\,e+$$
$$4\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\sqrt{928557+350503\sqrt{7}+135267\sqrt{47}+51193\sqrt{329}}\,e+$$
$$2\times 2^{3/4}\sqrt[4]{73\sqrt{5}+9\sqrt{329}}$$
$$\left.\sqrt{5\left(928557+350503\sqrt{7}+135267\sqrt{47}+51193\sqrt{329}\right)}\,e\right)$$

Series representations:

$$e^{\left(\left(\sqrt{5}+2\right)\sqrt[4]{\frac{1}{2}\left(9\sqrt{329}+73\sqrt{5}\right)}\right)}\left(\left(\sqrt{\frac{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}{\sqrt{2}\,\sqrt{2}}}\left(\sqrt{\frac{1}{8}\left(127+7\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(119+7\sqrt{129}\right)}\right)\right)\left(\sqrt{\frac{1}{8}\left(751+41\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(743+41\sqrt{329}\right)}\right)\right)-1024-89=$$

$$-1113+\frac{1}{\sqrt[4]{2}}\,e^{\sqrt[4]{\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\sqrt{z_0}\left(73\,(5-z_0)^k+9\,(329-z_0)^k\right)z_0^{-k}}{k!}}}\left(2+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k\,z_0^{-k}}{k!}\right)\sqrt{\frac{\left(3+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(7-z_0)^k\,z_0^{-k}}{k!}\right)\left(7+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(47-z_0)^k\,z_0^{-k}}{k!}\right)}{\sqrt{z_0}^{\,2}\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k\,z_0^{-k}}{k!}\right)^2}}\left(\frac{\sqrt{119+7\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(129-z_0)^k\,z_0^{-k}}{k!}}}{2\sqrt{2}}+\frac{\sqrt{127+7\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(329-z_0)^k\,z_0^{-k}}{k!}}}{2\sqrt{2}}\right)\left(\frac{\sqrt{743+41\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(329-z_0)^k\,z_0^{-k}}{k!}}}{2\sqrt{2}}+\frac{\sqrt{751+41\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(329-z_0)^k\,z_0^{-k}}{k!}}}{2\sqrt{2}}\right)$$

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

$$e\left(\left(\sqrt{5}+2\right)\sqrt[4]{\frac{1}{2}\left(9\sqrt{329}+73\sqrt{5}\right)}\right)$$
$$\left(\left(\sqrt{\frac{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}{\sqrt{2}\,\sqrt{2}}}\left(\sqrt{\frac{1}{8}\left(127+7\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(119+7\sqrt{129}\right)}\right)\right)\right.$$
$$\left.\left(\sqrt{\frac{1}{8}\left(751+41\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(743+41\sqrt{329}\right)}\right)\right)-1024-89=$$
$$-1113+\frac{1}{\sqrt[4]{2}}\,e\left(2+\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\sqrt{\left(\left(\left(3+\exp\left(i\pi\left\lfloor\frac{\arg(7-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(7-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right.\right.}$$
$$\left.\left.\left(7+\exp\left(i\pi\left\lfloor\frac{\arg(47-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(47-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\right/$$
$$\left(\exp^2\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^2\right)\Bigg)$$
$$\left(\frac{\sqrt{119+7\exp\left(i\pi\left\lfloor\frac{\arg(129-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(129-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}{2\sqrt{2}}+\right.$$
$$\left.\frac{\sqrt{127+7\exp\left(i\pi\left\lfloor\frac{\arg(329-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(329-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}{2\sqrt{2}}\right)$$
$$\left(\frac{\sqrt{743+41\exp\left(i\pi\left\lfloor\frac{\arg(329-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(329-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}{2\sqrt{2}}+\right.$$
$$\left.\frac{\sqrt{751+41\exp\left(i\pi\left\lfloor\frac{\arg(329-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(329-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}{2\sqrt{2}}\right)$$
$$\left(\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^k x^{-k}\left(73(5-x)^k\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)+9(329-x)^k\exp\right.\right.$$
$$\left.\left.\left(i\pi\left\lfloor\frac{\arg(329-x)}{2\pi}\right\rfloor\right)\right)\left(-\frac{1}{2}\right)_k\sqrt{x}\right)\wedge(1/4)\quad\text{for}\ (x\in\mathbb{R}\ \text{and}\ x<0)$$

$$e\left(\left(\sqrt{5}+2\right)\sqrt[4]{\frac{1}{2}\left(9\sqrt{329}+73\sqrt{5}\right)}\right)$$
$$\left(\left(\sqrt{\frac{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}{\sqrt{2}\ \sqrt{2}}}\left(\sqrt{\frac{1}{8}\left(127+7\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(119+7\sqrt{129}\right)}\right)\right)\right.$$
$$\left.\left(\sqrt{\frac{1}{8}\left(751+41\sqrt{329}\right)}+\sqrt{\frac{1}{8}\left(743+41\sqrt{329}\right)}\right)\right)-1024-89=-1113+$$
$$\frac{1}{\sqrt[4]{2}}\,e\left(2+\left(\frac{1}{z_0}\right)^{1/2\,[\arg(5-z_0)/(2\pi)]}\,z_0^{1/2\,(1+[\arg(5-z_0)/(2\pi)])}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k\,z_0^{-k}}{k!}\right)$$
$$\sqrt{\left(\left(\left(\frac{1}{z_0}\right)^{-[\arg(2-z_0)/(2\pi)]}\,z_0^{-1-[\arg(2-z_0)/(2\pi)]}\left(3+\left(\frac{1}{z_0}\right)^{1/2\,[\arg(7-z_0)/(2\pi)]}\right.\right.\right.$$
$$\left.z_0^{1/2\,(1+[\arg(7-z_0)/(2\pi)])}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(7-z_0)^k\,z_0^{-k}}{k!}\right)$$
$$\left(7+\left(\frac{1}{z_0}\right)^{1/2\,[\arg(47-z_0)/(2\pi)]}\,z_0^{1/2\,(1+[\arg(47-z_0)/(2\pi)])}\right.$$
$$\left.\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(47-z_0)^k\,z_0^{-k}}{k!}\right)\middle/\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k\,z_0^{-k}}{k!}\right)^2\right)\right)$$
$$\left(\frac{1}{2\sqrt{2}}\left(\sqrt{\left(119+7\left(\frac{1}{z_0}\right)^{1/2\,[\arg(129-z_0)/(2\pi)]}\,z_0^{1/2\,(1+[\arg(129-z_0)/(2\pi)])}\right.\right.\right.$$
$$\left.\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(129-z_0)^k\,z_0^{-k}}{k!}\right)\right)+\right.$$
$$\frac{1}{2\sqrt{2}}\left(\sqrt{\left(127+7\left(\frac{1}{z_0}\right)^{1/2\,[\arg(329-z_0)/(2\pi)]}\,z_0^{1/2\,(1+[\arg(329-z_0)/(2\pi)])}\right.\right.$$
$$\left.\left.\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(329-z_0)^k\,z_0^{-k}}{k!}\right)\right)\right)\right)$$
$$\left(\frac{1}{2\sqrt{2}}\left(\sqrt{\left(743+41\left(\frac{1}{z_0}\right)^{1/2\,[\arg(329-z_0)/(2\pi)]}\,z_0^{1/2\,(1+[\arg(329-z_0)/(2\pi)])}\right.\right.\right.$$
$$\left.\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(329-z_0)^k\,z_0^{-k}}{k!}\right)\right)+\right.$$
$$\frac{1}{2\sqrt{2}}\left(\sqrt{\left(751+41\left(\frac{1}{z_0}\right)^{1/2\,[\arg(329-z_0)/(2\pi)]}\,z_0^{1/2\,(1+[\arg(329-z_0)/(2\pi)])}\right.\right.$$
$$\left.\left.\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(329-z_0)^k\,z_0^{-k}}{k!}\right)\right)\right)\right)$$
$$\left(\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^k\left(-\frac{1}{2}\right)_k z_0^{1/2-k}\left(73\,(5-z_0)^k\left(\frac{1}{z_0}\right)^{1/2\,[\arg(5-z_0)/(2\pi)]}\,z_0^{1/2\,[\arg(5-z_0)/(2\pi)]}+\right.\right.$$
$$\left.\left.9\,(329-z_0)^k\left(\frac{1}{z_0}\right)^{1/2\,[\arg(329-z_0)/(2\pi)]}\,z_0^{1/2\,[\arg(329-z_0)/(2\pi)]}\right)\right)\wedge(1/4)$$

We have the following mathematical connections:

$$\left(\begin{array}{l}\frac{1}{2^{3/4}}\left(2+\sqrt{5}\right)\sqrt{\left(3+\sqrt{7}\right)\left(7+\sqrt{47}\right)}\sqrt[4]{73\sqrt{5}+9\sqrt{329}} \\ \left(\frac{1}{2}\sqrt{\frac{1}{2}\left(119+7\sqrt{129}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(127+7\sqrt{329}\right)}\right) \\ \left(\frac{1}{2}\sqrt{\frac{1}{2}\left(743+41\sqrt{329}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(751+41\sqrt{329}\right)}\right)e-1113\end{array}\right) = 73488.0099097\ldots$$

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

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

$$= 73490.8437525\ldots. \Rightarrow$$

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

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

$$= 73491.788325481187105491595720422205480251957265634133987 00\ldots$$

$$= 73491.7883254\ldots \Rightarrow$$

$$\left(I_{21} \ll \int_{-\infty}^{+\infty} \exp\left(-\left(\frac{t}{H}\right)^2\right) \left| \sum_{\lambda \leq P^{1-\varepsilon_2}} \frac{a(\lambda)}{\sqrt{\lambda}} B(\lambda) \lambda^{-i(T+t)} \right|^2 dt \ll \right.$$

$$\left. \ll H \left\{ \left(\frac{4}{\varepsilon_2 \log T} \right)^{2r} (\log T)(\log X)^{-2\beta} + (\varepsilon_2^{-2r} (\log T)^{-2r} + \varepsilon_2^{-r} h_1^r (\log T)^{-r}) T^{-\varepsilon_1} \right\} \right) /$$

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

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

Now, we have that:

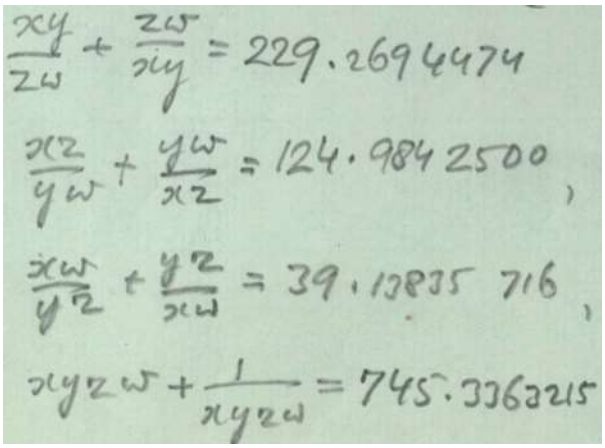
$$\frac{xy}{zw} + \frac{zw}{xy} = 229.2694474$$

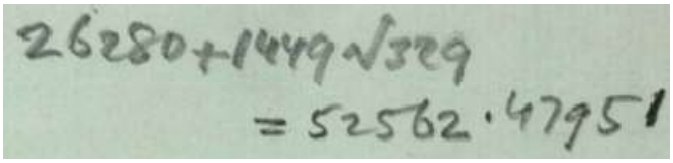
$$\left(\frac{xy}{zw}\right)^2 + \left(\frac{zw}{xy}\right)^2 = 52562.47949$$

$$\frac{123 + 7\sqrt{329}}{2} = 124.9842500$$

$$21 + \sqrt{329} = 39.13835\,71$$

$$\frac{747 + 41\sqrt{329}}{2} = 745.33632$$





We note that:

(229.2694474)^2-2

Input interpretation:

$229.2694474^2 - 2$

Result:
52562.47951110136676
52562.47951110136676

((((229.2694474)^2-2)))^1/2-89-1/golden ratio

Input interpretation:

$\sqrt{229.2694474^2 - 2} - 89 - \frac{1}{\phi}$

ϕ is the golden ratio

Result:
139.6470517...
139.647…. result practically equal to the rest mass of Pion meson 139.57 MeV

((((229.2694474)^2-2)))^1/2-89-13-2

Input interpretation:

$$\sqrt{229.2694474^2 - 2} - 89 - 13 - 2$$

Result:

125.2650857...

125.265….. result very near to the Higgs boson mass 125.18 GeV

1+1/((((229.2694474)^2-2)))^1/24

Input interpretation:

$$1 + \frac{1}{\sqrt[24]{229.2694474^2 - 2}}$$

Result:

1.6357775277...

1.6357775277…. $\approx \zeta(2) = \frac{\pi^2}{6} = 1.644934$ ...

229.2694474 + 124.98425 + 39.1383571 + 745.33632 = 1138.7283745

(229.2694474 + 124.98425 + 39.1383571 + 745.33632)^1/14

Input interpretation:

$$\sqrt[14]{229.2694474 + 124.98425 + 39.1383571 + 745.33632}$$

Result:

1.65316318...

1.65316318…. result very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3$ = 1164.2696 i.e. 1.65578...

and:

124.98425 + 39.1383571 + 745.33632 = 909.4589271

(124.98425 + 39.1383571 + 745.33632)^1/14

Input interpretation:

$\sqrt[14]{124.98425 + 39.1383571 + 745.33632}$

Result:

1.62682804...

1.62682804…

((((229.2694474)^2-2)))/(1138.7283745)

Input interpretation:

$\frac{229.2694474^2 - 2}{1138.7283745}$

Result:

46.158926648491419285345998024044143988264165274824281635 56...

46.158926648…

(((((((229.2694474)^2-2)))/(1138.7283745))))^1/8

Input interpretation:

$\sqrt[8]{\frac{229.2694474^2 - 2}{1138.7283745}}$

Result:

1.6144773728...

1.6144773728…. result that is a good approximation to the value of the golden ratio 1.618033988749...

(229.2694474 – 124.98425 – 2*39.1383571) – 2 = 26.0084832 – 2 = 24.0084832

1645((((229.2694474)^2-2)))/(1138.7283745)-1645*16+1645*2-229.2694474-124.98425+39.13835-24.0084832

Input interpretation:

$$1645 \times \frac{229.2694474^2 - 2}{1138.7283745} - 1645 \times 16 + 1645 \times 2 - 229.2694474 - 124.98425 + 39.13835 - 24.0084832$$

Result:

52562.310506168384724394166749552616860694551877085943290 50...

52562.310506…

Then, we note that:

124.98425 ≈ 125.18 (Higgs boson mass)

39.1383571 + 745.33632 = 784.4746771 ≈ 782.65 (Omega meson mass)

(26280+1449*sqrt329)

Input:

$$26\,280 + 1449\sqrt{329}$$

Decimal approximation:

52562.479506317511823039547017733915461948741039358577205 46...

52562.479506…

Alternate form:

$$9\left(2920 + 161\sqrt{329}\right)$$

Minimal polynomial:

$$x^2 - 52\,560\,x - 130\,329$$

(((52562.4795)/32))-39.1383571+124.98425

Input interpretation:

$$\frac{52562.4795}{32} - 39.1383571 + 124.98425$$

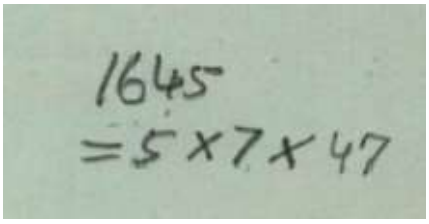
Result:

1728.423377275

1728.423377275

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Then, we have



1645 * 32 – 39.1383571*2

Input interpretation:

$1645 \times 32 + 2 \times (-39.1383571)$

Result:

52561.7232858

52561.7232858 ≈ 52562

From 52562.4795 , we obtain also:

ln(((52562.4795)*5))

Input interpretation:

$\log(52562.4795 \times 5)$

$\log(x)$ is the natural logarithm

Result:

12.47919574...

12.47919574…. ≈ 4π = Bekenstein-Hawking black hole entropy

Alternative representations:

$$\log(52562.5\times 5) = \log_e(262812.)$$

$$\log(52562.5\times 5) = \log(a)\log_a(262812.)$$

$$\log(52562.5\times 5) = -\mathrm{Li}_1(-262811.)$$

Series representations:

$$\log(52562.5\times 5) = \log(262811.) - \sum_{k=1}^{\infty} \frac{(-1)^k\, e^{-12.4792\,k}}{k}$$

$$\log(52562.5\times 5) = 2\,i\,\pi\left\lfloor \frac{\arg(262812.-x)}{2\,\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k\,(262812.-x)^k\,x^{-k}}{k}$$

for $x < 0$

$$\log(52562.5\times 5) = \left\lfloor \frac{\arg(262812.-z_0)}{2\,\pi}\right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(262812.-z_0)}{2\,\pi}\right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k\,(262812.-z_0)^k\,z_0^{-k}}{k}$$

Integral representations:

$$\log(52562.5\times 5) = \int_1^{262812.} \frac{1}{t}\,dt$$

$$\log(52562.5\times 5) = \frac{1}{2\,i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{e^{-12.4792\,s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1 < \gamma < 0$$

From:

https://trin-digital-library.trin.cam.ac.uk/iiif/2/Add.Ms.a.94.13%2F009_Add.Ms.a.94.13_008.jpg/full/1000,1618/0/default.jpg

elementary methods that

$$(6.6)\qquad t_1 + t_2 + t_3 + \cdots + t_n = \underline{o}(n),$$

It can be shown by transcendental methods that

$$t_1 + t_2 + t_3 + \cdots + t_n \sim \frac{C n}{(\log n)^{\frac{1}{2}}},$$

and

$$(6.7)\qquad t_1 + t_2 + t_3 + \cdots + t_n = C \int_1^n \frac{dx}{(\log x)^{\frac{1}{2}}} + \underline{O}\left(\frac{n}{(\log n)^r}\right)$$

where r is any positive number and

$$C = \frac{6^{\frac{1}{2}}}{7^{\frac{3}{4}}} \cdot \frac{1-2^{-6}}{1-2^{-7}} \cdot \frac{1-11^{-6}}{1-11^{-7}} \cdot \frac{1-23^{-6}}{1-23^{-7}} \cdot \frac{1-29^{-6}}{1-29^{-7}} \cdots$$

$$\times \left\{ \frac{1}{(1-3^{-2})(1-5^{-2})(1-13^{-2})(1-17^{-2})(1-19^{-2})\cdots} \right\}^{\frac{1}{2}},$$

$2, 11, 23, \cdots$ being primes of the form $7k+1$, $7k+2$ and $7k+4$ while $3, 5, 13, \cdots$ being primes of the form $7k+3$, $7k+5$ and $7k+6$.

Thus we see that $\tau(n)$ is divisible by 7 for almost all values of n; and at the same time the ~~number~~ the number of values of n for which $\tau(n)$ is divisible by 7 is far more numerous than that for which $\tau(n)$ is divisible by 5. (Now if)

$$\sum_1^\infty \lambda(n) x^n = x \frac{(1-x^{49})(1-x^{98})(1-x^{147})\cdots}{(1-x)(1-x^2)(1-x^3)\cdots}$$

it is clear from (5.6) that ~~I assert~~ (P)

$$(6.8)\qquad \lambda(n) - n^2 \sigma_1(n) + n\sigma_3(n) \equiv 0 \pmod 7.$$

But it is easy to show that $n^2\sigma_1(n)$ and $n\sigma_3(n)$ are divisible by 7 for almost all values of n. It follows that $\lambda(n)$ is divisible by 7 for almost all values of n. It can even be shown that the number of values of n not exceeding n for which $\lambda(n)$ is not divisible by n is

$$(6.9)\qquad \underline{O}\left(\frac{n}{(\log n)^{\frac{1}{6}}}\right).$$

The index $\frac{1}{6}$ in (6.9) is easily obtained by considering $n^2\sigma_1(n)$ and $n\sigma_3(n)$ separately; but whether this is the right index or not can be known only by considering

6^(1/2) / 7^(3/4) * (1-2^(-6)) / (1-2^(-7)) * (1-11^(-6)) / (1-11^(-7)) * (1-23^(-6)) / (1-23^(-7)) * (1-29^(-6)) / (1-29^(-7)) * 1 / [(1-3^-2)(1-5^-2)(1-13^-2)(1-17^-2)(1-19^-2)]^0.5

Input:

$$\frac{\sqrt{6}}{7^{3/4}} \times \frac{1-\frac{1}{2^6}}{1-\frac{1}{2^7}} \times \frac{1-\frac{1}{11^6}}{1-\frac{1}{11^7}} \times \frac{1-\frac{1}{23^6}}{1-\frac{1}{23^7}} \times \frac{1-\frac{1}{29^6}}{1-\frac{1}{29^7}} \times \frac{1}{\sqrt{\left(1-\frac{1}{3^2}\right)\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{13^2}\right)\left(1-\frac{1}{17^2}\right)\left(1-\frac{1}{19^2}\right)}}$$

Exact result:

$$\frac{8\,578\,680\,535\,326\,676\,698\,495 \times 7^{3/4}\sqrt{15}}{232\,480\,524\,959\,664\,865\,371\,238}$$

Decimal approximation:

0.615039597143169900505789959546024533821924391073809073692...

0.6150395971…. result that is a good approximation to the value of the golden ratio conjugate 0.618033988749...

0.6150395971431* Integrate 1/((ln(x))^1/2)x, [1, 3] + 3/(ln(3))^4

Input interpretation:

$$0.6150395971431 \int_1^3 \frac{1}{\sqrt{\log(x)}}\, x\, dx + \frac{3}{\log^4(3)}$$

$\log(x)$ is the natural logarithm

Result:

5.451256660920

5.451256660920

Computation result:

$$0.6150395971431 \int_1^3 \frac{x}{\sqrt{\log(x)}}\, dx + \frac{3}{\log^4(3)} = 5.45126$$

(((((0.6150395971431* Integrate 1/((ln(x))^1/2)x, [1, 3] + 3/(ln(3))^4)))))^3-24+sqrt3

Input interpretation:

$$\left(0.6150395971431 \int_1^3 \frac{1}{\sqrt{\log(x)}}\, x\, dx + \frac{3}{\log^4(3)}\right)^3 - 24 + \sqrt{3}$$

$\log(x)$ is the natural logarithm

Result:

139.7226795423

139.7226795423 result practically equal to the rest mass of Pion meson 139.57 MeV

(((((0.6150395971431* Integrate 1/((ln(x))^1/2)x, [1, 3] + 3/(ln(3))^4)))))^3-34-sqrt7

Input interpretation:

$$\left(0.6150395971431 \int_1^3 \frac{1}{\sqrt{\log(x)}}\, x\, dx + \frac{3}{\log^4(3)}\right)^3 - 34 - \sqrt{7}$$

$\log(x)$ is the natural logarithm

Result:

125.3448774237

125.3448774237 result very near to the Higgs boson mass 125.18 GeV

27*1/2(((((((((0.6150395971431* Integrate 1/((ln(x))^1/2)x, [1, 3] + 3/(ln(3))^4)))))^3-34))))+1

Input interpretation:

$$27 \times \frac{1}{2}\left(\left(0.6150395971431 \int_1^3 \frac{1}{\sqrt{\log(x)}}\, x\, dx + \frac{3}{\log^4(3)}\right)^3 - 34\right) + 1$$

$\log(x)$ is the natural logarithm

Result:

1728.873487919

1728.873487919

This result is very near to the mass of candidate glueball **$f_0(1710)$ scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

With regard 27 (From Wikipedia):

"The fundamental group of the complex form, compact real form, or any algebraic version of E_6 is the cyclic group $\boldsymbol{Z}/3\boldsymbol{Z}$, and its outer automorphism group is the cyclic group $\boldsymbol{Z}/2\boldsymbol{Z}$. Its fundamental representation is 27-dimensional (complex), and a basis is given by the 27 lines on a cubic surface. The dual representation, which is inequivalent, is also 27-dimensional. In particle physics, E_6 plays a role in some grand unified theories".

[27*1/2((((((((((0.6150395971431* Integrate 1/((ln(x))^1/2)x, [1, 3] + 3/(ln(3))^4)))))^3-34))))+1]^1/15

Input interpretation:

$$\sqrt[15]{27\times\frac{1}{2}\left(\left(0.6150395971431\int_1^3\frac{1}{\sqrt{\log(x)}}\,x\,dx+\frac{3}{\log^4(3)}\right)^3-34\right)+1}$$

$\log(x)$ is the natural logarithm

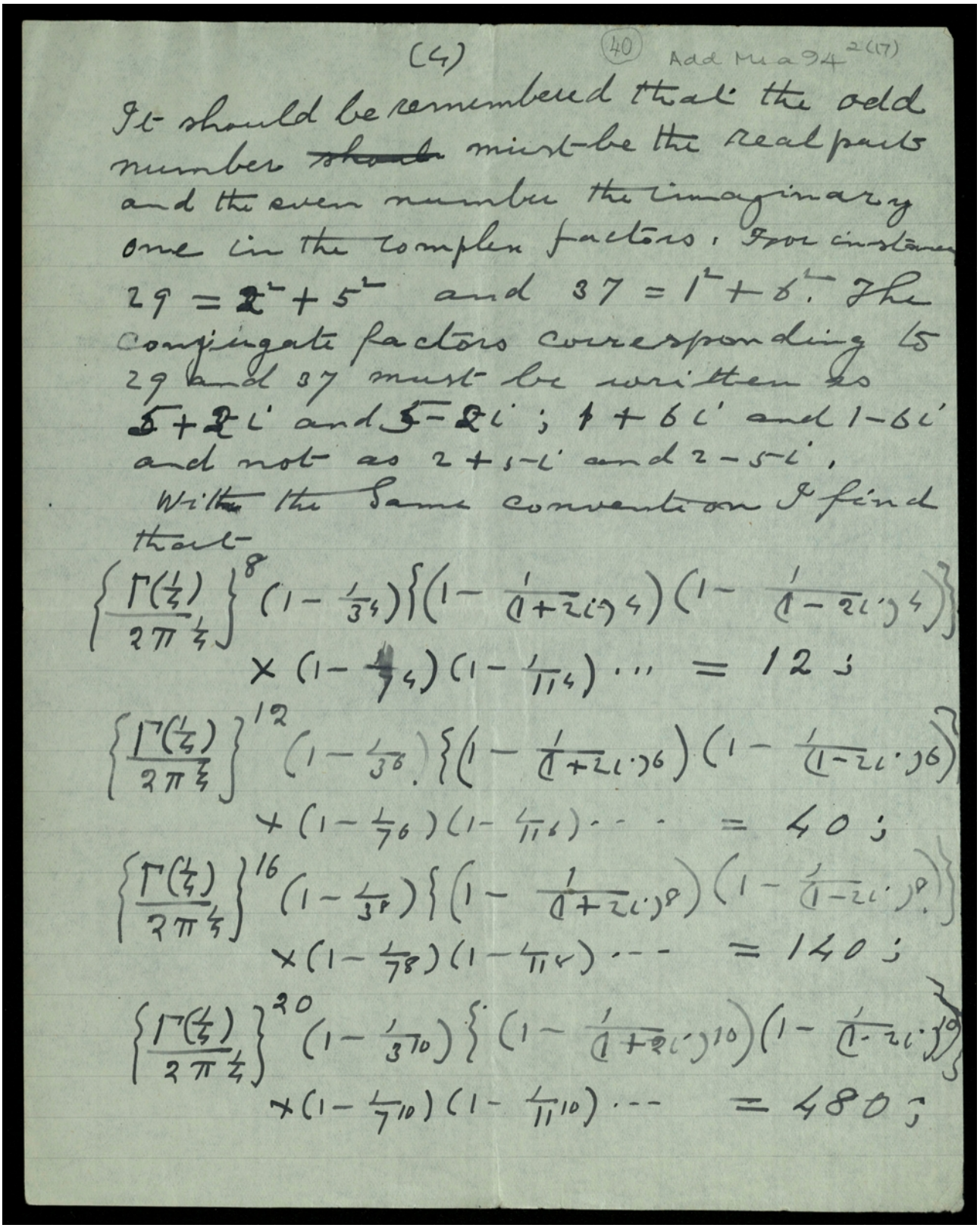
Result:

1.6438072098713

$1.6438072098713 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Now, we have that:

https://mss-cat.trin.cam.ac.uk/manuscripts/uv/view.php?n=Add.Ms.a.94.2#?c=0&m=0&s=0&cv=19&xywh=-2956%2C33%2C10702%2C6674



(4) (40) Add Mss 94 2(17)

It should be remembered that the odd number must be the real part and the even number the imaginary one in the complex factors. For instance $29 = 2^2 + 5^2$ and $37 = 1^2 + 6^2$. The conjugate factors corresponding to 29 and 37 must be written as $5+2i$ and $5-2i$; $1+6i$ and $1-6i$ and not as $2+5i$ and $2-5i$.

With the same convention I find that

$$\left\{\frac{\Gamma(\frac{1}{4})}{2\pi^{\frac{1}{4}}}\right\}^8 (1-\tfrac{1}{3^4})\left\{(1-\frac{1}{(1+2i)^4})(1-\frac{1}{(1-2i)^4})\right\} \times (1-\tfrac{1}{7^4})(1-\tfrac{1}{11^4})\cdots = 12;$$

$$\left\{\frac{\Gamma(\frac{1}{4})}{2\pi^{\frac{1}{4}}}\right\}^{12} (1-\tfrac{1}{3^6})\left\{(1-\frac{1}{(1+2i)^6})(1-\frac{1}{(1-2i)^6})\right\} \times (1-\tfrac{1}{7^6})(1-\tfrac{1}{11^6})\cdots = 40;$$

$$\left\{\frac{\Gamma(\frac{1}{4})}{2\pi^{\frac{1}{4}}}\right\}^{16} (1-\tfrac{1}{3^8})\left\{(1-\frac{1}{(1+2i)^8})(1-\frac{1}{(1-2i)^8})\right\} \times (1-\tfrac{1}{7^8})(1-\tfrac{1}{11^8})\cdots = 140;$$

$$\left\{\frac{\Gamma(\frac{1}{4})}{2\pi^{\frac{1}{4}}}\right\}^{20} (1-\tfrac{1}{3^{10}})\left\{(1-\frac{1}{(1+2i)^{10}})(1-\frac{1}{(1-2i)^{10}})\right\} \times (1-\tfrac{1}{7^{10}})(1-\tfrac{1}{11^{10}})\cdots = 480;$$

We obtain:

(((gamma (1/4))/(((2Pi)^(1/4)))))^20 (1-1/(3^10)) [(1-1/(1+2i)^10)(1-1/(1-2i)^10)] (1-(1/7^10)) (1-(1/11^10))

Input:

$$\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\left(\left(1-\frac{1}{(1+2\,i)^{10}}\right)\left(1-\frac{1}{(1-2\,i)^{10}}\right)\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)$$

$\Gamma(x)$ is the gamma function

i is the imaginary unit

Exact result:

$$\frac{440\,839\,903\,137\,967\,805\,492\,224\,\Gamma\left(\frac{1}{4}\right)^{20}}{14\,107\,799\,170\,219\,190\,944\,921\,875\,\pi^5}$$

Decimal approximation:

$1.57287339699517640466696964063104414440312600987221330\ldots \times 10^7$

$1.5728733969\ldots.*10^7$

Alternate forms:

$$\frac{484\,708\,599\,487\,841\,152\,125\,437\,763\,150\,413\,824\left(\frac{1}{4}!\right)^{20}}{14\,107\,799\,170\,219\,190\,944\,921\,875\,\pi^5}$$

$$\frac{473\,348\,241\,687\,344\,875\,122\,497\,815\,576\,576\,\left(2+\sqrt{2}\right)^{10}K\left(\frac{\left(-2-2\sqrt{2}\right)^2}{\left(4+2\sqrt{2}\right)^2}\right)^{10}}{14\,107\,799\,170\,219\,190\,944\,921\,875\left(4+2\sqrt{2}\right)^{10}}$$

Alternative representations:

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^{20}\left(1-\frac{1}{(1+2\,i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\left(1-\frac{1}{3^{10}}\right)\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)=$$

$$\left(1-\frac{1}{3^{10}}\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\left(1-\frac{1}{(1-2\,i)^{10}}\right)\left(1-\frac{1}{(1+2\,i)^{10}}\right)\left(\frac{G\left(1+\frac{1}{4}\right)}{G\left(\frac{1}{4}\right)\sqrt[4]{2\,\pi}}\right)^{20}$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i2)^{10}}\right)\left(1-\frac{1}{3^{10}}\right)\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)=$$
$$\left(1-\frac{1}{3^{10}}\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\left(1-\frac{1}{(1-2i)^{10}}\right)\left(1-\frac{1}{(1+2i)^{10}}\right)\left(\frac{\left(-1+\frac{1}{4}\right)!}{\sqrt[4]{2\pi}}\right)^{20}$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i2)^{10}}\right)\left(1-\frac{1}{3^{10}}\right)\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)=\left(1-\frac{1}{3^{10}}\right)$$
$$\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\left(1-\frac{1}{(1-2i)^{10}}\right)\left(1-\frac{1}{(1+2i)^{10}}\right)\left(\frac{e^{-\log G(1/4)+\log G(1+1/4)}}{\sqrt[4]{2\pi}}\right)^{20}$$

Series representations:

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i2)^{10}}\right)\left(1-\frac{1}{3^{10}}\right)\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)=$$
$$\frac{484\,708\,599\,487\,841\,152\,125\,437\,763\,150\,413\,824\left(\sum_{k=0}^{\infty}\frac{4^{-k}\,\Gamma^{(k)}(1)}{k!}\right)^{20}}{14\,107\,799\,170\,219\,190\,944\,921\,875\,\pi^5}$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i2)^{10}}\right)\left(1-\frac{1}{3^{10}}\right)\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)=$$
$$\frac{440\,839\,903\,137\,967\,805\,492\,224}{14\,107\,799\,170\,219\,190\,944\,921\,875\,\pi^5\left(\sum_{k=1}^{\infty}4^{-k}\,c_k\right)^{20}}$$
$$\text{for}\left(c_1=1\text{ and }c_2=1\text{ and }c_k=\frac{\gamma\,c_{-1+k}+\sum_{j=1}^{-2+k}(-1)^{1+j+k}\,c_j\,\zeta(-j+k)}{-1+k}\right)$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i2)^{10}}\right)\left(1-\frac{1}{3^{10}}\right)\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)=$$
$$\frac{440\,839\,903\,137\,967\,805\,492\,224\left(\sum_{k=0}^{\infty}\frac{\left(\frac{1}{4}-z_0\right)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^{20}}{14\,107\,799\,170\,219\,190\,944\,921\,875\,\pi^5}\quad\text{for}\,(z_0\notin\mathbb{Z}\text{ or }z_0>0)$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i2)^{10}}\right)\left(1-\frac{1}{3^{10}}\right)\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)=$$
$$(440\,839\,903\,137\,967\,805\,492\,224\,\pi^{15})\Bigg/\Bigg(14\,107\,799\,170\,219\,190\,944\,921\,875$$
$$\left(\sum_{k=0}^{\infty}\left(\frac{1}{4}-z_0\right)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\,\sin\left(\frac{1}{2}(-j+k)\pi+\pi z_0\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)^{20}\Bigg)$$

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

γ is the Euler-Mascheroni constant

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

Integral representations:

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i2)^{10}}\right)\left(1-\frac{1}{3^{10}}\right)\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)=$$
$$\frac{440\,839\,903\,137\,967\,805\,492\,224\left(\int_0^1 \frac{1}{\log^{3/4}\left(\frac{1}{t}\right)}\,dt\right)^{20}}{14\,107\,799\,170\,219\,190\,944\,921\,875\,\pi^5}$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i2)^{10}}\right)\left(1-\frac{1}{3^{10}}\right)\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)=$$
$$\frac{440\,839\,903\,137\,967\,805\,492\,224\exp\left(20\int_0^1 \frac{-\frac{3}{4}+\sqrt[4]{x}-\frac{x}{4}}{(-1+x)\log(x)}\,dx\right)}{14\,107\,799\,170\,219\,190\,944\,921\,875\,\pi^5}$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i2)^{10}}\right)\left(1-\frac{1}{3^{10}}\right)\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)=$$
$$\frac{440\,839\,903\,137\,967\,805\,492\,224\exp\left(-5\gamma+20\int_0^1 \frac{4-4\sqrt[4]{x}+\log(x)}{4\log(x)-4x\log(x)}\,dx\right)}{14\,107\,799\,170\,219\,190\,944\,921\,875\,\pi^5}$$

We observe that:

1/(8^5) (((gamma (1/4))/(((2Pi)^(1/4)))))^20 (1-1/(3^10)) [(1-1/(1+2i)^10)(1-1/(1-2i)^10)] (1-(1/7^10)) (1-(1/11^10))

Input:

$$\frac{1}{8^5}\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-2i)^{10}}\right)\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)$$

$\Gamma(x)$ is the gamma function

i is the imaginary unit

Exact result:

$$\frac{430\,507\,717\,908\,171\,685\,051\,\Gamma\left(\frac{1}{4}\right)^{20}}{451\,449\,573\,447\,014\,110\,237\,500\,000\,\pi^5}$$

Decimal approximation:

480.00286773534436177580860614961063977146179500494790900 04…

480.0028677353…

Alternate forms:

$$\frac{14\,792\,132\,552\,729\,527\,347\,578\,056\,736\,768\,\left(\frac{1}{4}!\right)^{20}}{14\,107\,799\,170\,219\,190\,944\,921\,875\,\pi^5}$$

$$\frac{14\,445\,441\,946\,024\,929\,050\,369\,196\,032\,\left(2+\sqrt{2}\right)^{10}K\left(\frac{\left(-2-2\sqrt{2}\right)^2}{\left(4+2\sqrt{2}\right)^2}\right)^{10}}{14\,107\,799\,170\,219\,190\,944\,921\,875\,\left(4+2\sqrt{2}\right)^{10}}$$

Alternative representations:

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5}=$$

$$\frac{\left(1-\frac{1}{3^{10}}\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\left(1-\frac{1}{(1-2i)^{10}}\right)\left(1-\frac{1}{(1+2i)^{10}}\right)\left(\frac{G\left(1+\frac{1}{4}\right)}{G\left(\frac{1}{4}\right)\sqrt[4]{2\pi}}\right)^{20}}{8^5}$$

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5} =$$
$$\frac{\left(1-\frac{1}{3^{10}}\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\left(1-\frac{1}{(1-2i)^{10}}\right)\left(1-\frac{1}{(1+2i)^{10}}\right)\left(\frac{\left(-1+\frac{1}{4}\right)!}{\sqrt[4]{2\pi}}\right)^{20}}{8^5}$$

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5} =$$
$$\frac{\left(1-\frac{1}{3^{10}}\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\left(1-\frac{1}{(1-2i)^{10}}\right)\left(1-\frac{1}{(1+2i)^{10}}\right)\left(\frac{e^{-\log G(1/4)+\log G(1+1/4)}}{\sqrt[4]{2\pi}}\right)^{20}}{8^5}$$

Series representations:

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5} =$$
$$\frac{14\,792\,132\,552\,729\,527\,347\,578\,056\,736\,768\left(\sum_{k=0}^{\infty}\frac{4^{-k}\,\Gamma^{(k)}(1)}{k!}\right)^{20}}{14\,107\,799\,170\,219\,190\,944\,921\,875\,\pi^5}$$

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5} =$$
$$\frac{430\,507\,717\,908\,171\,685\,051}{451\,449\,573\,447\,014\,110\,237\,500\,000\,\pi^5\left(\sum_{k=1}^{\infty}4^{-k}\,c_k\right)^{20}}$$
$$\text{for}\left(c_1=1\text{ and }c_2=1\text{ and }c_k=\frac{\gamma\,c_{-1+k}+\sum_{j=1}^{-2+k}(-1)^{1+j+k}\,c_j\,\zeta(-j+k)}{-1+k}\right)$$

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5} =$$
$$\frac{430\,507\,717\,908\,171\,685\,051\left(\sum_{k=0}^{\infty}\frac{\left(\frac{1}{4}-z_0\right)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^{20}}{451\,449\,573\,447\,014\,110\,237\,500\,000\,\pi^5}\quad\text{for}\,(z_0\notin\mathbb{Z}\text{ or }z_0>0)$$

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5} =$$

$$(430\,507\,717\,908\,171\,685\,051\,\pi^{15})\Big/\left(451\,449\,573\,447\,014\,110\,237\,500\,000\left(\sum_{k=0}^{\infty}\left(\frac{1}{4}-z_0\right)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\,\sin\left(\frac{1}{2}(-j+k)\pi+\pi z_0\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)^{20}\right)$$

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

γ is the Euler-Mascheroni constant

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

Integral representations:

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5} =$$

$$\frac{430\,507\,717\,908\,171\,685\,051\left(\int_0^1\frac{1}{\log^{3/4}\left(\frac{1}{t}\right)}\,dt\right)^{20}}{451\,449\,573\,447\,014\,110\,237\,500\,000\,\pi^5}$$

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5} =$$

$$\frac{430\,507\,717\,908\,171\,685\,051\exp\left(20\int_0^1\frac{-\frac{3}{4}+\sqrt[4]{x}-\frac{x}{4}}{(-1+x)\log(x)}\,dx\right)}{451\,449\,573\,447\,014\,110\,237\,500\,000\,\pi^5}$$

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5} =$$

$$\frac{430\,507\,717\,908\,171\,685\,051\exp\left(-5\,\gamma+20\int_0^1\frac{4-4\sqrt[4]{x}+\log(x)}{4\log(x)-4x\log(x)}\,dx\right)}{451\,449\,573\,447\,014\,110\,237\,500\,000\,\pi^5}$$

From which:

1/(8^5) (((gamma (1/4))/(((2Pi)^(1/4)))))^20 (1-1/(3^10)) [(1-1/(1+2i)^10)(1-1/(1-2i)^10)] (1-(1/7^10)) (1-(1/11^10)) + 16

Input:

$$\frac{1}{8^5}\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\left(\left(1-\frac{1}{(1+2\,i)^{10}}\right)\left(1-\frac{1}{(1-2\,i)^{10}}\right)\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)+16$$

$\Gamma(x)$ is the gamma function

i is the imaginary unit

Exact result:

$$16+\frac{430\,507\,717\,908\,171\,685\,051\,\Gamma\left(\frac{1}{4}\right)^{20}}{451\,449\,573\,447\,014\,110\,237\,500\,000\,\pi^5}$$

Decimal approximation:

496.00286773534436177580860614961063977146179500494790900 04...

496.002867735… result concerning the dimension of the gauge group of type I string theory that is 496.

Alternate forms:

$$\frac{14\,792\,132\,552\,729\,527\,347\,578\,056\,736\,768\left(\frac{1}{4}!\right)^{20}}{14\,107\,799\,170\,219\,190\,944\,921\,875\,\pi^5}+16$$

$$\left(16\left(924\,508\,284\,545\,595\,459\,223\,628\,546\,048\left(\frac{1}{4}!\right)^{20}+14\,107\,799\,170\,219\,190\,944\,921\,875\,\pi^5\right)\right)\Big/\left(14\,107\,799\,170\,219\,190\,944\,921\,875\,\pi^5\right)$$

$$\frac{7\,223\,193\,175\,152\,225\,763\,800\,000\,000\,\pi^5+430\,507\,717\,908\,171\,685\,051\,\Gamma\left(\frac{1}{4}\right)^{20}}{451\,449\,573\,447\,014\,110\,237\,500\,000\,\pi^5}$$

Alternative representations:

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5}+16=$$
$$16+\frac{\left(1-\frac{1}{3^{10}}\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\left(1-\frac{1}{(1-2i)^{10}}\right)\left(1-\frac{1}{(1+2i)^{10}}\right)\left(\frac{G\left(1+\frac{1}{4}\right)}{G\left(\frac{1}{4}\right)\sqrt[4]{2\pi}}\right)^{20}}{8^5}$$

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5}+16=$$
$$16+\frac{\left(1-\frac{1}{3^{10}}\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\left(1-\frac{1}{(1-2i)^{10}}\right)\left(1-\frac{1}{(1+2i)^{10}}\right)\left(\frac{\left(-1+\frac{1}{4}\right)!}{\sqrt[4]{2\pi}}\right)^{20}}{8^5}$$

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5}+16=$$
$$16+\frac{\left(1-\frac{1}{3^{10}}\right)\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\left(1-\frac{1}{(1-2i)^{10}}\right)\left(1-\frac{1}{(1+2i)^{10}}\right)\left(\frac{e^{-\log G(1/4)+\log G(1+1/4)}}{\sqrt[4]{2\pi}}\right)^{20}}{8^5}$$

Series representations:

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5}+16=$$
$$16+\frac{14\,792\,132\,552\,729\,527\,347\,578\,056\,736\,768\left(\sum_{k=0}^{\infty}\frac{4^{-k}\,\Gamma^{(k)}(1)}{k!}\right)^{20}}{14\,107\,799\,170\,219\,190\,944\,921\,875\,\pi^5}$$

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2\,i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5}+16=$$

$$16+\frac{430\,507\,717\,908\,171\,685\,051}{451\,449\,573\,447\,014\,110\,237\,500\,000\,\pi^5\left(\sum_{k=1}^{\infty}4^{-k}\,c_k\right)^{20}}$$

$$\text{for}\left(c_1=1\text{ and }c_2=1\text{ and }c_k=\frac{\gamma\,c_{-1+k}+\sum_{j=1}^{-2+k}(-1)^{1+j+k}\,c_j\,\zeta(-j+k)}{-1+k}\right)$$

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2\,i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5}+16=$$

$$16+\frac{430\,507\,717\,908\,171\,685\,051\left(\sum_{k=0}^{\infty}\frac{\left(\frac{1}{4}-z_0\right)^k\Gamma^{(k)}(z_0)}{k!}\right)^{20}}{451\,449\,573\,447\,014\,110\,237\,500\,000\,\pi^5}\quad\text{for}\,(z_0\notin\mathbb{Z}\text{ or }z_0>0)$$

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2\,i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5}+16=$$

$$\left(430\,507\,717\,908\,171\,685\,051\,\pi^{15}+7\,223\,193\,175\,152\,225\,763\,800\,000\,000\left(\sum_{k=0}^{\infty}\left(\frac{1}{4}-z_0\right)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\,\sin\left(\frac{1}{2}\,\pi\,(-j+k+2\,z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)^{20}\right)\Big/$$

$$\left(451\,449\,573\,447\,014\,110\,237\,500\,000\left(\sum_{k=0}^{\infty}\left(\frac{1}{4}-z_0\right)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\,\sin\left(\frac{1}{2}\,\pi\,(-j+k+2\,z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)^{20}\right)$$

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

γ is the Euler-Mascheroni constant

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

Integral representations:

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5}+16=$$

$$16+\frac{430\,507\,717\,908\,171\,685\,051\left(\int_0^1\frac{1}{\log^{3/4}\left(\frac{1}{t}\right)}\,dt\right)^{20}}{451\,449\,573\,447\,014\,110\,237\,500\,000\,\pi^5}$$

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5}+16=$$

$$16+\frac{430\,507\,717\,908\,171\,685\,051\exp\left(20\int_0^1\frac{-\frac{3}{4}+\sqrt[4]{x}-\frac{x}{4}}{(-1+x)\log(x)}\,dx\right)}{451\,449\,573\,447\,014\,110\,237\,500\,000\,\pi^5}$$

$$\frac{\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{20}\left(1-\frac{1}{3^{10}}\right)\right)\left(\left(1-\frac{1}{(1+2i)^{10}}\right)\left(1-\frac{1}{(1-i\,2)^{10}}\right)\right)\left(\left(1-\frac{1}{7^{10}}\right)\left(1-\frac{1}{11^{10}}\right)\right)}{8^5}+16=$$

$$16+\frac{430\,507\,717\,908\,171\,685\,051\exp\left(-5\,\gamma+20\int_0^1\frac{4-4\sqrt[4]{x}+\log(x)}{4\log(x)-4\,x\log(x)}\,dx\right)}{451\,449\,573\,447\,014\,110\,237\,500\,000\,\pi^5}$$

From:

(((gamma (1/4))/(((2Pi)^(1/4)))))^16 (1-1/(3^8)) [(1-1/(1+2i)^8)(1-1/(1-2i)^8)] (1-(1/7^8)) (1-(1/11^8))

we obtain:

Input:

$$\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{16}\left(1-\frac{1}{3^8}\right)\left(\left(1-\frac{1}{(1+2\,i)^8}\right)\left(1-\frac{1}{(1-2\,i)^8}\right)\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)$$

$\Gamma(x)$ is the gamma function

i is the imaginary unit

Exact result:

$$\frac{783\,981\,719\,809\,163\,264\,\Gamma\left(\frac{1}{4}\right)^{16}}{12\,511\,829\,951\,920\,270\,125\,\pi^4}$$

Decimal approximation:

573433.172697315536915076252409579031900790494286557583357 1...

573433.172697315…

Alternate forms:

$$\frac{3\,367\,175\,847\,242\,191\,580\,004\,614\,144\left(\frac{1}{4}!\right)^{16}}{12\,511\,829\,951\,920\,270\,125\,\pi^4}$$

$$\frac{13\,153\,030\,653\,289\,810\,859\,393\,024\left(2+\sqrt{2}\right)^8 K\left(\frac{\left(-2-2\sqrt{2}\right)^2}{\left(4+2\sqrt{2}\right)^2}\right)^8}{12\,511\,829\,951\,920\,270\,125\left(4+2\sqrt{2}\right)^8}$$

Alternative representations:

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^{16}\left(1-\frac{1}{(1+2\,i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\left(1-\frac{1}{3^8}\right)\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)=$$
$$\left(1-\frac{1}{3^8}\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)\left(1-\frac{1}{(1-2\,i)^8}\right)\left(1-\frac{1}{(1+2\,i)^8}\right)\left(\frac{G\left(1+\frac{1}{4}\right)}{G\left(\frac{1}{4}\right)\sqrt[4]{2\,\pi}}\right)^{16}$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^{16}\left(1-\frac{1}{(1+2\,i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\left(1-\frac{1}{3^8}\right)\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)=$$
$$\left(1-\frac{1}{3^8}\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)\left(1-\frac{1}{(1-2\,i)^8}\right)\left(1-\frac{1}{(1+2\,i)^8}\right)\left(\frac{\left(-1+\frac{1}{4}\right)!}{\sqrt[4]{2\,\pi}}\right)^{16}$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^{16}\left(1-\frac{1}{(1+2\,i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\left(1-\frac{1}{3^8}\right)\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)=$$
$$\left(1-\frac{1}{3^8}\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)\left(1-\frac{1}{(1-2\,i)^8}\right)\left(1-\frac{1}{(1+2\,i)^8}\right)\left(\frac{e^{-\log G(1/4)+\log G(1+1/4)}}{\sqrt[4]{2\,\pi}}\right)^{16}$$

Series representations:

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^{16}\left(1-\frac{1}{(1+2\,i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\left(1-\frac{1}{3^8}\right)\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)=$$
$$\frac{3\,367\,175\,847\,242\,191\,580\,004\,614\,144\left(\sum_{k=0}^{\infty}\frac{4^{-k}\,\Gamma^{(k)}(1)}{k!}\right)^{16}}{12\,511\,829\,951\,920\,270\,125\,\pi^4}$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^{16}\left(1-\frac{1}{(1+2\,i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\left(1-\frac{1}{3^8}\right)\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)=$$
$$\frac{783\,981\,719\,809\,163\,264}{12\,511\,829\,951\,920\,270\,125\,\pi^4\left(\sum_{k=1}^{\infty}4^{-k}\,c_k\right)^{16}}$$
$$\text{for}\left(c_1=1\text{ and }c_2=1\text{ and }c_k=\frac{\gamma\,c_{-1+k}+\sum_{j=1}^{-2+k}(-1)^{1+j+k}\,c_j\,\zeta(-j+k)}{-1+k}\right)$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^{16}\left(1-\frac{1}{(1+2\,i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\left(1-\frac{1}{3^8}\right)\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)=$$
$$\frac{783\,981\,719\,809\,163\,264\left(\sum_{k=0}^{\infty}\frac{\left(\frac{1}{4}-z_0\right)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^{16}}{12\,511\,829\,951\,920\,270\,125\,\pi^4}\quad\text{for}\ (z_0\notin\mathbb{Z}\text{ or }z_0>0)$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^{16}\left(1-\frac{1}{(1+2\,i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\left(1-\frac{1}{3^8}\right)\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)=$$
$$(783\,981\,719\,809\,163\,264\,\pi^{12})\Big/\left(12\,511\,829\,951\,920\,270\,125\left(\sum_{k=0}^{\infty}\left(\frac{1}{4}-z_0\right)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\,\sin\left(\frac{1}{2}(-j+k)\,\pi+\pi\,z_0\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)^{16}\right)$$

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

γ is the Euler-Mascheroni constant

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

Integral representations:

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{16}\left(1-\frac{1}{(1+2i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\left(1-\frac{1}{3^8}\right)\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)=$$
$$\frac{783\,981\,719\,809\,163\,264\left(\int_0^1 \frac{1}{\log^{3/4}\left(\frac{1}{t}\right)}\,dt\right)^{16}}{12\,511\,829\,951\,920\,270\,125\,\pi^4}$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{16}\left(1-\frac{1}{(1+2i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\left(1-\frac{1}{3^8}\right)\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)=$$
$$\frac{783\,981\,719\,809\,163\,264\exp\left(16\int_0^1 \frac{-\frac{3}{4}+\sqrt[4]{x}-\frac{x}{4}}{(-1+x)\log(x)}\,dx\right)}{12\,511\,829\,951\,920\,270\,125\,\pi^4}$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{16}\left(1-\frac{1}{(1+2i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\left(1-\frac{1}{3^8}\right)\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)=$$
$$\frac{783\,981\,719\,809\,163\,264\exp\left(-4\gamma+16\int_0^1 \frac{4-4\sqrt[4]{x}+\log(x)}{4\log(x)-4x\log(x)}\,dx\right)}{12\,511\,829\,951\,920\,270\,125\,\pi^4}$$

We observe that:

1/(8^4) * [gamma (1/4)/(((2Pi)^(1/4)))]^16 (1-1/(3^8)) [(1-1/(1+2i)^8)(1-1/(1-2i)^8)] (1-(1/7^8)) (1-(1/11^8))

Input:

$$\left(\frac{1}{8^4}\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{16}\right)\left(1-\frac{1}{3^8}\right)\left(\left(1-\frac{1}{(1+2i)^8}\right)\left(1-\frac{1}{(1-2i)^8}\right)\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)$$

$\Gamma(x)$ is the gamma function

i is the imaginary unit

Exact result:

$$\frac{191\,401\,787\,062\,784\,\Gamma\left(\frac{1}{4}\right)^{16}}{12\,511\,829\,951\,920\,270\,125\,\pi^4}$$

Decimal approximation:

139.998331780555510046572881859323808351539292691790974993...

139.998333178… result practically equal to the rest mass of Pion meson 139.57 MeV

Alternate forms:

$$\frac{822\,064\,415\,830\,613\,178\,712\,064\left(\frac{1}{4}!\right)^{16}}{12\,511\,829\,951\,920\,270\,125\,\pi^4}$$

$$\frac{3\,211\,189\,124\,338\,332\,729\,344\left(2+\sqrt{2}\right)^8 K\left(\frac{\left(-2-2\sqrt{2}\right)^2}{\left(4+2\sqrt{2}\right)^2}\right)^8}{12\,511\,829\,951\,920\,270\,125\left(4+2\sqrt{2}\right)^8}$$

Alternative representations:

$$\frac{\left(1-\frac{1}{3^8}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{16}\left(\left(1-\frac{1}{(1+2i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\right)\left(\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)\right)}{8^4}=$$
$$\frac{\left(1-\frac{1}{3^8}\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)\left(1-\frac{1}{(1-2i)^8}\right)\left(1-\frac{1}{(1+2i)^8}\right)\left(\frac{G\left(1+\frac{1}{4}\right)}{G\left(\frac{1}{4}\right)\sqrt[4]{2\pi}}\right)^{16}}{8^4}$$

$$\frac{\left(1-\frac{1}{3^8}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{16}\left(\left(1-\frac{1}{(1+2i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\right)\left(\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)\right)}{8^4}=$$
$$\frac{\left(1-\frac{1}{3^8}\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)\left(1-\frac{1}{(1-2i)^8}\right)\left(1-\frac{1}{(1+2i)^8}\right)\left(\frac{\left(-1+\frac{1}{4}\right)!}{\sqrt[4]{2\pi}}\right)^{16}}{8^4}$$

$$\frac{\left(1-\frac{1}{3^8}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{16}\left(\left(1-\frac{1}{(1+2i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\right)\left(\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)\right)}{8^4} =$$
$$\frac{\left(1-\frac{1}{3^8}\right)\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)\left(1-\frac{1}{(1-2i)^8}\right)\left(1-\frac{1}{(1+2i)^8}\right)\left(\frac{e^{-\log G(1/4)+\log G(1+1/4)}}{\sqrt[4]{2\pi}}\right)^{16}}{8^4}$$

Series representations:

$$\frac{\left(1-\frac{1}{3^8}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{16}\left(\left(1-\frac{1}{(1+2i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\right)\left(\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)\right)}{8^4} =$$
$$\frac{822\,064\,415\,830\,613\,178\,712\,064\left(\sum_{k=0}^{\infty}\frac{4^{-k}\,\Gamma^{(k)}(1)}{k!}\right)^{16}}{12\,511\,829\,951\,920\,270\,125\,\pi^4}$$

$$\frac{\left(1-\frac{1}{3^8}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{16}\left(\left(1-\frac{1}{(1+2i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\right)\left(\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)\right)}{8^4} =$$
$$\frac{191\,401\,787\,062\,784}{12\,511\,829\,951\,920\,270\,125\,\pi^4\left(\sum_{k=1}^{\infty}4^{-k}\,c_k\right)^{16}}$$
$$\text{for}\left(c_1=1\text{ and }c_2=1\text{ and }c_k=\frac{\gamma\,c_{-1+k}+\sum_{j=1}^{-2+k}(-1)^{1+j+k}\,c_j\,\zeta(-j+k)}{-1+k}\right)$$

$$\frac{\left(1-\frac{1}{3^8}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{16}\left(\left(1-\frac{1}{(1+2i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\right)\left(\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)\right)}{8^4} =$$
$$\frac{191\,401\,787\,062\,784\left(\sum_{k=0}^{\infty}\frac{\left(\frac{1}{4}-z_0\right)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^{16}}{12\,511\,829\,951\,920\,270\,125\,\pi^4}\quad\text{for}\ (z_0\notin\mathbb{Z}\text{ or }z_0>0)$$

$$\frac{\left(1-\frac{1}{3^8}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{16}\left(\left(1-\frac{1}{(1+2i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\right)\left(\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)\right)}{8^4} =$$
$$(191\,401\,787\,062\,784\,\pi^{12})\Big/\left(12\,511\,829\,951\,920\,270\,125\left(\sum_{k=0}^{\infty}\left(\frac{1}{4}-z_0\right)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\,\sin\left(\frac{1}{2}(-j+k)\pi+\pi z_0\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)^{16}\right)$$

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

γ is the Euler-Mascheroni constant

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

Integral representations:

$$\frac{\left(1-\frac{1}{3^8}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{16}\left(\left(1-\frac{1}{(1+2i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\right)\left(\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)\right)}{8^4}=\frac{191\,401\,787\,062\,784\left(\int_0^1\frac{1}{\log^{3/4}\left(\frac{1}{t}\right)}\,dt\right)^{16}}{12\,511\,829\,951\,920\,270\,125\,\pi^4}$$

$$\frac{\left(1-\frac{1}{3^8}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{16}\left(\left(1-\frac{1}{(1+2i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\right)\left(\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)\right)}{8^4}=\frac{191\,401\,787\,062\,784\exp\left(16\int_0^1\frac{-\frac{3}{4}+\sqrt[4]{x}-\frac{x}{4}}{(-1+x)\log(x)}\,dx\right)}{12\,511\,829\,951\,920\,270\,125\,\pi^4}$$

$$\frac{\left(1-\frac{1}{3^8}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^{16}\left(\left(1-\frac{1}{(1+2i)^8}\right)\left(1-\frac{1}{(1-i\,2)^8}\right)\right)\left(\left(1-\frac{1}{7^8}\right)\left(1-\frac{1}{11^8}\right)\right)}{8^4}=\frac{191\,401\,787\,062\,784\exp\left(-4\gamma+16\int_0^1\frac{4-4\sqrt[4]{x}+\log(x)}{4\log(x)-4x\log(x)}\,dx\right)}{12\,511\,829\,951\,920\,270\,125\,\pi^4}$$

And again:

(((gamma (1/4))/(((2Pi)^(1/4)))))^8 (1-1/(3^4)) [(1-1/(1+2i)^4)(1-1/(1-2i)^4)] (1-(1/7^4)) (1-(1/11^4))

Input:

$$\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^8\left(1-\frac{1}{3^4}\right)\left(\left(1-\frac{1}{(1+2i)^4}\right)\left(1-\frac{1}{(1-2i)^4}\right)\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)$$

$\Gamma(x)$ is the gamma function

i is the imaginary unit

Exact result:

$$\frac{79\,953\,920\,\Gamma\left(\frac{1}{4}\right)^8}{316\,377\,369\,\pi^2}$$

Decimal approximation:

764.5100627609127421516042737502568155070322678995376077300…

764.5100627609… result very near to the rest mass of Neutral rho meson 775.26

Alternate forms:

$$\frac{5\,239\,860\,101\,120\left(\frac{1}{4}!\right)^8}{316\,377\,369\,\pi^2}$$

$$\frac{327\,491\,256\,320\,(2+\sqrt{2}\,)^4\,K\left(\frac{\left(-2-2\sqrt{2}\right)^2}{\left(4+2\sqrt{2}\right)^2}\right)^4}{316\,377\,369\,(4+2\sqrt{2}\,)^4}$$

Alternative representations:

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^8\left(1-\frac{1}{(1+2\,i)^4}\right)\left(1-\frac{1}{(1-i\,2)^4}\right)\left(1-\frac{1}{3^4}\right)\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)=$$
$$\left(1-\frac{1}{3^4}\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)\left(1-\frac{1}{(1-2\,i)^4}\right)\left(1-\frac{1}{(1+2\,i)^4}\right)\left(\frac{G\left(1+\frac{1}{4}\right)}{G\left(\frac{1}{4}\right)\sqrt[4]{2\,\pi}}\right)^8$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^8\left(1-\frac{1}{(1+2\,i)^4}\right)\left(1-\frac{1}{(1-i\,2)^4}\right)\left(1-\frac{1}{3^4}\right)\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)=$$
$$\left(1-\frac{1}{3^4}\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)\left(1-\frac{1}{(1-2\,i)^4}\right)\left(1-\frac{1}{(1+2\,i)^4}\right)\left(\frac{\left(-1+\frac{1}{4}\right)!}{\sqrt[4]{2\,\pi}}\right)^8$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^8\left(1-\frac{1}{(1+2\,i)^4}\right)\left(1-\frac{1}{(1-i\,2)^4}\right)\left(1-\frac{1}{3^4}\right)\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)=$$
$$\left(1-\frac{1}{3^4}\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)\left(1-\frac{1}{(1-2\,i)^4}\right)\left(1-\frac{1}{(1+2\,i)^4}\right)\left(\frac{e^{-\log G(1/4)+\log G(1+1/4)}}{\sqrt[4]{2\,\pi}}\right)^8$$

Series representations:

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^8\left(1-\frac{1}{(1+2\,i)^4}\right)\left(1-\frac{1}{(1-i\,2)^4}\right)\left(1-\frac{1}{3^4}\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)=\frac{5\,239\,860\,101\,120\left(\sum_{k=0}^{\infty}\frac{4^{-k}\,\Gamma^{(k)}(1)}{k!}\right)^8}{316\,377\,369\,\pi^2}$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^8\left(1-\frac{1}{(1+2\,i)^4}\right)\left(1-\frac{1}{(1-i\,2)^4}\right)\left(1-\frac{1}{3^4}\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)=\frac{79\,953\,920}{316\,377\,369\,\pi^2\left(\sum_{k=1}^{\infty}4^{-k}\,c_k\right)^8}\right.$$
$$\left.\text{for}\left(c_1=1\text{ and }c_2=1\text{ and }c_k=\frac{\gamma\,c_{-1+k}+\sum_{j=1}^{-2+k}(-1)^{1+j+k}\,c_j\,\zeta(-j+k)}{-1+k}\right)\right)$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^8\left(1-\frac{1}{(1+2\,i)^4}\right)\left(1-\frac{1}{(1-i\,2)^4}\right)\left(1-\frac{1}{3^4}\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)=\frac{79\,953\,920\left(\sum_{k=0}^{\infty}\frac{\left(\frac{1}{4}-z_0\right)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^8}{316\,377\,369\,\pi^2}\right.\quad\left.\text{for}\,(z_0\notin\mathbb{Z}\text{ or }z_0>0)\right)$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\,\pi}}\right)^8\left(1-\frac{1}{(1+2\,i)^4}\right)\left(1-\frac{1}{(1-i\,2)^4}\right)\left(1-\frac{1}{3^4}\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)=\frac{79\,953\,920\,\pi^6}{316\,377\,369\left(\sum_{k=0}^{\infty}\left(\frac{1}{4}-z_0\right)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}(-j+k)\pi+\pi\,z_0\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)^8}\right)$$

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

γ is the Euler-Mascheroni constant

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

Integral representations:

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^8\left(1-\frac{1}{(1+2i)^4}\right)\left(1-\frac{1}{(1-i2)^4}\right)\left(1-\frac{1}{3^4}\right)\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)=\frac{79\,953\,920\left(\int_0^1\frac{1}{\log^{3/4}\left(\frac{1}{t}\right)}\,dt\right)^8}{316\,377\,369\,\pi^2}$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^8\left(1-\frac{1}{(1+2i)^4}\right)\left(1-\frac{1}{(1-i2)^4}\right)\left(1-\frac{1}{3^4}\right)\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)=\frac{79\,953\,920\exp\left(8\int_0^1\frac{-\frac{3}{4}+\sqrt[4]{x}-\frac{x}{4}}{(-1+x)\log(x)}\,dx\right)}{316\,377\,369\,\pi^2}$$

$$\left(\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^8\left(1-\frac{1}{(1+2i)^4}\right)\left(1-\frac{1}{(1-i2)^4}\right)\left(1-\frac{1}{3^4}\right)\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)=\frac{79\,953\,920\exp\left(-2\gamma+8\int_0^1\frac{4-4\sqrt[4]{x}+\log(x)}{4\log(x)-4x\log(x)}\,dx\right)}{316\,377\,369\,\pi^2}$$

We note that:

1/(8^2) * (((gamma (1/4))/(((2Pi)^(1/4)))))^8 (1-1/(3^4)) [(1-1/(1+2i)^4)(1-1/(1-2i)^4)] (1-(1/7^4)) (1-(1/11^4))

Input:

$$\left(\frac{1}{8^2}\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^8\right)\left(1-\frac{1}{3^4}\right)\left(\left(1-\frac{1}{(1+2i)^4}\right)\left(1-\frac{1}{(1-2i)^4}\right)\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)$$

$\Gamma(x)$ is the gamma function

i is the imaginary unit

Exact result:

$$\frac{1\,249\,280\,\Gamma\left(\frac{1}{4}\right)^8}{316\,377\,369\,\pi^2}$$

Decimal approximation:

11.945469730639261596118816777347762742297379185930275120 78...

11.9454697… ≈ 12 and result very near to the black hole entropy 11.8458

Alternate forms:

$$\frac{81\,872\,814\,080\left(\frac{1}{4}!\right)^8}{316\,377\,369\,\pi^2}$$

$$\frac{5\,117\,050\,880\left(2+\sqrt{2}\right)^4 K\left(\frac{\left(-2-2\sqrt{2}\right)^2}{\left(4+2\sqrt{2}\right)^2}\right)^4}{316\,377\,369\left(4+2\sqrt{2}\right)^4}$$

Alternative representations:

$$\frac{\left(1-\frac{1}{3^4}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^8\left(\left(1-\frac{1}{(1+2i)^4}\right)\left(1-\frac{1}{(1-i\,2)^4}\right)\right)\left(\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)\right)}{8^2}=$$
$$\frac{\left(1-\frac{1}{3^4}\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)\left(1-\frac{1}{(1-2i)^4}\right)\left(1-\frac{1}{(1+2i)^4}\right)\left(\frac{G\left(1+\frac{1}{4}\right)}{G\left(\frac{1}{4}\right)\sqrt[4]{2\pi}}\right)^8}{8^2}$$

$$\frac{\left(1-\frac{1}{3^4}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^8\left(\left(1-\frac{1}{(1+2i)^4}\right)\left(1-\frac{1}{(1-i\,2)^4}\right)\right)\left(\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)\right)}{8^2}=$$
$$\frac{\left(1-\frac{1}{3^4}\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)\left(1-\frac{1}{(1-2i)^4}\right)\left(1-\frac{1}{(1+2i)^4}\right)\left(\frac{\left(-1+\frac{1}{4}\right)!}{\sqrt[4]{2\pi}}\right)^8}{8^2}$$

$$\frac{\left(1-\frac{1}{3^4}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^8\left(\left(1-\frac{1}{(1+2i)^4}\right)\left(1-\frac{1}{(1-i\,2)^4}\right)\right)\left(\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)\right)}{8^2} =$$
$$\frac{\left(1-\frac{1}{3^4}\right)\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)\left(1-\frac{1}{(1-2i)^4}\right)\left(1-\frac{1}{(1+2i)^4}\right)\left(\frac{e^{-\log G(1/4)+\log G(1+1/4)}}{\sqrt[4]{2\pi}}\right)^8}{8^2}$$

Series representations:

$$\frac{\left(1-\frac{1}{3^4}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^8\left(\left(1-\frac{1}{(1+2i)^4}\right)\left(1-\frac{1}{(1-i\,2)^4}\right)\right)\left(\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)\right)}{8^2} =$$
$$\frac{81\,872\,814\,080\left(\sum_{k=0}^{\infty}\frac{4^{-k}\,\Gamma^{(k)}(1)}{k!}\right)^8}{316\,377\,369\,\pi^2}$$

$$\frac{\left(1-\frac{1}{3^4}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^8\left(\left(1-\frac{1}{(1+2i)^4}\right)\left(1-\frac{1}{(1-i\,2)^4}\right)\right)\left(\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)\right)}{8^2} =$$
$$\frac{1\,249\,280}{316\,377\,369\,\pi^2\left(\sum_{k=1}^{\infty}4^{-k}\,c_k\right)^8}$$
$$\text{for}\left(c_1=1\text{ and }c_2=1\text{ and }c_k=\frac{\gamma\,c_{-1+k}+\sum_{j=1}^{-2+k}(-1)^{1+j+k}\,c_j\,\zeta(-j+k)}{-1+k}\right)$$

$$\frac{\left(1-\frac{1}{3^4}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^8\left(\left(1-\frac{1}{(1+2i)^4}\right)\left(1-\frac{1}{(1-i\,2)^4}\right)\right)\left(\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)\right)}{8^2} =$$
$$\frac{1\,249\,280\left(\sum_{k=0}^{\infty}\frac{\left(\frac{1}{4}-z_0\right)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^8}{316\,377\,369\,\pi^2}\quad\text{for}\,(z_0\notin\mathbb{Z}\text{ or }z_0>0)$$

$$\frac{\left(1-\frac{1}{3^4}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^8\left(\left(1-\frac{1}{(1+2i)^4}\right)\left(1-\frac{1}{(1-i\,2)^4}\right)\right)\left(\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)\right)}{8^2} =$$
$$\frac{1\,249\,280\,\pi^6}{316\,377\,369\left(\sum_{k=0}^{\infty}\left(\frac{1}{4}-z_0\right)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}(-j+k)\pi+\pi\,z_0\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)^8}$$

Integral representations:

$$\frac{\left(1-\frac{1}{3^4}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^8\left(\left(1-\frac{1}{(1+2i)^4}\right)\left(1-\frac{1}{(1-i\,2)^4}\right)\right)\left(\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)\right)}{8^2}=\frac{1\,249\,280\left(\int_0^1\frac{1}{\log^{3/4}\left(\frac{1}{t}\right)}\,dt\right)^8}{316\,377\,369\,\pi^2}$$

$$\frac{\left(1-\frac{1}{3^4}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^8\left(\left(1-\frac{1}{(1+2i)^4}\right)\left(1-\frac{1}{(1-i\,2)^4}\right)\right)\left(\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)\right)}{8^2}=\frac{1\,249\,280\exp\left(8\int_0^1\frac{-\frac{3}{4}+\sqrt[4]{x}-\frac{x}{4}}{(-1+x)\log(x)}\,dx\right)}{316\,377\,369\,\pi^2}$$

$$\frac{\left(1-\frac{1}{3^4}\right)\left(\frac{\Gamma\left(\frac{1}{4}\right)}{\sqrt[4]{2\pi}}\right)^8\left(\left(1-\frac{1}{(1+2i)^4}\right)\left(1-\frac{1}{(1-i\,2)^4}\right)\right)\left(\left(1-\frac{1}{7^4}\right)\left(1-\frac{1}{11^4}\right)\right)}{8^2}=\frac{1\,249\,280\exp\left(-2\gamma+8\int_0^1\frac{4-4\sqrt[4]{x}+\log(x)}{4\log(x)-4x\log(x)}\,dx\right)}{316\,377\,369\,\pi^2}$$

Now, we have that:

https://mss-cat.trin.cam.ac.uk/manuscripts/uv/view.php?n=Add.Ms.a.94.15#?c=0&m=0&s=0&cv=63&xywh=302%2C4620%2C5065%2C3158

$$(1-abx)(1-ab x^2)(1-ab x^3)\cdots$$

$$\times\left\{1+\frac{abx}{(1+ax)(1+bx)}+\frac{a^2b^2x^3}{(1+ax)(1+ax^2)(1+bx)(1+bx^2)}\right.$$

$$=(1+a)(1+b)\left\{\frac{1}{(1+a)(1+b)}-\frac{abx^2}{(1+ax)(1+bx)}\cdot\frac{1-abx^2}{1-x}\right.$$

$$\left.+\frac{a^2b^2x^7}{(1+ax^2)(1+bx^3)}\cdot\frac{(1-abx)(1-abx^4)}{(1-x)(1-x^2)}-\frac{a^3b^3x^{15}}{\cdots}\cdots\right\}$$

$$\frac{2}{\sqrt{3}}\int_0^\infty \frac{e^{-\frac{1}{3}\pi n x^2}\cos\pi b x}{e^{\frac{3\pi x}{3}}+1+e^{-\frac{3\pi x}{3}}}\,dx$$

$$=e^{-\frac{\pi n}{6}}\left\{\frac{e^{-\frac{1^2\pi n}{2}}}{(1+e^{\pi b-\pi n})(1+e^{-\pi b-\pi n})}+\right.$$

$$\frac{e^{-\frac{3^2\pi n}{2}}}{(1+e^{\pi b-\pi n})(1+e^{-\pi b-\pi n})(1+e^{\pi b-3\pi n})(1+e^{-\pi b-3\pi n})}$$

$$\left.+\cdots\cdots\right\}$$

$$+\frac{1}{\sqrt{n}}e^{-\frac{3\pi b^2}{4n}-\frac{\pi}{6n}}\left\{\frac{e^{-\frac{1^2\pi}{2n}}}{(1+e^{i\pi b-\frac{\pi}{n}})(1+e^{-i\pi b-\frac{\pi}{n}})}\right.$$

$$+\frac{e^{-\frac{3^2\pi}{2n}}}{(1+e^{i\pi b-\frac{\pi}{n}})(1+e^{-i\pi b-\frac{\pi}{n}})(1+e^{i\pi b-\frac{3\pi}{n}})(1+e^{-i\pi b-\frac{3\pi}{n}})}$$

$$\left.+\cdots\right\}$$

$$=\frac{e^{\frac{n\pi}{12}}}{(1-e^{-2n\pi})(1-e^{-4n\pi})(1-e^{-6n\pi})\cdots\cdots}$$

$$\times\left[\left\{e^{-\frac{3\pi n}{4}\cdot 1^2}\left(\frac{1}{1+e^{\pi b-\pi n}}+\frac{1}{1+e^{-\pi b-\pi n}}-1\right)\right.\right.$$

$$-e^{-\frac{3\pi n}{4}\cdot 3^2}\left(\frac{1}{1+e^{\pi b-3\pi n}}+\frac{1}{1+e^{-\pi b-3\pi n}}-1\right)$$

$$\left.+\cdots\cdots\right\}$$

$$+\frac{1}{n}e^{-\frac{3\pi b^2}{4n}}\left\{e^{-\frac{3\pi}{4n}\cdot 1^2}\left(\frac{1}{1+e^{i\pi b-\frac{\pi}{n}}}+\frac{1}{1+e^{-i\pi b-\frac{\pi}{n}}}-1\right)\right.$$

$$-e^{-\frac{3\pi}{4n}\cdot 3^2}\left(\frac{1}{1+e^{i\pi b-\frac{3\pi}{n}}}+\frac{1}{1+e^{-i\pi b-\frac{3\pi}{n}}}-1\right)$$

$$\left.\left.+\cdots\cdots\right\}\right]$$

For n = 2 and t = 3:

e^(2Pi/12) / ((((1-e^(-4Pi)) (1-e^(-8Pi)) (1-e^(-12Pi)))))

Input:

$$\frac{e^{2\times\pi/12}}{\left(1-e^{-4\,\pi}\right)\left(1-e^{-8\,\pi}\right)\left(1-e^{-12\,\pi}\right)}$$

Exact result:

$$\frac{e^{\pi/6}}{\left(1-e^{-12\,\pi}\right)\left(1-e^{-8\,\pi}\right)\left(1-e^{-4\,\pi}\right)}$$

Decimal approximation:

1.688097681959546212054160413447840572420514454182718102445...

1.6880976819…

Property:

$$\frac{e^{\pi/6}}{\left(1-e^{-12\,\pi}\right)\left(1-e^{-8\,\pi}\right)\left(1-e^{-4\,\pi}\right)}$$ is a transcendental number

Alternate forms:

$$-\frac{e^{\pi/6}}{\left(e^{-12\,\pi}-1\right)\left(e^{-8\,\pi}-1\right)\left(e^{-4\,\pi}-1\right)}$$

$$\frac{e^{(145\,\pi)/6}}{\left(e^{4\,\pi}-1\right)^3\left(1+e^{4\,\pi}\right)\left(1+e^{4\,\pi}+e^{8\,\pi}\right)}$$

$$e^{(145\,\pi)/6}\Big/\Big(\left(e^{\pi/6}-1\right)^3\left(1+e^{\pi/6}\right)^3\left(1+e^{\pi/3}\right)^3\left(1-e^{\pi/6}+e^{\pi/3}\right)^3\left(1+e^{\pi/6}+e^{\pi/3}\right)^3$$
$$\left(1+e^{(2\,\pi)/3}\right)^3\left(1-e^{\pi/3}+e^{(2\,\pi)/3}\right)^3\left(1-e^{\pi/2}+e^{\pi}\right)\left(1+e^{\pi/2}+e^{\pi}\right)\left(1+e^{(4\,\pi)/3}\right)$$
$$\left(1-e^{(2\,\pi)/3}+e^{(4\,\pi)/3}\right)^3\left(1-e^{\pi}+e^{2\,\pi}\right)\left(1-e^{(4\,\pi)/3}+e^{(8\,\pi)/3}\right)\left(1-e^{2\,\pi}+e^{4\,\pi}\right)\Big)$$

Alternative representations:

$$\frac{e^{(2\pi)/12}}{\left(1-e^{-4\pi}\right)\left(1-e^{-8\pi}\right)\left(1-e^{-12\pi}\right)} = \frac{e^{(360^\circ)/12}}{\left(1-e^{-2160^\circ}\right)\left(1-e^{-1440^\circ}\right)\left(1-e^{-720^\circ}\right)}$$

$$\frac{e^{(2\pi)/12}}{\left(1-e^{-4\pi}\right)\left(1-e^{-8\pi}\right)\left(1-e^{-12\pi}\right)} = \frac{e^{-2/12\, i\log(-1)}}{\left(1-e^{4\, i\log(-1)}\right)\left(1-e^{8\, i\log(-1)}\right)\left(1-e^{12\, i\log(-1)}\right)}$$

$$\frac{e^{(2\pi)/12}}{\left(1-e^{-4\pi}\right)\left(1-e^{-8\pi}\right)\left(1-e^{-12\pi}\right)} = \frac{\exp^{\frac{2\pi}{12}}(z)}{\left(1-\exp^{-4\pi}(z)\right)\left(1-\exp^{-8\pi}(z)\right)\left(1-\exp^{-12\pi}(z)\right)} \quad \text{for } z = 1$$

Series representations:

$$\frac{e^{(2\pi)/12}}{\left(1-e^{-4\pi}\right)\left(1-e^{-8\pi}\right)\left(1-e^{-12\pi}\right)} = \frac{e^{2/3\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}{\left(1-e^{-48\sum_{k=0}^{\infty}(-1)^k/(1+2k)}\right)\left(1-e^{-32\sum_{k=0}^{\infty}(-1)^k/(1+2k)}\right)\left(1-e^{-16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}\right)}$$

$$\frac{e^{(2\pi)/12}}{\left(1-e^{-4\pi}\right)\left(1-e^{-8\pi}\right)\left(1-e^{-12\pi}\right)} = \frac{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{\pi/6}}{\left(1-\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-12\pi}\right)\left(1-\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-8\pi}\right)\left(1-\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-4\pi}\right)}$$

$$\frac{e^{(2\pi)/12}}{\left(1-e^{-4\pi}\right)\left(1-e^{-8\pi}\right)\left(1-e^{-12\pi}\right)} = \frac{\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{\pi/6}}{\left(1-\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{-12\pi}\right)\left(1-\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{-8\pi}\right)\left(1-\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{-4\pi}\right)}$$

Integral representations:

$$\frac{e^{(2\pi)/12}}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})} = \frac{e^{1/3\int_0^\infty 1/(1+t^2)\,dt}}{\left(1-e^{-24\int_0^\infty 1/(1+t^2)\,dt}\right)\left(1-e^{-16\int_0^\infty 1/(1+t^2)\,dt}\right)\left(1-e^{-8\int_0^\infty 1/(1+t^2)\,dt}\right)}$$

$$\frac{e^{(2\pi)/12}}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})} = \frac{e^{1/3\int_0^\infty \sin(t)/t\,dt}}{\left(1-e^{-24\int_0^\infty \sin(t)/t\,dt}\right)\left(1-e^{-16\int_0^\infty \sin(t)/t\,dt}\right)\left(1-e^{-8\int_0^\infty \sin(t)/t\,dt}\right)}$$

$$\frac{e^{(2\pi)/12}}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})} = \frac{e^{2/3\int_0^1 \sqrt{1-t^2}\,dt}}{\left(1-e^{-48\int_0^1 \sqrt{1-t^2}\,dt}\right)\left(1-e^{-32\int_0^1 \sqrt{1-t^2}\,dt}\right)\left(1-e^{-16\int_0^1 \sqrt{1-t^2}\,dt}\right)}$$

From which:

[((e^((-6Pi)/4)))(((1/(1+e^(3Pi-2Pi)))+1/(1+e^(-3Pi-2Pi))-1))-((((e^((-6Pi)/4*9)))))(((1/(1+e^(3Pi-6Pi)))+1/(1+e^(-3Pi-6Pi))-1))]

Input:

$$e^{1/4\,(-6\pi)}\left(\frac{1}{1+e^{3\pi-2\pi}}+\frac{1}{1+e^{-3\pi-2\pi}}-1\right)-e^{(1/4\,(-6\pi))\times 9}\left(\frac{1}{1+e^{3\pi-6\pi}}+\frac{1}{1+e^{-3\pi-6\pi}}-1\right)$$

Exact result:

$$e^{-(3\pi)/2}\left(-1+\frac{1}{1+e^{-5\pi}}+\frac{1}{1+e^{\pi}}\right)-e^{-(27\pi)/2}\left(-1+\frac{1}{1+e^{-9\pi}}+\frac{1}{1+e^{-3\pi}}\right)$$

Decimal approximation:

0.000372120985763587328293822756805434065846969973037622757...

0.000372120985763587328293822756805434065846969973037622757...

0.00037212098576358

Property:

$$-e^{-(27\pi)/2}\left(-1+\frac{1}{1+e^{-9\pi}}+\frac{1}{1+e^{-3\pi}}\right)+e^{-(3\pi)/2}\left(-1+\frac{1}{1+e^{-5\pi}}+\frac{1}{1+e^{\pi}}\right)$$

is a transcendental number

Alternate forms:

$$e^{-(27\pi)/2}\left(-\frac{1}{1+e^{-9\pi}}+\frac{1}{1+e^{3\pi}}+e^{12\pi}\left(-1+\frac{1}{1+e^{-5\pi}}+\frac{1}{1+e^{\pi}}\right)\right)$$

$$e^{-(27\pi)/2}-e^{-(3\pi)/2}-\frac{e^{-(27\pi)/2}}{1+e^{-9\pi}}+\frac{e^{-(3\pi)/2}}{1+e^{-5\pi}}-\frac{e^{-(27\pi)/2}}{1+e^{-3\pi}}+\frac{e^{-(3\pi)/2}}{1+e^{\pi}}$$

$$e^{-(3\pi)/2}\left(\frac{1-e^{\pi}+e^{2\pi}-e^{3\pi}+e^{4\pi}+e^{5\pi}}{(1+e^{\pi})\left(1-e^{\pi}+e^{2\pi}-e^{3\pi}+e^{4\pi}\right)}-1\right)+e^{-(27\pi)/2}\left(1-\frac{e^{3\pi}\left(1-e^{3\pi}+2e^{6\pi}\right)}{\left(1+e^{3\pi}\right)\left(1-e^{3\pi}+e^{6\pi}\right)}\right)$$

Alternative representations:

$$e^{-(6\pi)/4}\left(\frac{1}{1+e^{3\pi-2\pi}}+\frac{1}{1+e^{-3\pi-2\pi}}-1\right)-e^{9/4\,(-6\pi)}\left(\frac{1}{1+e^{3\pi-6\pi}}+\frac{1}{1+e^{-3\pi-6\pi}}-1\right)=$$
$$-e^{-(9720^\circ)/4}\left(-1+\frac{1}{1+e^{-1620^\circ}}+\frac{1}{1+e^{-540^\circ}}\right)+e^{-(1080^\circ)/4}\left(-1+\frac{1}{1+e^{-900^\circ}}+\frac{1}{1+e^{180^\circ}}\right)$$

$$e^{-(6\pi)/4}\left(\frac{1}{1+e^{3\pi-2\pi}}+\frac{1}{1+e^{-3\pi-2\pi}}-1\right)-e^{9/4\,(-6\pi)}\left(\frac{1}{1+e^{3\pi-6\pi}}+\frac{1}{1+e^{-3\pi-6\pi}}-1\right)=$$
$$e^{6/4\,i\log(-1)}\left(-1+\frac{1}{1+e^{-i\log(-1)}}+\frac{1}{1+e^{5i\log(-1)}}\right)-$$
$$e^{54/4\,i\log(-1)}\left(-1+\frac{1}{1+e^{3i\log(-1)}}+\frac{1}{1+e^{9i\log(-1)}}\right)$$

$$e^{-(6\pi)/4}\left(\frac{1}{1+e^{3\pi-2\pi}}+\frac{1}{1+e^{-3\pi-2\pi}}-1\right)-e^{9/4\,(-6\pi)}\left(\frac{1}{1+e^{3\pi-6\pi}}+\frac{1}{1+e^{-3\pi-6\pi}}-1\right)=$$
$$\exp^{-\frac{6}{4}\cos^{-1}(-1)}(z)\left(\frac{1}{1+\exp^{3\cos^{-1}(-1)-2\cos^{-1}(-1)}(z)}+\right.$$
$$\left.\frac{1}{1+\exp^{-3\cos^{-1}(-1)-2\cos^{-1}(-1)}(z)}-1\right)-\exp^{\frac{9}{4}(-6\cos^{-1}(-1))}(z)$$
$$\left(\frac{1}{1+\exp^{3\cos^{-1}(-1)-6\cos^{-1}(-1)}(z)}+\frac{1}{1+\exp^{-3\cos^{-1}(-1)-6\cos^{-1}(-1)}(z)}-1\right)\text{ for } z=1$$

Integral representations:

$$e^{-(6\pi)/4}\left(\frac{1}{1+e^{3\pi-2\pi}}+\frac{1}{1+e^{-3\pi-2\pi}}-1\right)-e^{9/4\,(-6\pi)}\left(\frac{1}{1+e^{3\pi-6\pi}}+\frac{1}{1+e^{-3\pi-6\pi}}-1\right)=$$
$$e^{-54\int_0^1\sqrt{1-t^2}\,dt}-e^{-6\int_0^1\sqrt{1-t^2}\,dt}-\frac{e^{-54\int_0^1\sqrt{1-t^2}\,dt}}{1+e^{-36\int_0^1\sqrt{1-t^2}\,dt}}+$$
$$\frac{e^{-6\int_0^1\sqrt{1-t^2}\,dt}}{1+e^{-20\int_0^1\sqrt{1-t^2}\,dt}}-\frac{e^{-54\int_0^1\sqrt{1-t^2}\,dt}}{1+e^{-12\int_0^1\sqrt{1-t^2}\,dt}}+\frac{e^{-6\int_0^1\sqrt{1-t^2}\,dt}}{1+e^{4\int_0^1\sqrt{1-t^2}\,dt}}$$

$$e^{-(6\pi)/4}\left(\frac{1}{1+e^{3\pi-2\pi}}+\frac{1}{1+e^{-3\pi-2\pi}}-1\right)-e^{9/4\,(-6\pi)}\left(\frac{1}{1+e^{3\pi-6\pi}}+\frac{1}{1+e^{-3\pi-6\pi}}-1\right)=$$
$$e^{-36\int_0^\infty\sin^3(t)/t^3\,dt}-e^{-4\int_0^\infty\sin^3(t)/t^3\,dt}-\frac{e^{-36\int_0^\infty\sin^3(t)/t^3\,dt}}{1+e^{-24\int_0^\infty\sin^3(t)/t^3\,dt}}+$$
$$\frac{e^{-4\int_0^\infty\sin^3(t)/t^3\,dt}}{1+e^{-40/3\int_0^\infty\sin^3(t)/t^3\,dt}}-\frac{e^{-36\int_0^\infty\sin^3(t)/t^3\,dt}}{1+e^{-8\int_0^\infty\sin^3(t)/t^3\,dt}}+\frac{e^{-4\int_0^\infty\sin^3(t)/t^3\,dt}}{1+e^{8/3\int_0^\infty\sin^3(t)/t^3\,dt}}$$

$$e^{-(6\pi)/4}\left(\frac{1}{1+e^{3\pi-2\pi}}+\frac{1}{1+e^{-3\pi-2\pi}}-1\right)-e^{9/4\,(-6\pi)}\left(\frac{1}{1+e^{3\pi-6\pi}}+\frac{1}{1+e^{-3\pi-6\pi}}-1\right)=$$
$$e^{-81/2\int_0^\infty\sin^4(t)/t^4\,dt}-e^{-9/2\int_0^\infty\sin^4(t)/t^4\,dt}-\frac{e^{-81/2\int_0^\infty\sin^4(t)/t^4\,dt}}{1+e^{-27\int_0^\infty\sin^4(t)/t^4\,dt}}+$$
$$\frac{e^{-9/2\int_0^\infty\sin^4(t)/t^4\,dt}}{1+e^{-15\int_0^\infty\sin^4(t)/t^4\,dt}}-\frac{e^{-81/2\int_0^\infty\sin^4(t)/t^4\,dt}}{1+e^{-9\int_0^\infty\sin^4(t)/t^4\,dt}}+\frac{e^{-9/2\int_0^\infty\sin^4(t)/t^4\,dt}}{1+e^{3\int_0^\infty\sin^4(t)/t^4\,dt}}$$

[(1/2(e^((-27Pi)/8))) ((e^((-3Pi)/8)))(((1/(1+e^(3Pi*i/2-Pi/2)))+1/(1+e^(-3Pi*i/2-Pi/2))-1))-((((e^((-27Pi)/8)))))(((1/(1+e^(3Pi*i/2-3Pi/2)))+1/(1+e^(-3Pi*i/2-3Pi/2))-1))]

Input:

$$\left(\frac{1}{2}\,e^{1/8\,(-27\,\pi)}\right)e^{1/8\,(-3\,\pi)}\left(\frac{1}{1+e^{3\,\pi\times i/2-\pi/2}}+\frac{1}{1+e^{-3\,\pi\times i/2-\pi/2}}-1\right)-e^{1/8\,(-27\,\pi)}\left(\frac{1}{1+e^{3\,\pi\times i/2-3\times\pi/2}}+\frac{1}{1+e^{-3\,\pi\times i/2-3\times\pi/2}}-1\right)$$

i is the imaginary unit

Exact result:

$$\frac{1}{2}\,e^{-(15\,\pi)/4}\left(-1+\frac{1}{1-i\,e^{-\pi/2}}+\frac{1}{1+i\,e^{-\pi/2}}\right)-e^{-(27\,\pi)/8}\left(-1+\frac{1}{1-i\,e^{-(3\,\pi)/2}}+\frac{1}{1+i\,e^{-(3\,\pi)/2}}\right)$$

Decimal approximation:

−0.000021332944431063497503942712209560278728662196496499 70...

(using the principal branch of the logarithm for complex exponentiation)

-0.0000213329444310634975

Property:

$$-e^{-(27\,\pi)/8}\left(-1+\frac{1}{1-i\,e^{-(3\,\pi)/2}}+\frac{1}{1+i\,e^{-(3\,\pi)/2}}\right)+\frac{1}{2}\,e^{-(15\,\pi)/4}\left(-1+\frac{1}{1-i\,e^{-\pi/2}}+\frac{1}{1+i\,e^{-\pi/2}}\right)$$

is a transcendental number

Expanded form:

$$-\frac{1}{2}\,e^{-(15\,\pi)/4}+e^{-(27\,\pi)/8}-\frac{e^{-(27\,\pi)/8}}{1-i\,e^{-(3\,\pi)/2}}-\frac{e^{-(27\,\pi)/8}}{1+i\,e^{-(3\,\pi)/2}}+\frac{e^{-(15\,\pi)/4}}{2\left(1-i\,e^{-\pi/2}\right)}+\frac{e^{-(15\,\pi)/4}}{2\left(1+i\,e^{-\pi/2}\right)}$$

Alternate forms:

$$-\frac{1}{2}\,e^{-(15\,\pi)/4}+e^{-(27\,\pi)/8}-\frac{2\,e^{-(27\,\pi)/8}}{1+e^{-3\,\pi}}+\frac{e^{-(15\,\pi)/4}}{1+e^{-\pi}}$$

$$\frac{e^{-(15\pi)/4}\left(-1+2e^{(3\pi)/8}+2e^{\pi}-2e^{2\pi}+e^{3\pi}-2e^{(27\pi)/8}\right)}{2\left(1+e^{3\pi}\right)}$$

$$-\frac{e^{-(15\pi)/4}\left(1-e^{\pi}\right)\left(e^{(3\pi)/2}+-i\right)\left(e^{(3\pi)/2}+i\right)+2e^{-(27\pi)/8}\left(e^{\pi/2}+-i\right)\left(e^{\pi/2}+i\right)\left(e^{3\pi}-1\right)}{2\left(e^{\pi/2}+-i\right)\left(e^{\pi/2}+i\right)\left(e^{(3\pi)/2}+-i\right)\left(e^{(3\pi)/2}+i\right)}$$

Alternative representations:

$$\frac{1}{2}\left(e^{-(3\pi)/8}\left(\frac{1}{1+e^{(3\pi i)/2-\pi/2}}+\frac{1}{1+e^{-(3\pi i)/2-\pi/2}}-1\right)\right)e^{-(27\pi)/8}-e^{-(27\pi)/8}\left(\frac{1}{1+e^{1/2(3\pi)i-(3\pi)/2}}+\frac{1}{1+e^{1/2(-3\pi)i-(3\pi)/2}}-1\right)=-e^{-(4860^\circ)/8}\left(-1+\frac{1}{1+e^{-270^\circ-270^\circ i}}+\frac{1}{1+e^{-270^\circ+270^\circ i}}\right)+\frac{1}{2}e^{-(4860^\circ)/8}e^{-(540^\circ)/8}\left(-1+\frac{1}{1+e^{-90^\circ-270^\circ i}}+\frac{1}{1+e^{-90^\circ+270^\circ i}}\right)$$

$$\frac{1}{2}\left(e^{-(3\pi)/8}\left(\frac{1}{1+e^{(3\pi i)/2-\pi/2}}+\frac{1}{1+e^{-(3\pi i)/2-\pi/2}}-1\right)\right)e^{-(27\pi)/8}-e^{-(27\pi)/8}\left(\frac{1}{1+e^{1/2(3\pi)i-(3\pi)/2}}+\frac{1}{1+e^{1/2(-3\pi)i-(3\pi)/2}}-1\right)=\frac{1}{2}e^{3/8\,i\log(-1)}e^{27/8\,i\log(-1)}\left(-1+\frac{1}{1+e^{1/2\,i\log(-1)-3/2\,i^2\log(-1)}}+\frac{1}{1+e^{1/2\,i\log(-1)+3/2\,i^2\log(-1)}}\right)-e^{27/8\,i\log(-1)}\left(-1+\frac{1}{1+e^{3/2\,i\log(-1)-3/2\,i^2\log(-1)}}+\frac{1}{1+e^{3/2\,i\log(-1)+3/2\,i^2\log(-1)}}\right)$$

$$\frac{1}{2}\left(e^{-(3\pi)/8}\left(\frac{1}{1+e^{(3\pi i)/2-\pi/2}}+\frac{1}{1+e^{-(3\pi i)/2-\pi/2}}-1\right)\right)e^{-(27\pi)/8}-e^{-(27\pi)/8}\left(\frac{1}{1+e^{1/2(3\pi)i-(3\pi)/2}}+\frac{1}{1+e^{1/2(-3\pi)i-(3\pi)/2}}-1\right)=\frac{1}{2}\left(\exp^{-\frac{3}{8}\cos^{-1}(-1)}(z)\left(\frac{1}{1+\exp^{\frac{3}{2}\cos^{-1}(-1)i-\frac{1}{2}\cos^{-1}(-1)}(z)}+\frac{1}{1+\exp^{-\frac{3}{2}\cos^{-1}(-1)i-\frac{1}{2}\cos^{-1}(-1)}(z)}-1\right)\right)\exp^{-\frac{27}{8}\cos^{-1}(-1)}(z)-\exp^{-\frac{27}{8}\cos^{-1}(-1)}(z)\left(\frac{1}{1+\exp^{\frac{1}{2}\left(3\cos^{-1}(-1)\right)i-\frac{3}{2}\cos^{-1}(-1)}(z)}+\frac{1}{1+\exp^{\frac{1}{2}\left(-3\cos^{-1}(-1)\right)i-\frac{3}{2}\cos^{-1}(-1)}(z)}-1\right)\text{ for }z=1$$

Integral representations:

$$\frac{1}{2}\left(e^{-(3\pi)/8}\left(\frac{1}{1+e^{(3\pi i)/2-\pi/2}}+\frac{1}{1+e^{-(3\pi i)/2-\pi/2}}-1\right)\right)e^{-(27\pi)/8}-e^{-(27\pi)/8}\left(\frac{1}{1+e^{1/2(3\pi)i-(3\pi)/2}}+\frac{1}{1+e^{1/2(-3\pi)i-(3\pi)/2}}-1\right)=-\frac{1}{2}e^{-45/4\int_0^\infty \sin^4(t)/t^4\,dt}+e^{-81/8\int_0^\infty \sin^4(t)/t^4\,dt}-\frac{e^{-81/8\int_0^\infty \sin^4(t)/t^4\,dt}}{1-i\,e^{-9/2\int_0^\infty \sin^4(t)/t^4\,dt}}-\frac{e^{-81/8\int_0^\infty \sin^4(t)/t^4\,dt}}{1+i\,e^{-9/2\int_0^\infty \sin^4(t)/t^4\,dt}}+\frac{e^{-45/4\int_0^\infty \sin^4(t)/t^4\,dt}}{2\left(1-i\,e^{-3/2\int_0^\infty \sin^4(t)/t^4\,dt}\right)}+\frac{e^{-45/4\int_0^\infty \sin^4(t)/t^4\,dt}}{2\left(1+i\,e^{-3/2\int_0^\infty \sin^4(t)/t^4\,dt}\right)}$$

$$\frac{1}{2}\left(e^{-(3\pi)/8}\left(\frac{1}{1+e^{(3\pi i)/2-\pi/2}}+\frac{1}{1+e^{-(3\pi i)/2-\pi/2}}-1\right)\right)e^{-(27\pi)/8}-e^{-(27\pi)/8}\left(\frac{1}{1+e^{1/2(3\pi)i-(3\pi)/2}}+\frac{1}{1+e^{1/2(-3\pi)i-(3\pi)/2}}-1\right)=-\left(\left(e^{-15/2\int_0^\infty \sin(t)/t\,dt}\left(-1+e^{1/4\int_0^\infty \sin(t)/t\,dt}\right)\left(1+e^{1/4\int_0^\infty \sin(t)/t\,dt}\right)\left(1+e^{1/2\int_0^\infty \sin(t)/t\,dt}\right)\left(1+e^{\int_0^\infty \sin(t)/t\,dt}\right)\left(-1+2\,e^{3/4\int_0^\infty \sin(t)/t\,dt}+e^{2\int_0^\infty \sin(t)/t\,dt}+2\,e^{11/4\int_0^\infty \sin(t)/t\,dt}-e^{4\int_0^\infty \sin(t)/t\,dt}+2\,e^{19/4\int_0^\infty \sin(t)/t\,dt}\right)\right)\Big/\left(2\left(1+e^{2\int_0^\infty \sin(t)/t\,dt}\right)\left(1-e^{2\int_0^\infty \sin(t)/t\,dt}+e^{4\int_0^\infty \sin(t)/t\,dt}\right)\right)\right)$$

$$\frac{1}{2}\left(e^{-(3\pi)/8}\left(\frac{1}{1+e^{(3\pi i)/2-\pi/2}}+\frac{1}{1+e^{-(3\pi i)/2-\pi/2}}-1\right)\right)e^{-(27\pi)/8}-e^{-(27\pi)/8}\left(\frac{1}{1+e^{1/2(3\pi)i-(3\pi)/2}}+\frac{1}{1+e^{1/2(-3\pi)i-(3\pi)/2}}-1\right)=-\left(\left(e^{-15/2\int_0^\infty 1/(1+t^2)\,dt}\left(-1+e^{1/4\int_0^\infty 1/(1+t^2)\,dt}\right)\left(1+e^{1/4\int_0^\infty 1/(1+t^2)\,dt}\right)\left(1+e^{1/2\int_0^\infty 1/(1+t^2)\,dt}\right)\left(1+e^{\int_0^\infty 1/(1+t^2)\,dt}\right)\left(-1+2\,e^{3/4\int_0^\infty 1/(1+t^2)\,dt}+e^{2\int_0^\infty 1/(1+t^2)\,dt}+2\,e^{11/4\int_0^\infty 1/(1+t^2)\,dt}-e^{4\int_0^\infty 1/(1+t^2)\,dt}+2\,e^{19/4\int_0^\infty 1/(1+t^2)\,dt}\right)\right)\Big/\left(2\left(1+e^{2\int_0^\infty 1/(1+t^2)\,dt}\right)\left(1-e^{2\int_0^\infty 1/(1+t^2)\,dt}+e^{4\int_0^\infty 1/(1+t^2)\,dt}\right)\right)\right)$$

Thence, in conclusion, the final expression is:

e^(2Pi/12) / ((((1-e^(-4Pi)) (1-e^(-8Pi)) (1-e^(-12Pi))))) * (0.00037212098-0.000021332944)

Input interpretation:

$$\frac{e^{2\times\pi/12}}{\left(1-e^{-4\pi}\right)\left(1-e^{-8\pi}\right)\left(1-e^{-12\pi}\right)}\,(0.00037212098-0.000021332944)$$

Result:

0.00059216447...

0.00059216447…

Alternative representations:

$$\frac{(0.000372121-0.0000213329)\,e^{(2\pi)/12}}{\left(1-e^{-4\pi}\right)\left(1-e^{-8\pi}\right)\left(1-e^{-12\pi}\right)}=\frac{0.000350788\,e^{(360\,^\circ)/12}}{\left(1-e^{-2160\,^\circ}\right)\left(1-e^{-1440\,^\circ}\right)\left(1-e^{-720\,^\circ}\right)}$$

$$\frac{(0.000372121-0.0000213329)\,e^{(2\pi)/12}}{\left(1-e^{-4\pi}\right)\left(1-e^{-8\pi}\right)\left(1-e^{-12\pi}\right)}=\frac{0.000350788\,e^{-2/12\,i\log(-1)}}{\left(1-e^{4\,i\log(-1)}\right)\left(1-e^{8\,i\log(-1)}\right)\left(1-e^{12\,i\log(-1)}\right)}$$

$$\frac{(0.000372121-0.0000213329)\,e^{(2\pi)/12}}{\left(1-e^{-4\pi}\right)\left(1-e^{-8\pi}\right)\left(1-e^{-12\pi}\right)}=\frac{(0.000372121-0.0000213329)\exp^{\frac{2\pi}{12}}(z)}{\left(1-\exp^{-4\pi}(z)\right)\left(1-\exp^{-8\pi}(z)\right)\left(1-\exp^{-12\pi}(z)\right)}\quad\text{for } z=1$$

Series representations:

$$\frac{(0.000372121-0.0000213329)\,e^{(2\pi)/12}}{\left(1-e^{-4\pi}\right)\left(1-e^{-8\pi}\right)\left(1-e^{-12\pi}\right)}=\left(0.000350788\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2/3\sum_{k=0}^{\infty}(-1)^k/(1+2k)}\right)\Bigg/\left(\left(1-\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-48\sum_{k=0}^{\infty}(-1)^k/(1+2k)}\right)\left(1-\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-32\sum_{k=0}^{\infty}(-1)^k/(1+2k)}\right)\left(1-\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}\right)\right)$$

$$\frac{(0.000372121 - 0.0000213329)\, e^{(2\pi)/12}}{\left(1 - e^{-4\pi}\right)\left(1 - e^{-8\pi}\right)\left(1 - e^{-12\pi}\right)} = \left(0.000350788 \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{2/3 \sum_{k=1}^{\infty} \tan^{-1}(1/F_{1+2k})}\right) \Big/ \left(\left(1 - \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{-48 \sum_{k=1}^{\infty} \tan^{-1}(1/F_{1+2k})}\right) \left(1 - \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{-32 \sum_{k=1}^{\infty} \tan^{-1}(1/F_{1+2k})}\right)\left(1 - \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{-16 \sum_{k=1}^{\infty} \tan^{-1}(1/F_{1+2k})}\right)\right)$$

$$\frac{(0.000372121 - 0.0000213329)\, e^{(2\pi)/12}}{\left(1 - e^{-4\pi}\right)\left(1 - e^{-8\pi}\right)\left(1 - e^{-12\pi}\right)} = \left(0.000350788 \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{1/6 \times \sum_{k=1}^{\infty} 4^{-k}\left(-1+3^k\right)\zeta(1+k)}\right) \Big/ \left(\left(1 - \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{-12 \times \sum_{k=1}^{\infty} 4^{-k}\left(-1+3^k\right)\zeta(1+k)}\right) \left(1 - \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{-8 \times \sum_{k=1}^{\infty} 4^{-k}\left(-1+3^k\right)\zeta(1+k)}\right)\left(1 - \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{-4 \times \sum_{k=1}^{\infty} 4^{-k}\left(-1+3^k\right)\zeta(1+k)}\right)\right)$$

Integral representations:

$$\frac{(0.000372121 - 0.0000213329)\, e^{(2\pi)/12}}{\left(1 - e^{-4\pi}\right)\left(1 - e^{-8\pi}\right)\left(1 - e^{-12\pi}\right)} = \frac{0.000350788\, e^{1/3 \int_0^{\infty} 1/(1+t^2)\, dt}}{\left(1 - e^{-24 \int_0^{\infty} 1/(1+t^2)\, dt}\right)\left(1 - e^{-16 \int_0^{\infty} 1/(1+t^2)\, dt}\right)\left(1 - e^{-8 \int_0^{\infty} 1/(1+t^2)\, dt}\right)}$$

$$\frac{(0.000372121 - 0.0000213329)\, e^{(2\pi)/12}}{\left(1 - e^{-4\pi}\right)\left(1 - e^{-8\pi}\right)\left(1 - e^{-12\pi}\right)} = -\frac{0.000350788\, e^{145/3 \int_0^{\infty} \sin(t)/t\, dt}}{\left(1 - e^{8 \int_0^{\infty} \sin(t)/t\, dt}\right)\left(1 - e^{16 \int_0^{\infty} \sin(t)/t\, dt}\right)\left(1 - e^{24 \int_0^{\infty} \sin(t)/t\, dt}\right)}$$

$$\frac{(0.000372121 - 0.0000213329)\, e^{(2\pi)/12}}{\left(1 - e^{-4\pi}\right)\left(1 - e^{-8\pi}\right)\left(1 - e^{-12\pi}\right)} = -\frac{0.000350788\, e^{290/3 \int_0^1 \sqrt{1-t^2}\, dt}}{\left(1 - e^{16 \int_0^1 \sqrt{1-t^2}\, dt}\right)\left(1 - e^{32 \int_0^1 \sqrt{1-t^2}\, dt}\right)\left(1 - e^{48 \int_0^1 \sqrt{1-t^2}\, dt}\right)}$$

From which:

(128/125)1/((((e^(2Pi/12) / ((((1-e^(-4Pi)) (1-e^(-8Pi)) (1-e^(-12Pi))))) * (0.00037212098-0.000021332944)))))

Input interpretation:

$$\frac{128}{125} \times \frac{1}{\frac{e^{2\times\pi/12}}{(1-e^{-4\,\pi})(1-e^{-8\,\pi})(1-e^{-12\,\pi})}(0.00037212098 - 0.000021332944)}$$

Result:

1729.2493...

1729.2493…

This result is very near to the mass of candidate glueball **$f_0(1710)$ scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Alternative representations:

$$\frac{128}{\frac{\left(e^{(2\,\pi)/12}\,(0.000372121-0.0000213329)\right)125}{(1-e^{-4\,\pi})(1-e^{-8\,\pi})(1-e^{-12\,\pi})}} = \frac{128}{\frac{125\left(0.000350788\,e^{(360\,^\circ)/12}\right)}{\left(1-e^{-2160\,^\circ}\right)\left(1-e^{-1440\,^\circ}\right)\left(1-e^{-720\,^\circ}\right)}}$$

$$\frac{128}{\frac{\left(e^{(2\,\pi)/12}\,(0.000372121-0.0000213329)\right)125}{(1-e^{-4\,\pi})(1-e^{-8\,\pi})(1-e^{-12\,\pi})}} = \frac{128}{\frac{125\left(0.000350788\,e^{-2/12\,i\,\log(-1)}\right)}{\left(1-e^{4\,i\,\log(-1)}\right)\left(1-e^{8\,i\,\log(-1)}\right)\left(1-e^{12\,i\,\log(-1)}\right)}}$$

$$\frac{128}{\frac{\left(e^{(2\,\pi)/12}\,(0.000372121-0.0000213329)\right)125}{(1-e^{-4\,\pi})(1-e^{-8\,\pi})(1-e^{-12\,\pi})}} = \frac{128}{\frac{\left(\exp^{\frac{2\,\pi}{12}}(z)\,(0.000372121-0.0000213329)\right)125}{(1-\exp^{-4\,\pi}(z))(1-\exp^{-8\,\pi}(z))(1-\exp^{-12\,\pi}(z))}} \quad \text{for } z = 1$$

Series representations:

$$\frac{128}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)125}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})}} =$$

$$0-2919.14\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-290/3\sum_{k=0}^{\infty}(-1)^k/(1+2k)}+2919.14\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-242/3\sum_{k=0}^{\infty}(-1)^k/(1+2k)}+$$
$$2919.14\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-194/3\sum_{k=0}^{\infty}(-1)^k/(1+2k)}-2919.14\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-98/3\sum_{k=0}^{\infty}(-1)^k/(1+2k)}-$$
$$2919.14\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-50/3\sum_{k=0}^{\infty}(-1)^k/(1+2k)}+2919.14\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-2/3\sum_{k=0}^{\infty}(-1)^k/(1+2k)}$$

$$\frac{128}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)125}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})}} =$$

$$0-2919.14\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-290/3\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}+2919.14\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-242/3\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}+$$
$$2919.14\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-194/3\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}-2919.14\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-98/3\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}-$$
$$2919.14\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-50/3\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}+2919.14\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-2/3\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}$$

$$\frac{128}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)125}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})}} =$$

$$0-2919.14\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-145/6\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^k\right)\zeta(1+k)}+2919.14$$
$$\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-121/6\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^k\right)\zeta(1+k)}+2919.14\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-97/6\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^k\right)\zeta(1+k)}-$$
$$2919.14\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-49/6\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^k\right)\zeta(1+k)}-$$
$$2919.14\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-25/6\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^k\right)\zeta(1+k)}+$$
$$2919.14\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-1/6\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^k\right)\zeta(1+k)}$$

Integral representations:

$$\frac{128}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)125}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})}} =$$
$$0-2919.14\,e^{-145/3\int_0^\infty 1/(1+t^2)\,dt}+2919.14\,e^{-121/3\int_0^\infty 1/(1+t^2)\,dt}+$$
$$2919.14\,e^{-97/3\int_0^\infty 1/(1+t^2)\,dt}-2919.14\,e^{-49/3\int_0^\infty 1/(1+t^2)\,dt}-$$
$$2919.14\,e^{-25/3\int_0^\infty 1/(1+t^2)\,dt}+2919.14\,e^{-1/3\int_0^\infty 1/(1+t^2)\,dt}$$

$$\frac{128}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)125}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})}} =$$
$$0-2919.14\,e^{-145/3\int_0^\infty \sin(t)/t\,dt}+2919.14\,e^{-121/3\int_0^\infty \sin(t)/t\,dt}+2919.14\,e^{-97/3\int_0^\infty \sin(t)/t\,dt}-$$
$$2919.14\,e^{-49/3\int_0^\infty \sin(t)/t\,dt}-2919.14\,e^{-25/3\int_0^\infty \sin(t)/t\,dt}+2919.14\,e^{-1/3\int_0^\infty \sin(t)/t\,dt}$$

$$\frac{128}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)125}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})}} =$$
$$0-2919.14\,e^{-145/3\int_0^\infty \sin^2(t)/t^2\,dt}+2919.14\,e^{-121/3\int_0^\infty \sin^2(t)/t^2\,dt}+$$
$$2919.14\,e^{-97/3\int_0^\infty \sin^2(t)/t^2\,dt}-2919.14\,e^{-49/3\int_0^\infty \sin^2(t)/t^2\,dt}-$$
$$2919.14\,e^{-25/3\int_0^\infty \sin^2(t)/t^2\,dt}+2919.14\,e^{-1/3\int_0^\infty \sin^2(t)/t^2\,dt}$$

and:

(π^2/126) 1/((((e^(2Pi/12) / ((((1-e^(-4Pi)) (1-e^(-8Pi)) (1-e^(-12Pi))))) * (0.00037212098-0.000021332944)))))+7

Input interpretation:

$$\frac{\pi^2}{126}\times\frac{1}{\frac{e^{2\times\pi/12}}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})}(0.00037212098-0.000021332944)}+7$$

Result:

139.27777...

139.27777… result practically equal to the rest mass of Pion meson 139.57 MeV

Alternative representations:

$$\frac{\pi^2}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)126}{\left(1-e^{-4\pi}\right)\left(1-e^{-8\pi}\right)\left(1-e^{-12\pi}\right)}}+7=7+\frac{(180^\circ)^2}{\frac{126\left(0.000350788\,e^{(360^\circ)/12}\right)}{\left(1-e^{-2160^\circ}\right)\left(1-e^{-1440^\circ}\right)\left(1-e^{-720^\circ}\right)}}$$

$$\frac{\pi^2}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)126}{\left(1-e^{-4\pi}\right)\left(1-e^{-8\pi}\right)\left(1-e^{-12\pi}\right)}}+7=7+\frac{(-i\log(-1))^2}{\frac{126\left(0.000350788\,e^{-2/12\,i\log(-1)}\right)}{\left(1-e^{4\,i\log(-1)}\right)\left(1-e^{8\,i\log(-1)}\right)\left(1-e^{12\,i\log(-1)}\right)}}$$

$$\frac{\pi^2}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)126}{\left(1-e^{-4\pi}\right)\left(1-e^{-8\pi}\right)\left(1-e^{-12\pi}\right)}}+7=\frac{\pi^2}{\frac{\left(\exp^{\frac{2\pi}{12}}(z)\,(0.000372121-0.0000213329)\right)126}{\left(1-\exp^{-4\pi}(z)\right)\left(1-\exp^{-8\pi}(z)\right)\left(1-\exp^{-12\pi}(z)\right)}}+7 \quad \text{for } z=1$$

Integral representations:

$$\frac{\pi^2}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)126}{\left(1-e^{-4\pi}\right)\left(1-e^{-8\pi}\right)\left(1-e^{-12\pi}\right)}}+7=$$
$$7\,e^{-145/3\int_0^\infty \sin(t)/t\,dt}\left(e^{145/3\int_0^\infty \sin(t)/t\,dt}-12.9285\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^2+12.9285\,e^{8\int_0^\infty \sin(t)/t\,dt}\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^2+12.9285\,e^{16\int_0^\infty \sin(t)/t\,dt}\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^2-12.9285\,e^{32\int_0^\infty \sin(t)/t\,dt}\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^2-12.9285\,e^{40\int_0^\infty \sin(t)/t\,dt}\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^2+12.9285\,e^{48\int_0^\infty \sin(t)/t\,dt}\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^2\right)$$

$$\frac{\pi^2}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)126}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})}}+7=$$

$$7\,e^{-145/3\int_0^\infty 1/(1+t^2)\,dt}\left(e^{145/3\int_0^\infty 1/(1+t^2)\,dt}-12.9285\left(\int_0^\infty\frac{1}{1+t^2}\,dt\right)^2+12.9285\right.$$
$$e^{8\int_0^\infty 1/(1+t^2)\,dt}\left(\int_0^\infty\frac{1}{1+t^2}\,dt\right)^2+12.9285\,e^{16\int_0^\infty 1/(1+t^2)\,dt}\left(\int_0^\infty\frac{1}{1+t^2}\,dt\right)^2-$$
$$12.9285\,e^{32\int_0^\infty 1/(1+t^2)\,dt}\left(\int_0^\infty\frac{1}{1+t^2}\,dt\right)^2-12.9285\,e^{40\int_0^\infty 1/(1+t^2)\,dt}$$
$$\left.\left(\int_0^\infty\frac{1}{1+t^2}\,dt\right)^2+12.9285\,e^{48\int_0^\infty 1/(1+t^2)\,dt}\left(\int_0^\infty\frac{1}{1+t^2}\,dt\right)^2\right)$$

$$\frac{\pi^2}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)126}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})}}+7=$$

$$7\,e^{-145/3\int_0^\infty \sin^2(t)/t^2\,dt}\left(e^{145/3\int_0^\infty \sin^2(t)/t^2\,dt}-12.9285\left(\int_0^\infty\frac{\sin^2(t)}{t^2}\,dt\right)^2+\right.$$
$$12.9285\,e^{8\int_0^\infty \sin^2(t)/t^2\,dt}\left(\int_0^\infty\frac{\sin^2(t)}{t^2}\,dt\right)^2+$$
$$12.9285\,e^{16\int_0^\infty \sin^2(t)/t^2\,dt}\left(\int_0^\infty\frac{\sin^2(t)}{t^2}\,dt\right)^2-12.9285\,e^{32\int_0^\infty \sin^2(t)/t^2\,dt}$$
$$\left(\int_0^\infty\frac{\sin^2(t)}{t^2}\,dt\right)^2-12.9285\,e^{40\int_0^\infty \sin^2(t)/t^2\,dt}\left(\int_0^\infty\frac{\sin^2(t)}{t^2}\,dt\right)^2+$$
$$\left.12.9285\,e^{48\int_0^\infty \sin^2(t)/t^2\,dt}\left(\int_0^\infty\frac{\sin^2(t)}{t^2}\,dt\right)^2\right)$$

(π^2/126) 1/((((e^(2Pi/12) / ((((1-e^(-4Pi)) (1-e^(-8Pi)) (1-e^(-12Pi))))) * (0.00037212098-0.000021332944)))))-7

Input interpretation:

$$\frac{\pi^2}{126}\times\frac{1}{\frac{e^{2\times\pi/12}}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})}\,(0.00037212098-0.000021332944)}-7$$

Result:

125.27777...

125.27777… result very near to the Higgs boson mass 125.18 GeV

Alternative representations:

$$\frac{\pi^2}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)126}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})}}-7=-7+\frac{(180^\circ)^2}{\frac{126\left(0.000350788\,e^{(360^\circ)/12}\right)}{\left(1-e^{-2160^\circ}\right)\left(1-e^{-1440^\circ}\right)\left(1-e^{-720^\circ}\right)}}$$

$$\frac{\pi^2}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)126}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})}}-7=-7+\frac{(-i\log(-1))^2}{\frac{126\left(0.000350788\,e^{-2/12\,i\log(-1)}\right)}{\left(1-e^{4\,i\log(-1)}\right)\left(1-e^{8\,i\log(-1)}\right)\left(1-e^{12\,i\log(-1)}\right)}}$$

$$\frac{\pi^2}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)126}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})}}-7=$$
$$\frac{\pi^2}{\frac{\left(\exp^{\frac{2\pi}{12}}(z)\,(0.000372121-0.0000213329)\right)126}{(1-\exp^{-4\pi}(z))(1-\exp^{-8\pi}(z))(1-\exp^{-12\pi}(z))}}-7 \quad \text{for } z=1$$

Integral representations:

$$\frac{\pi^2}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)126}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})}}-7=$$
$$-7\,e^{-145/3\int_0^\infty \sin(t)/t\,dt}\left(e^{145/3\int_0^\infty \sin(t)/t\,dt}+12.9285\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^2-\right.$$
$$12.9285\,e^{8\int_0^\infty \sin(t)/t\,dt}\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^2-12.9285\,e^{16\int_0^\infty \sin(t)/t\,dt}$$
$$\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^2+12.9285\,e^{32\int_0^\infty \sin(t)/t\,dt}\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^2+12.9285$$
$$\left.e^{40\int_0^\infty \sin(t)/t\,dt}\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^2-12.9285\,e^{48\int_0^\infty \sin(t)/t\,dt}\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^2\right)$$

$$\frac{\pi^2}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)126}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})}}-7=$$
$$-7\,e^{-145/3\int_0^\infty 1/(1+t^2)\,dt}\left(e^{145/3\int_0^\infty 1/(1+t^2)\,dt}+12.9285\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^2-12.9285\right.$$
$$e^{8\int_0^\infty 1/(1+t^2)\,dt}\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^2-12.9285\,e^{16\int_0^\infty 1/(1+t^2)\,dt}\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^2+$$
$$12.9285\,e^{32\int_0^\infty 1/(1+t^2)\,dt}\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^2+12.9285\,e^{40\int_0^\infty 1/(1+t^2)\,dt}$$
$$\left.\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^2-12.9285\,e^{48\int_0^\infty 1/(1+t^2)\,dt}\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^2\right)$$

$$\frac{\pi^2}{\frac{\left(e^{(2\pi)/12}\,(0.000372121-0.0000213329)\right)126}{(1-e^{-4\pi})(1-e^{-8\pi})(1-e^{-12\pi})}} - 7 =$$

$$-7\,e^{-145/3\int_0^\infty \sin^2(t)/t^2\,dt}\left(e^{145/3\int_0^\infty \sin^2(t)/t^2\,dt} + 12.9285\left(\int_0^\infty \frac{\sin^2(t)}{t^2}\,dt\right)^2 - 12.9285\,e^{8\int_0^\infty \sin^2(t)/t^2\,dt}\left(\int_0^\infty \frac{\sin^2(t)}{t^2}\,dt\right)^2 - 12.9285\,e^{16\int_0^\infty \sin^2(t)/t^2\,dt}\left(\int_0^\infty \frac{\sin^2(t)}{t^2}\,dt\right)^2 + 12.9285\,e^{32\int_0^\infty \sin^2(t)/t^2\,dt}\left(\int_0^\infty \frac{\sin^2(t)}{t^2}\,dt\right)^2 + 12.9285\,e^{40\int_0^\infty \sin^2(t)/t^2\,dt}\left(\int_0^\infty \frac{\sin^2(t)}{t^2}\,dt\right)^2 - 12.9285\,e^{48\int_0^\infty \sin^2(t)/t^2\,dt}\left(\int_0^\infty \frac{\sin^2(t)}{t^2}\,dt\right)^2\right)$$

Observations

From:
https://www.scientificamerican.com/article/mathematics-ramanujan/?fbclid=IwAR2caRXrn_RpOSvJ1QxWsVLBcJ6KVgd_Af_hrmDYBNyU8mpSjRs1BDeremA

Ramanujan's statement concerned the deceptively simple concept of partitions—the different ways in which a whole number can be subdivided into smaller numbers. Ramanujan's original statement, in fact, stemmed from the observation of patterns, such as the fact that p(9) = 30, p(9 + 5) = 135, p(9 + 10) = 490, p(9 + 15) = 1,575 and so on are all divisible by 5. Note that here the n's come at intervals of five units.

Ramanujan posited that this pattern should go on forever, and that similar patterns exist when 5 is replaced by 7 or 11—there are infinite sequences of p(n) that are all divisible by 7 or 11, or, as mathematicians say, in which the "moduli" are 7 or 11.

Then, in nearly oracular tone Ramanujan went on: "There appear to be corresponding properties," he wrote in his 1919 paper, "in which the moduli are powers of 5, 7 or 11...and no simple properties for any moduli involving primes other than these three." (Primes are whole numbers that are only divisible by themselves or by 1.) Thus, for instance, there should be formulas for an infinity of n's separated by 5^3 = 125 units, saying that the corresponding p(n)'s should all be divisible by 125.
In the past methods developed to understand partitions have later been applied to physics problems such as the theory of the strong nuclear force or the entropy of black holes.

From Wikipedia

In particle physics, Yukawa's interaction or Yukawa coupling, named after Hideki Yukawa, is an interaction between a scalar field ϕ and a Dirac field ψ. The Yukawa interaction can be used to describe the nuclear force between nucleons (which are fermions), mediated by pions (which are pseudoscalar mesons). The Yukawa interaction is also used in the Standard Model to describe the coupling between the Higgs field and massless quark and lepton fields (i.e., the fundamental fermion particles). Through spontaneous symmetry breaking, these fermions acquire a mass proportional to the vacuum expectation value of the Higgs field.

Can be this the motivation that from the development of the Ramanujan's equations we obtain results very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18 GeV and practically equal to the rest mass of Pion meson 139.57 MeV

Note that:

$$g_{22} = \sqrt{(1+\sqrt{2})}.$$

Hence

$$\begin{aligned} 64g_{22}^{24} &= e^{\pi\sqrt{22}} - 24 + 276e^{-\pi\sqrt{22}} - \cdots, \\ 64g_{22}^{-24} &= 4096e^{-\pi\sqrt{22}} + \cdots, \end{aligned}$$

so that

$$64(g_{22}^{24} + g_{22}^{-24}) = e^{\pi\sqrt{22}} - 24 + 4372e^{-\pi\sqrt{22}} + \cdots = 64\{(1+\sqrt{2})^{12} + (1-\sqrt{2})^{12}\}.$$

Hence

$$e^{\pi\sqrt{22}} = 2508951.9982\ldots.$$

Thence:

$$64g_{22}^{-24} \quad - \qquad 4096e^{-\pi\sqrt{22}} + \cdots$$

And

$$64(g_{22}^{24} + g_{22}^{-24}) = e^{\pi\sqrt{22}} - 24 + 4372e^{-\pi\sqrt{22}} + \cdots = 64\{(1+\sqrt{2})^{12} + (1-\sqrt{2})^{12}\}$$

That are connected with 64, 128, 256, 512, 1024 and 4096 = 64^2

(Modular equations and approximations to π - S. Ramanujan - Quarterly Journal of Mathematics, XLV, 1914, 350 – 372)

All the results of the most important connections are signed in blue throughout the drafting of the paper. We highlight as in the development of the various equations we use always the constants π, ϕ, 1/ϕ, the Fibonacci and Lucas numbers, linked to the golden ratio, that play a fundamental role in the development, and therefore, in the final results of the analyzed expressions.

In mathematics, the Fibonacci numbers, commonly denoted F_n, form a sequence, called the Fibonacci sequence, such that each number is the sum of the two preceding ones, starting from 0 and 1. Fibonacci numbers are strongly related to the golden ratio: Binet's formula expresses the nth Fibonacci number in terms of n and the golden ratio, and implies that the ratio of two consecutive Fibonacci numbers tends to the golden ratio as n increases.
Fibonacci numbers are also closely related to Lucas numbers ,in that the Fibonacci and Lucas numbers form a complementary pair of Lucas sequences

The beginning of the sequence is thus:

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610, 987, 1597, 2584, 4181, 6765, 10946, 17711, 28657, 46368, 75025, 121393, 196418, 317811, 514229, 832040, 1346269, 2178309, 3524578, 5702887, 9227465, 14930352, 24157817, 39088169, 63245986, 102334155...

The Lucas numbers or Lucas series are an integer sequence named after the mathematician François Édouard Anatole Lucas (1842–91), who studied both that sequence and the closely related Fibonacci numbers. Lucas numbers and Fibonacci numbers form complementary instances of Lucas sequences.

The Lucas sequence has the same recursive relationship as the Fibonacci sequence, where each term is the sum of the two previous terms, but with different starting values. This produces a sequence where the ratios of successive terms approach the golden ratio, and in fact the terms themselves are roundings of integer powers of the golden ratio.[1] The sequence also has a variety of relationships with the Fibonacci numbers, like the fact that adding any two Fibonacci numbers two terms apart in the Fibonacci sequence results in the Lucas number in between.

The sequence of Lucas numbers is:

2, 1, 3, 4, 7, 11, 18, 29, 47, 76, 123, 199, 322, 521, 843, 1364, 2207, 3571, 5778, 9349, 15127, 24476, 39603, 64079, 103682, 167761, 271443, 439204, 710647, 1149851, 1860498, 3010349, 4870847, 7881196, 12752043, 20633239, 33385282, 54018521, 87403803……

All Fibonacci-like integer sequences appear in shifted form as a row of the Wythoff array; the Fibonacci sequence itself is the first row and the Lucas sequence is the second row. Also like all Fibonacci-like integer sequences, the ratio between two consecutive Lucas numbers converges to the golden ratio.

A Lucas prime is a Lucas number that is prime. The first few Lucas primes are:

2, 3, 7, 11, 29, 47, 199, 521, 2207, 3571, 9349, 3010349, 54018521, 370248451, 6643838879, ... (sequence A005479 in the OEIS).

In geometry, a golden spiral is a logarithmic spiral whose growth factor is φ, the golden ratio.[1] That is, a golden spiral gets wider (or further from its origin) by a factor of φ for every quarter turn it makes. Approximate logarithmic spirals can

occur in nature, for example the arms of spiral galaxies[3] - golden spirals are one special case of these logarithmic spirals

We observe that 1728 and 1729 are results very near to the mass of candidate glueball **f_0(1710) scalar 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 (taxicab number).

Furthermore, we obtain as results of our computations, always values very near to the Higgs boson mass 125.18 GeV and practically equals to the rest mass of Pion meson 139.57 MeV. In conclusion we obtain also many results that are very good approximations to the value of the golden ratio 1.618033988749... and to ζ(2) = $\frac{\pi^2}{6} = 1.644934 \ldots$

We note how the following three values: 137.508 (golden angle), 139.57 (mass of the Pion - meson Pi) and 125.18 (mass of the Higgs boson), are connected to each other. In fact, just add 2 to 137.508 to obtain a result very close to the mass of the Pion and subtract 12 to 137.508 to obtain a result that is also very close to the mass of the Higgs boson. We can therefore hypothesize that it is the golden angle (and the related golden ratio inherent in it) to be a fundamental ingredient both in the structures of the microcosm and in those of the macrocosm.

References

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