On the Ramanujan's Mock ϑ-functions of his last letter: mathematical connections with some sectors of Particle Physics, Cosmology, some expressions concerning Monster Group, Black Hole entropies and hypothetical mass of Dark Matter particles.

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Abstract

In this research paper we have obtained some interesting mathematical connections between the Mock Theta functions of the Ramanujan's last letter and some sectors of Particle Physics, Cosmology and some expressions concerning the Monster Group, the Black Hole entropies and the hypothetical mass of Dark Matter particles

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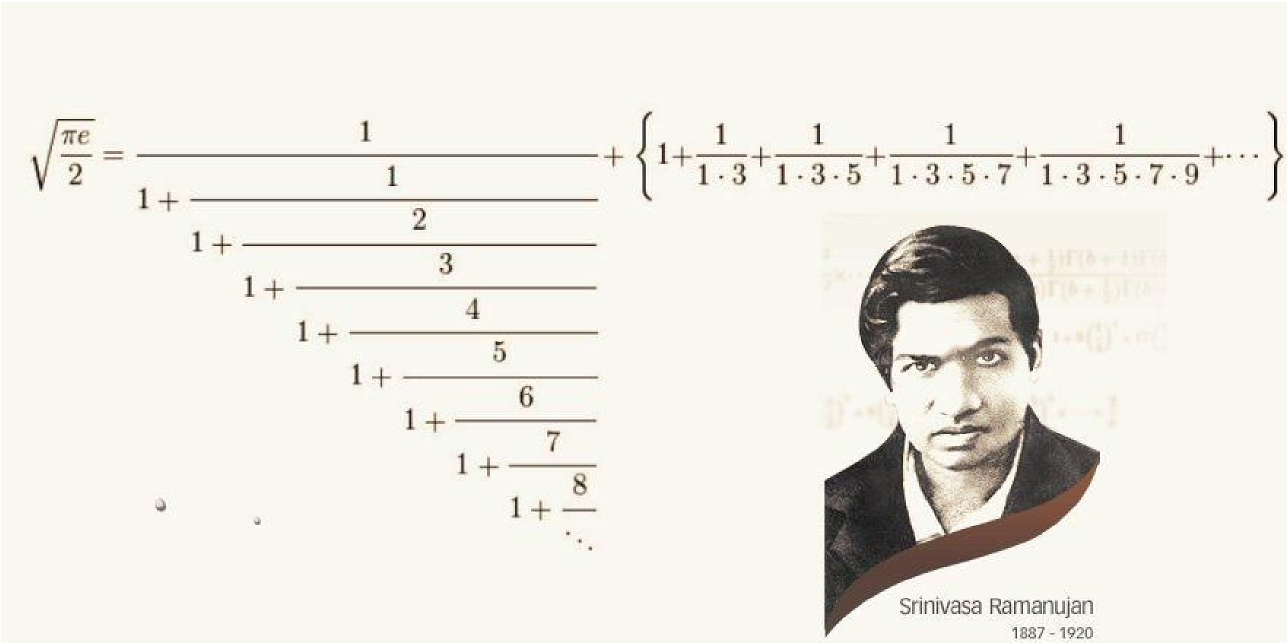

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From the Ramanujan's last letter:

"I am extremely sorry for not writing you a single letter up to now . . . I discovered very interesting functions recently which I call "Mock" ϑ-functions. Unlike the "False" ϑ-functions (studied partially by Prof. Rogers in his interesting paper) they enter into mathematics as beautifully as the ordinary ϑ-function. I am sending you with this letter some examples . . .
If we consider a ϑ-function in the transformed Eulerian form e.g...".

Analysis of the various mock theta functions and new mathematical connections with some sectors of physics

For the equation (C) (PAGE 1), we have that:

(((sqrt(0.12/(2sqrt(5))) exp[(Pi^2/(5*0.12)) + 0.12*1/(8sqrt(5))+0.0144*1/(8sqrt(5))+0.001728*1/(8sqrt(5))))))] * (0.257602862254+0.0144) *10^5

Input interpretation:

$$\sqrt{\frac{0.12}{2\sqrt{5}}}\exp\left(\frac{\pi^2}{5\times 0.12}+0.12\times\frac{1}{8\sqrt{5}}+0.0144\times\frac{1}{8\sqrt{5}}+0.001728\times\frac{1}{8\sqrt{5}}\right)(0.257602862254+0.0144)\times 10^5$$

Result:

$$6.25273\ldots\times 10^{10}$$

Series representations:

$$\sqrt{\frac{0.12}{2\sqrt{5}}}\exp\left(\frac{\pi^2}{5\times 0.12}+\frac{0.12}{8\sqrt{5}}+\frac{0.0144}{8\sqrt{5}}+\frac{0.001728}{8\sqrt{5}}\right)(0.2576028622540000+0.0144)\,10^5 = 27\,200.3\exp\left(1.66667\pi^2+\frac{0.017016}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}}\right)\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{0.06}{\sqrt{5}}-z_0\right)^k z_0^{-k}}{k!}\quad\text{for not }((z_0\in\mathbb{R}\text{ and }-\infty<z_0\le 0))$$

$$\sqrt{\frac{0.12}{2\sqrt{5}}}\exp\left(\frac{\pi^2}{5\times 0.12}+\frac{0.12}{8\sqrt{5}}+\frac{0.0144}{8\sqrt{5}}+\frac{0.001728}{8\sqrt{5}}\right)(0.2576028622540000+0.0144)\,10^5 = 27\,200.3\exp\left(i\pi\left\lfloor\frac{\arg\left(-x+\frac{0.06}{\sqrt{5}}\right)}{2\pi}\right\rfloor\right)\exp\left(1.66667\pi^2+\frac{0.017016}{\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k x^{-k}\left(-\frac{1}{2}\right)_k\left(-x+\frac{0.06}{\sqrt{5}}\right)^k}{k!}\quad\text{for }(x\in\mathbb{R}\text{ and }x<0)$$

$$\sqrt{\frac{0.12}{2\sqrt{5}}}\exp\left(\frac{\pi^2}{5\times 0.12}+\frac{0.12}{8\sqrt{5}}+\frac{0.0144}{8\sqrt{5}}+\frac{0.001728}{8\sqrt{5}}\right)(0.2576028622540000+0.0144)\,10^5 = 27200.3\exp\left(1.66667\pi^2+\frac{0.017016\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor} z_0^{-1/2-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}}{\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}}\right)\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{0.06}{\sqrt{5}}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2+1/2\left\lfloor\arg\left(\frac{0.06}{\sqrt{5}}-z_0\right)/(2\pi)\right\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{0.06}{\sqrt{5}}-z_0\right)^k z_0^{-k}}{k!}$$

$$\sqrt{\frac{0.12}{2\sqrt{5}}}\exp\left(\frac{\pi^2}{5\times 0.12}+\frac{0.12}{8\sqrt{5}}+\frac{0.0144}{8\sqrt{5}}+\frac{0.001728}{8\sqrt{5}}\right)(0.2576028622540000+0.0144)\,10^5 = 27200.3\exp\left(1.66667\pi^2+\frac{0.017016\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor} z_0^{1/2(-1-\lfloor\arg(5-z_0)/(2\pi)\rfloor)}}{\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}}\right)\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{0.06}{\sqrt{5}}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2+1/2\left\lfloor\arg\left(\frac{0.06}{\sqrt{5}}-z_0\right)/(2\pi)\right\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{0.06}{\sqrt{5}}-z_0\right)^k z_0^{-k}}{k!}$$

Where 1/(8√5) = 0,0559; 0.0559 * 0.12 = 0,006708; 0.001728 / 0.006708 = 0,257602862254; 0.257602862254 + 0.0144

and:

(1+(e^-0.12)/(1-e^-0.12)^2+(e^-0.12)^3/((1-e^-0.12)^2(1-e^-0.12^2)^2)+(e^-0.12)^6/((1-e^-0.12)^2(1-e^-0.12^2)^2(1-e^-0.12^3)^2))

Input:

$$1+\frac{1}{e^{0.12}\left(1-\frac{1}{e^{0.12}}\right)^2}+\frac{\left(\frac{1}{e^{0.12}}\right)^3}{\left(1-\frac{1}{e^{0.12}}\right)^2\left(1-e^{-0.12^2}\right)^2}+\frac{\left(\frac{1}{e^{0.12}}\right)^6}{\left(1-\frac{1}{e^{0.12}}\right)^2\left(1-e^{-0.12^2}\right)^2\left(1-e^{-0.12^3}\right)^2}$$

Result:

$6.24778\ldots\times 10^{10}$

Alternative representation:

$$1+\frac{1}{e^{0.12}\left(1-\frac{1}{e^{0.12}}\right)^2}+\frac{\left(\frac{1}{e^{0.12}}\right)^3}{\left(1-\frac{1}{e^{0.12}}\right)^2\left(1-e^{-0.12^2}\right)^2}+\frac{\left(\frac{1}{e^{0.12}}\right)^6}{\left(1-\frac{1}{e^{0.12}}\right)^2\left(1-e^{-0.12^2}\right)^2\left(1-e^{-0.12^3}\right)^2}=$$

$$1+\frac{1}{\exp^{0.12}(z)\left(1-\frac{1}{\exp^{0.12}(z)}\right)^2}+\frac{\left(\frac{1}{\exp^{0.12}(z)}\right)^3}{\left(1-\frac{1}{\exp^{0.12}(z)}\right)^2\left(1-\exp^{-0.12^2}(z)\right)^2}+\frac{\left(\frac{1}{\exp^{0.12}(z)}\right)^6}{\left(1-\frac{1}{\exp^{0.12}(z)}\right)^2\left(1-\exp^{-0.12^2}(z)\right)^2\left(1-\exp^{-0.12^3}(z)\right)^2}\quad \text{for } z=1$$

Series representations:

$$1+\frac{1}{e^{0.12}\left(1-\frac{1}{e^{0.12}}\right)^2}+\frac{\left(\frac{1}{e^{0.12}}\right)^3}{\left(1-\frac{1}{e^{0.12}}\right)^2\left(1-e^{-0.12^2}\right)^2}+\frac{\left(\frac{1}{e^{0.12}}\right)^6}{\left(1-\frac{1}{e^{0.12}}\right)^2\left(1-e^{-0.12^2}\right)^2\left(1-e^{-0.12^3}\right)^2}=$$

$$1+\frac{1}{\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.12}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.0144}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.001728}}\right)^2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.72}}+\frac{1}{\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.12}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.0144}}\right)^2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.36}}+\frac{1}{\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.12}}\right)^2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.12}}$$

$$1+\frac{1}{e^{0.12}\left(1-\frac{1}{e^{0.12}}\right)^2}+\frac{\left(\frac{1}{e^{0.12}}\right)^3}{\left(1-\frac{1}{e^{0.12}}\right)^2\left(1-e^{-0.12^2}\right)^2}+\frac{\left(\frac{1}{e^{0.12}}\right)^6}{\left(1-\frac{1}{e^{0.12}}\right)^2\left(1-e^{-0.12^2}\right)^2\left(1-e^{-0.12^3}\right)^2}=1+\frac{1.64718}{\left(1-\frac{1.08673}{\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.12}}\right)^2\left(1-\frac{1.01003}{\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.0144}}\right)^2\left(1-\frac{1.0012}{\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.001728}}\right)^2\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.72}}+\frac{1.28343}{\left(1-\frac{1.08673}{\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.12}}\right)^2\left(1-\frac{1.01003}{\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.0144}}\right)^2\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.36}}+\frac{1.08673}{\left(1-\frac{1.08673}{\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.12}}\right)^2\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.12}}$$

$$1+\frac{1}{e^{0.12}\left(1-\frac{1}{e^{0.12}}\right)^2}+\frac{\left(\frac{1}{e^{0.12}}\right)^3}{\left(1-\frac{1}{e^{0.12}}\right)^2\left(1-e^{-0.12^2}\right)^2}+\frac{\left(\frac{1}{e^{0.12}}\right)^6}{\left(1-\frac{1}{e^{0.12}}\right)^2\left(1-e^{-0.12^2}\right)^2\left(1-e^{-0.12^3}\right)^2}=1+1\Bigg/\left(\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.12}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.0144}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.001728}}\right)^2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.72}\right)+\frac{1}{\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.12}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.0144}}\right)^2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.36}}+\frac{1}{\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.12}}\right)^2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.12}}$$

Note that:

27+1.08346Pi * (6.24778 × 10^10)^1/4

Input interpretation:

$$27 + 1.08346\,\pi \sqrt[4]{6.24778 \times 10^{10}}$$

Open code

Result:

- More digits

$1728.74\ldots$

This result is very near to the mass of $f_0(1710)$ candidate glueball

Continued fraction:

- Linear form

$$1728 + \cfrac{1}{1 + \cfrac{1}{2 + \cfrac{1}{1 + \cfrac{1}{9 + \cfrac{1}{2 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{8 + \cfrac{1}{1 + \cfrac{1}{15 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{2 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{5 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Possible closed forms:

- More

$$-751 + \frac{317}{2\pi} - \frac{564}{\sqrt{\pi}} + 1660\sqrt{\pi} - 62\pi \approx 1728.743839819785700130293$$

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$$\frac{197929 + 175699\,e - 4931\,e^2}{136\,e} \approx 1728.743839819785700114109$$

$$\frac{17390\,e\,e! + 12387 + 10307\,e + 344\,e^2}{52\,e} \approx 1728.74383981978570012178461$$

1/72 * [27+1.08346Pi * (6.24778 × 10^10)^1/4]

Input interpretation:

$$\frac{1}{72}\left(27 + 1.08346\,\pi \sqrt[4]{6.24778 \times 10^{10}}\right)$$

Open code

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Result:

- Fewer digits
- More digits

24.01033110860813472390890291088494296531517821201400679205...

This result 24,01033 is practically equal to 24, are the physical degrees of freedom of the bosonic string, that are the 24 transverse coordinates.

Continued fraction:

- Linear form

$$24+\cfrac{1}{96+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{17+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{10+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{44+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Possible closed forms:

- More

$$\frac{9712717865\,\pi}{1270844744} \approx 24.01033110860813472339648$$

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$\text{root of } 36x^5 - 898x^4 + 829x^3 - 528x^2 + 200x + 899 \text{ near } x = 24.0103 \approx$ 24.01033110860813472279547

$\pi \; \text{root of } 462x^4 - 4296x^3 + 5639x^2 + 2440x - 6490 \text{ near } x = 7.64273 \approx$ 24.01033110860813472375750

1/(sqrt(5)) * [27+1.08346Pi * (6.24778 × 10^10)^1/4]

Input interpretation:

$$\frac{1}{\sqrt{5}}\left(27 + 1.08346\,\pi\,\sqrt[4]{6.24778\times 10^{10}}\right)$$

Open code

Result:

- More digits

773.118...

This value 773,118 is very near to the rest mass of Charged rho meson

Continued fraction:

- Linear form

$$773+\cfrac{1}{8+\cfrac{1}{2+\cfrac{1}{33+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{148+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}$$

1/(137*3) * [27+1.08346Pi * (6.24778 × 10^10)^1/4]

Input interpretation:

$$\frac{1}{137\times 3}\left(27+1.08346\,\pi\,\sqrt[4]{6.24778\times 10^{10}}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

4.206189391289016301998639925994442563266892533491504839483...

This result 4,20618 is in the range of the mass of hypothetical dark matter particles

Continued fraction:

- Linear form

$$4+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{27+\cfrac{1}{7+\cfrac{1}{17+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{51+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}$$

2Pi * (0.663723)^2 [(6.24778 × 10^10)^1/4]

Input interpretation:

$$2\pi \times 0.663723^2 \sqrt[4]{6.24778 \times 10^{10}}$$

Open code

Result:

- More digits

1383.84...

This result 1383,84 is practically equal to the rest mass of Sigma baryon

1383.8373099004053208878518213417159831225513162043778

Continued fraction:

- Linear form

$$1383+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{15+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{30+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

1/2 (ln 6.24778 × 10^10)

Input interpretation:

$$\frac{1}{2}\log(6.24778\times 10^{10})$$

Result:

12.42904...

This result 12,42904 is very near to the value of black hole entropy (see Tables)

Possible closed forms:

$$-e^{-2+1/e+3/\pi+\pi}\cot(e\,\pi)\csc(e\,\pi)\approx 12.429039177$$

$$6+2\sqrt{\frac{31}{3}}\approx 12.42910050$$

$$\frac{724\,\pi}{183}\approx 12.429033230$$

Continued fraction:

- Linear form

$$12+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{43+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}$$

And

1/6 ln 6.24778 × 10^10

Input interpretation:

$$\frac{1}{6}\log(6.24778\times10^{10})$$

Result:

4.143013...

This result 4,143013 is in the range of the mass of hypothetical dark matter particles

Continued fraction:

- Linear form

$$4+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{130+\cfrac{1}{11+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{\ldots}}}}}}}$$

Note that from the previously expression, if we replaced $\frac{\pi^2}{5}$ with $\frac{\pi^2}{6}$ and 27 with 42, we obtain:

(((sqrt(0.12/(2sqrt(5))) exp[(Pi^2/(6*0.12)) + 0.12*1/(8sqrt(5))+0.0144*1/(8sqrt(5))+0.001728*1/(8sqrt(5))))))] * 42*10^4

Input interpretation:

$$\sqrt{\frac{0.12}{2\sqrt{5}}}\exp\left(\frac{\pi^2}{6\times0.12}+0.12\times\frac{1}{8\sqrt{5}}+0.0144\times\frac{1}{8\sqrt{5}}+0.001728\times\frac{1}{8\sqrt{5}}\right)\times42\times10^4$$

Result:

$6.22447... \times 10^{10}$

(((sqrt(0.12/(2sqrt(5))) exp[(Pi^2/(6*0.12)) + 0.12*1/(8sqrt(5))+0.0144*1/(8sqrt(5))+0.001728*1/(8sqrt(5))))))] * 42*10^4) / (37840240076.77331293157064141904)

we can to obtain

$$\frac{\pi^2}{6} = \zeta(2) = 1.644934066848226436472415166646025189218949901206798437735...$$

Input interpretation:

$$\frac{\sqrt{\frac{0.12}{2\sqrt{5}}}\,\exp\left(\frac{\pi^2}{6\times 0.12}+0.12\times\frac{1}{8\sqrt{5}}+0.0144\times\frac{1}{8\sqrt{5}}+0.001728\times\frac{1}{8\sqrt{5}}\right)\times 42\times 10^4}{3.784024007677331293157064141904\times 10^{10}}$$

Result:

1.64493...

Result:

- More digits
  1.644934066848226475081076911228437646701217835062251517803...

Or:

(((sqrt(0.12/(2sqrt(5))) exp[(Pi^2/(6*0.12)) + 0.12*1/(8sqrt(5))+0.0144*1/(8sqrt(5))+0.001728*1/(8sqrt(5))))))] * 42*10^4) / (196884 - 1728.32026394733275450092328764-576-54)^2

Input interpretation:

$$\frac{\sqrt{\frac{0.12}{2\sqrt{5}}}\,\exp\left(\frac{\pi^2}{6\times 0.12}+0.12\times\frac{1}{8\sqrt{5}}+0.0144\times\frac{1}{8\sqrt{5}}+0.001728\times\frac{1}{8\sqrt{5}}\right)\times 42\times 10^4}{(196\,884-1728.32026394733275450092328764-576-54)^2}$$

Result:

1.64493...

Possible closed forms:

$$\frac{\pi^2}{6} \approx 1.644934066848226436472$$

$$\zeta(2) \approx 1.644934066848226436472$$

Considering t = 0.14, $\exp^2$ and $\frac{\pi^2}{5}$, we obtain:

Input interpretation:

$$\sqrt{\frac{0.14}{2\sqrt{5}}} \times 0.028 \exp^2\left(\frac{\pi^2}{5\times 0.14} + 0.14\times\frac{1}{8\sqrt{5}} + 0.0196\times\frac{1}{8\sqrt{5}} + 0.002744\times\frac{1}{8\sqrt{5}} + 0.00038416\times\frac{1}{8\sqrt{5}} + 0.0000537824\times\frac{1}{8\sqrt{5}}\right)$$

Result:

- More digits
  8.901886223482068850893548668551715783365155358289911 83... × 10^9

Series representations:

$$\sqrt{\frac{0.14}{2\sqrt{5}}}\, 0.028 \exp^2\left(\frac{\pi^2}{5\times 0.14} + \frac{0.14}{8\sqrt{5}} + \frac{0.0196}{8\sqrt{5}} + \frac{0.002744}{8\sqrt{5}} + \frac{0.00038416}{8\sqrt{5}} + \frac{0.0000537824}{8\sqrt{5}}\right) = 0.028 \exp^2\left(1.42857\pi^2 + \frac{0.0203477}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (5-z_0)^k z_0^{-k}}{k!}}\right)\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{0.07}{\sqrt{5}}-z_0\right)^k z_0^{-k}}{k!} \quad \text{for not } ((z_0 \in \mathbb{R} \text{ and } -\infty < z_0 \le 0))$$

$$\sqrt{\frac{0.14}{2\sqrt{5}}}\, 0.028 \exp^2\left(\frac{\pi^2}{5\times 0.14} + \frac{0.14}{8\sqrt{5}} + \frac{0.0196}{8\sqrt{5}} + \frac{0.002744}{8\sqrt{5}} + \frac{0.00038416}{8\sqrt{5}} + \frac{0.0000537824}{8\sqrt{5}}\right) = 0.028 \exp\left(i\pi\left\lfloor\frac{\arg\left(-x+\frac{0.07}{\sqrt{5}}\right)}{2\pi}\right\rfloor\right) \exp^2\left(1.42857\pi^2 + \frac{0.0203477}{\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k (5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k x^{-k}\left(-\frac{1}{2}\right)_k\left(-x+\frac{0.07}{\sqrt{5}}\right)^k}{k!} \quad \text{for } (x \in \mathbb{R} \text{ and } x < 0)$$

$$\sqrt{\frac{0.14}{2\sqrt{5}}}\;0.028\;\exp^2\left(\frac{\pi^2}{5\times 0.14}+\frac{0.14}{8\sqrt{5}}+\frac{0.0196}{8\sqrt{5}}+\frac{0.002744}{8\sqrt{5}}+\frac{0.00038416}{8\sqrt{5}}+\frac{0.0000537824}{8\sqrt{5}}\right)=$$

$$0.028\exp^2\left(1.42857\pi^2+\frac{0.0203477\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor} z_0^{-1/2-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}}{\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}}\right)$$

$$\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{0.07}{\sqrt{5}}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2+1/2\left\lfloor\arg\left(\frac{0.07}{\sqrt{5}}-z_0\right)/(2\pi)\right\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{0.07}{\sqrt{5}}-z_0\right)^k z_0^{-k}}{k!}$$

$$\sqrt{\frac{0.14}{2\sqrt{5}}}\;0.028\;\exp^2\left(\frac{\pi^2}{5\times 0.14}+\frac{0.14}{8\sqrt{5}}+\frac{0.0196}{8\sqrt{5}}+\frac{0.002744}{8\sqrt{5}}+\frac{0.00038416}{8\sqrt{5}}+\frac{0.0000537824}{8\sqrt{5}}\right)=$$

$$0.028\exp^2\left(1.42857\pi^2+\frac{0.0203477\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor} z_0^{1/2(-1-\lfloor\arg(5-z_0)/(2\pi)\rfloor)}}{\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}}\right)$$

$$\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{0.07}{\sqrt{5}}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2+1/2\left\lfloor\arg\left(\frac{0.07}{\sqrt{5}}-z_0\right)/(2\pi)\right\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{0.07}{\sqrt{5}}-z_0\right)^k z_0^{-k}}{k!}$$

Note that:

(8.90189 × 10^9)^1/9

Input interpretation:

$$\sqrt[9]{8.90189\times 10^9}$$

Result:

12.74964...

This result 12,74964 is very near to the value of black hole entropy (see Tables)

(13*5) (8.90189 × 10^9)^1/7

Input interpretation:

$$(13 \times 5) \sqrt[7]{8.90189 \times 10^9}$$

Result:

1715.015...

This result 1715,015 is very near to the mass of $f_0(1710)$ candidate glueball

(53) (8.90189 × 10^9)^1/7

Input interpretation:

$$53 \sqrt[7]{8.90189 \times 10^9}$$

Result:

1398.397...

This result 1398,397 is a good approximation to the rest mass of Sigma baryon

(29) (8.90189 × 10^9)^1/7

Input interpretation:

$$29 \sqrt[7]{8.90189 \times 10^9}$$

Result:

765.1606...

This value 765,1606 is very near to the rest mass of Charged rho meson

$(8901886223{,}482)^{1/16} = 4{,}18641837028$

$(8901886223{,}482)^{1/46} = 1{,}645481817826$ value very near to the $\frac{\pi^2}{6} = \zeta(2) =$ 1.644934066848226436472415166646025189218949901206798437735...

Obviously, all the results can be represented with infinite continued fractions

And

Input:

$$1+\frac{1}{e^{0.14}\left(1-\frac{1}{e^{0.14}}\right)^2}+\frac{\left(\frac{1}{e^{0.14}}\right)^3}{\left(1-\frac{1}{e^{0.14}}\right)^2\left(1-e^{-0.14^2}\right)^2}+\frac{\left(\frac{1}{e^{0.14}}\right)^6}{\left(1-\frac{1}{e^{0.14}}\right)^2\left(1-e^{-0.14^2}\right)^2\left(1-e^{-0.14^3}\right)^2}$$

Result:

$$8.94217\ldots\times 10^9$$

Alternative representation:

$$1+\frac{1}{e^{0.14}\left(1-\frac{1}{e^{0.14}}\right)^2}+\frac{\left(\frac{1}{e^{0.14}}\right)^3}{\left(1-\frac{1}{e^{0.14}}\right)^2\left(1-e^{-0.14^2}\right)^2}+\frac{\left(\frac{1}{e^{0.14}}\right)^6}{\left(1-\frac{1}{e^{0.14}}\right)^2\left(1-e^{-0.14^2}\right)^2\left(1-e^{-0.14^3}\right)^2}=$$

$$1+\frac{1}{\exp^{0.14}(z)\left(1-\frac{1}{\exp^{0.14}(z)}\right)^2}+\frac{\left(\frac{1}{\exp^{0.14}(z)}\right)^3}{\left(1-\frac{1}{\exp^{0.14}(z)}\right)^2\left(1-\exp^{-0.14^2}(z)\right)^2}+\frac{\left(\frac{1}{\exp^{0.14}(z)}\right)^6}{\left(1-\frac{1}{\exp^{0.14}(z)}\right)^2\left(1-\exp^{-0.14^2}(z)\right)^2\left(1-\exp^{-0.14^3}(z)\right)^2}\quad\text{for } z=1$$

Series representations:

$$1+\frac{1}{e^{0.14}\left(1-\frac{1}{e^{0.14}}\right)^2}+\frac{\left(\frac{1}{e^{0.14}}\right)^3}{\left(1-\frac{1}{e^{0.14}}\right)^2\left(1-e^{-0.14^2}\right)^2}+\frac{\left(\frac{1}{e^{0.14}}\right)^6}{\left(1-\frac{1}{e^{0.14}}\right)^2\left(1-e^{-0.14^2}\right)^2\left(1-e^{-0.14^3}\right)^2}=$$

$$1+\frac{1}{\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.14}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.0196}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.002744}}\right)^2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.84}}+\frac{1}{\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.14}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.0196}}\right)^2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.42}}+\frac{1}{\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.14}}\right)^2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.14}}$$

$$1+\frac{1}{e^{0.14}\left(1-\frac{1}{e^{0.14}}\right)^2}+\frac{\left(\frac{1}{e^{0.14}}\right)^3}{\left(1-\frac{1}{e^{0.14}}\right)^2\left(1-e^{-0.14^2}\right)^2}+\frac{\left(\frac{1}{e^{0.14}}\right)^6}{\left(1-\frac{1}{e^{0.14}}\right)^2\left(1-e^{-0.14^2}\right)^2\left(1-e^{-0.14^3}\right)^2}=$$

$$1+1.79005\Bigg/\left(\left(-1.0019+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.002744}\right)^2\left(-1.01368+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.0196}\right)^2\left(-1.10191+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.14}\right)^2\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.515312}\right)+\frac{1.33793}{\left(-1.01368+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.0196}\right)^2\left(-1.10191+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.14}\right)^2\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.1008}}+\frac{1.10191\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.14}}{\left(-1.10191+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.14}\right)^2}$$

$$1+\frac{1}{e^{0.14}\left(1-\frac{1}{e^{0.14}}\right)^2}+\frac{\left(\frac{1}{e^{0.14}}\right)^3}{\left(1-\frac{1}{e^{0.14}}\right)^2\left(1-e^{-0.14^2}\right)^2}+\frac{\left(\frac{1}{e^{0.14}}\right)^6}{\left(1-\frac{1}{e^{0.14}}\right)^2\left(1-e^{-0.14^2}\right)^2\left(1-e^{-0.14^3}\right)^2}=$$

$$1+1\Bigg/\left(\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.14}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.0196}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.002744}}\right)^2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.84}\right)+\frac{1}{\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.14}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.0196}}\right)^2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.42}}+\frac{1}{\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.14}}\right)^2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.14}}$$

Now, we have, from (A) and (B) (PAGE 1):

sqrt((0.12)/(2Pi)) * exp(Pi^2/0.72-0.12/24)

Input:

$$\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)$$

Open code

Result:

- More digits

$1.23465\ldots \times 10^5$

Series representations:

- More

$$\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)=\exp\left(-0.005+1.38889\,\pi^2\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+\frac{0.06}{\pi}\right)^k\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

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$$\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)=$$
$$\exp\left(-0.005+1.38889\,\pi^2\right)\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{0.06}{\pi}-z_0\right)^k z_0^{-k}}{k!}$$
$$\text{for not }\left(\left(z_0\in\mathbb{R}\text{ and }-\infty<z_0\le 0\right)\right)$$

Open code

$$\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)=\exp\left(-0.005+1.38889\,\pi^2\right)\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{0.06}{\pi}-x\right)}{2\pi}\right\rfloor\right)$$
$$\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{0.06}{\pi}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\quad\text{for }(x\in\mathbb{R}\text{ and }x<0)$$

Continued fraction:

- Linear form

$$123465+\cfrac{1}{13+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}$$

exp(Pi^2/(15*0.72)-0.12/60) /(sqrt((5-sqrt(5))/2)

Input:

$$\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}$$

Open code

Result:

- Fewer digits
- More digits

2.117208961660161995731773296803025758360626158670675011836...

Series representations:

- More

$$\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}=\frac{\exp\left(-0.002+0.0925926\,\pi^2\right)}{\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k\left(3-\sqrt{5}\right)^k}{k!}}$$

Open code

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$$\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}=\frac{\exp\left(-0.002+0.0925926\,\pi^2\right)}{\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k\left(5-\sqrt{5}-2\,z_0\right)^k z_0^{-k}}{k!}}$$

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

Open code

$$\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}} = -\frac{2\exp\left(-0.002+0.0925926\,\pi^2\right)\sqrt{\pi}}{\sum_{j=0}^{\infty}\mathrm{Res}_{s=-j}\,2^s\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\left(3-\sqrt{5}\right)^{-s}}$$

Continued fraction:

- Linear form

$$2+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{63+\cfrac{1}{14+\cfrac{1}{11+\cfrac{1}{2+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{4+\cfrac{1}{6+\cfrac{1}{4+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Now:

ln(((((((((((((sqrt((0.12)/(2Pi)) * exp(Pi^2/0.72-0.12/24) * exp(Pi^2/(15*0.72)-0.12/60) /(sqrt((5-sqrt(5))/2)))))))))))))

Input:

$$\log\left(\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)\times\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- Fewer digits
- More digits

12.47381228287857112805891354242198544545804851258009386702...

This result 12,4738 is very near to the value of black hole entropy (see Tables)

Alternative representations:

$$\log\left(\frac{\left(\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)\right)\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right) =$$

$$\log_e\left(\frac{\exp\left(-\frac{0.12}{24}+\frac{\pi^2}{0.72}\right)\exp\left(-\frac{0.12}{60}+\frac{\pi^2}{10.8}\right)\sqrt{\frac{0.12}{2\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)$$

Open code

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$$\log\left(\frac{\left(\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)\right)\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right) =$$

$$\log(a)\log_a\left(\frac{\exp\left(-\frac{0.12}{24}+\frac{\pi^2}{0.72}\right)\exp\left(-\frac{0.12}{60}+\frac{\pi^2}{10.8}\right)\sqrt{\frac{0.12}{2\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)$$

Series representation:

$$\log\left(\frac{\left(\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)\right)\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right) =$$

$$\log\left(-1+\frac{\exp\left(-0.002+0.0925926\,\pi^2\right)\exp\left(-0.005+1.38889\,\pi^2\right)\sqrt{\frac{0.06}{\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right) - \sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\exp\left(-0.002+0.0925926\pi^2\right)\exp\left(-0.005+1.38889\pi^2\right)\sqrt{\frac{0.06}{\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)^{-k}}{k}$$

Integral representations:

$$\log\left(\frac{\left(\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)\right)\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)=\int_1^{\frac{\exp(-0.002+0.0925926\pi^2)\exp(-0.005+1.38889\pi^2)\sqrt{\frac{0.06}{\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}\frac{1}{t}\,dt$$

Open code

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$$\log\left(\frac{\left(\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)\right)\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)=\frac{1}{2i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)\left(-1+\frac{\exp(-0.002+0.0925926\pi^2)\exp(-0.005+1.38889\pi^2)\sqrt{\frac{0.06}{\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)^{-s}}{\Gamma(1-s)}\,ds$$

for $-1<\gamma<0$

Continued fraction:

- Linear form

$$12+\cfrac{1}{2+\cfrac{1}{9+\cfrac{1}{21+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{10+\cfrac{1}{93+\cfrac{1}{5+\cfrac{1}{11+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{5+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{6+\cfrac{1}{12+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}$$

1/3 ln(((sqrt((0.12)/(2Pi)) * exp(Pi^2/0.72-0.12/24) * exp(Pi^2/(15*0.72)-0.12/60) /(sqrt((5-sqrt(5))/2)))

Input:

$$\frac{1}{3}\log\left(\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)\times\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- Fewer digits
- More digits

4.157937427626190376019637847473995148486016170860031289009...

This result 4,1579 is in the range of the mass of hypothetical dark matter particles

Alternative representations:

$$\frac{1}{3}\log\left(\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)=$$
$$\frac{1}{3}\log_e\left(\frac{\exp\left(-\frac{0.12}{24}+\frac{\pi^2}{0.72}\right)\exp\left(-\frac{0.12}{60}+\frac{\pi^2}{10.8}\right)\sqrt{\frac{0.12}{2\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)$$

Open code

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$$\frac{1}{3}\log\left(\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)=$$
$$\frac{1}{3}\log(a)\log_a\left(\frac{\exp\left(-\frac{0.12}{24}+\frac{\pi^2}{0.72}\right)\exp\left(-\frac{0.12}{60}+\frac{\pi^2}{10.8}\right)\sqrt{\frac{0.12}{2\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)$$

Series representation:

$$\frac{1}{3}\log\left(\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)\exp\left(\frac{\pi^2}{15\times0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)=$$

$$\frac{1}{3}\log\left(-1+\frac{\exp(-0.002+0.0925926\,\pi^2)\exp(-0.005+1.38889\,\pi^2)\sqrt{\frac{0.06}{\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)-$$

$$\frac{1}{3}\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\exp(-0.002+0.0925926\pi^2)\exp(-0.005+1.38889\pi^2)\sqrt{\frac{0.06}{\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)^{-k}}{k}$$

Open code

Integral representations:

$$\frac{1}{3}\log\left(\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)\exp\left(\frac{\pi^2}{15\times0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)=$$

$$\frac{1}{3}\int_1^{\frac{\exp(-0.002+0.0925926\,\pi^2)\exp(-0.005+1.38889\,\pi^2)\sqrt{\frac{0.06}{\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}\frac{1}{t}\,dt$$

Open code

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$$\frac{1}{3}\log\left(\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)\exp\left(\frac{\pi^2}{15\times0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)=\frac{1}{6\,i\,\pi}$$

$$\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)\left(-1+\frac{\exp(-0.002+0.0925926\pi^2)\exp(-0.005+1.38889\pi^2)\sqrt{\frac{0.06}{\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)^{-s}}{\Gamma(1-s)}\,ds$$

for $-1<\gamma<0$

Continued fraction:

- Linear form

$$4+\cfrac{1}{6+\cfrac{1}{3+\cfrac{1}{64+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{279+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

138 ln(((sqrt((0.12)/(2Pi)) * exp(Pi^2/0.72-0.12/24) * exp(Pi^2/(15*0.72)-0.12/60) /(sqrt((5-sqrt(5))/2)))

Input:

$$138 \log\left(\sqrt{\frac{0.12}{2\pi}}\, \exp\left(\frac{\pi^2}{0.72} - \frac{0.12}{24}\right) \times \frac{\exp\left(\frac{\pi^2}{15\times 0.72} - \frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)$$

Open code

- $\log(x)$ is the natural logarithm

Result:

- Fewer digits
- More digits

1721.3860950372428156721300688542339914732106947360529536 49...

This result 1721,386 is very near to the mass of $f_0(1710)$ candidate glueball

Alternative representations:

$$138 \log\left(\frac{\left(\sqrt{\frac{0.12}{2\pi}}\, \exp\left(\frac{\pi^2}{0.72} - \frac{0.12}{24}\right)\right) \exp\left(\frac{\pi^2}{15\times 0.72} - \frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right) =$$

$$138 \log_e\left(\frac{\exp\left(-\frac{0.12}{24} + \frac{\pi^2}{0.72}\right) \exp\left(-\frac{0.12}{60} + \frac{\pi^2}{10.8}\right) \sqrt{\frac{0.12}{2\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)$$

Open code

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$$138 \log\left(\frac{\left(\sqrt{\frac{0.12}{2\pi}} \exp\left(\frac{\pi^2}{0.72} - \frac{0.12}{24}\right)\right) \exp\left(\frac{\pi^2}{15 \times 0.72} - \frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5 - \sqrt{5}\right)}}\right) =$$

$$138 \log(a) \log_a\left(\frac{\exp\left(-\frac{0.12}{24} + \frac{\pi^2}{0.72}\right) \exp\left(-\frac{0.12}{60} + \frac{\pi^2}{10.8}\right) \sqrt{\frac{0.12}{2\pi}}}{\sqrt{\frac{1}{2}\left(5 - \sqrt{5}\right)}}\right)$$

Series representation:

$$138 \log\left(\frac{\left(\sqrt{\frac{0.12}{2\pi}} \exp\left(\frac{\pi^2}{0.72} - \frac{0.12}{24}\right)\right) \exp\left(\frac{\pi^2}{15 \times 0.72} - \frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5 - \sqrt{5}\right)}}\right) =$$

$$138 \log\left(-1 + \frac{\exp(-0.002 + 0.0925926\,\pi^2) \exp(-0.005 + 1.38889\,\pi^2) \sqrt{\frac{0.06}{\pi}}}{\sqrt{\frac{1}{2}\left(5 - \sqrt{5}\right)}}\right) -$$

$$138 \sum_{k=1}^{\infty} \frac{(-1)^k \left(-1 + \frac{\exp(-0.002+0.0925926\pi^2)\exp(-0.005+1.38889\pi^2)\sqrt{\frac{0.06}{\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)^{-k}}{k}$$

Integral representations:

$$138 \log\left(\frac{\left(\sqrt{\frac{0.12}{2\pi}} \exp\left(\frac{\pi^2}{0.72} - \frac{0.12}{24}\right)\right) \exp\left(\frac{\pi^2}{15 \times 0.72} - \frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5 - \sqrt{5}\right)}}\right) =$$

$$138 \int_1^{\frac{\exp(-0.002+0.0925926\,\pi^2)\exp(-0.005+1.38889\,\pi^2)\sqrt{\frac{0.06}{\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}} \frac{1}{t}\,dt$$

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$$138\log\left(\frac{\left(\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)\right)\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)=\frac{69}{i\pi}$$

$$\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)\left(-1+\frac{\exp(-0.002+0.0925926\pi^2)\exp(-0.005+1.38889\pi^2)\sqrt{\frac{0.06}{\pi}}}{\sqrt{\frac{1}{2}(5-\sqrt{5})}}\right)^{-s}}{\Gamma(1-s)}\,ds$$

for $-1<\gamma<0$

Continued fraction:

- Linear form

$$1721+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{11+\cfrac{1}{10+\cfrac{1}{2+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Open code

62 ln(((sqrt((0.12)/(2Pi)) * exp(Pi^2/0.72-0.12/24) * exp(Pi^2/(15*0.72)-0.12/60) /(sqrt((5-sqrt(5))/2)))

Input:

$$62\log\left(\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)\times\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits
  773.376...

This value 773,376 is very near to the rest mass of Charged rho meson

Alternative representations:

$$62 \log\left(\frac{\left(\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)\right)\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right) = 62 \log_e\left(\frac{\exp\left(-\frac{0.12}{24}+\frac{\pi^2}{0.72}\right)\exp\left(-\frac{0.12}{60}+\frac{\pi^2}{10.8}\right)\sqrt{\frac{0.12}{2\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)$$

Open code

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$$62 \log\left(\frac{\left(\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)\right)\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right) = 62 \log(a) \log_a\left(\frac{\exp\left(-\frac{0.12}{24}+\frac{\pi^2}{0.72}\right)\exp\left(-\frac{0.12}{60}+\frac{\pi^2}{10.8}\right)\sqrt{\frac{0.12}{2\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)$$

Open code

Series representation:

$$62 \log\left(\frac{\left(\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)\right)\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right) = 62 \log\left(-1+\frac{\exp\left(-0.002+0.0925926\,\pi^2\right)\exp\left(-0.005+1.38889\,\pi^2\right)\sqrt{\frac{0.06}{\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right) - 62\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\exp\left(-0.002+0.0925926\,\pi^2\right)\exp\left(-0.005+1.38889\,\pi^2\right)\sqrt{\frac{0.06}{\pi}}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)^{-k}}{k}$$

Open code

Integral representations:

$$62 \log\left(\frac{\left(\sqrt{\frac{0.12}{2\pi}} \exp\left(\frac{\pi^2}{0.72} - \frac{0.12}{24}\right)\right) \exp\left(\frac{\pi^2}{15 \times 0.72} - \frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5 - \sqrt{5}\right)}}\right) = 62 \int_1^{\frac{\exp(-0.002+0.0925926\pi^2)\exp(-0.005+1.38889\pi^2)\sqrt{\frac{0.06}{\pi}}}{\sqrt{\frac{1}{2}(5-\sqrt{5})}}} \frac{1}{t}\,dt$$

Open code

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$$62 \log\left(\frac{\left(\sqrt{\frac{0.12}{2\pi}} \exp\left(\frac{\pi^2}{0.72} - \frac{0.12}{24}\right)\right) \exp\left(\frac{\pi^2}{15 \times 0.72} - \frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5 - \sqrt{5}\right)}}\right) = \frac{31}{i\pi} \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\Gamma(-s)^2\,\Gamma(1+s)\left(-1 + \frac{\exp(-0.002+0.0925926\pi^2)\exp(-0.005+1.38889\pi^2)\sqrt{\frac{0.06}{\pi}}}{\sqrt{\frac{1}{2}(5-\sqrt{5})}}\right)^{-s}}{\Gamma(1-s)}\,ds \quad \text{for } -1 < \gamma < 0$$

Open code

((((((ln(((sqrt((0.12)/(2Pi)) * exp(Pi^2/0.72-0.12/24) * exp(Pi^2/(15*0.72)-0.12/60) /(sqrt((5-sqrt(5))/2)))))))^1/5

Input:

$$\sqrt[5]{\log\left(\sqrt{\frac{0.12}{2\pi}} \exp\left(\frac{\pi^2}{0.72} - \frac{0.12}{24}\right) \times \frac{\exp\left(\frac{\pi^2}{15\times 0.72} - \frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5 - \sqrt{5}\right)}}\right)}$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

1.656532...

1/72 * (((sqrt((0.12)/(2Pi)) * exp(Pi^2/0.72-0.12/24) + exp(Pi^2/(15*0.72)-0.12/60) /(sqrt((5-sqrt(5))/2)))

Input:

$$\frac{1}{72}\left(\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)+\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)$$

Open code

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Result:

- More digits

1714.82...

This result 1714,82 is very near to the mass of $f_0(1710)$ candidate glueball

Continued fraction:

- Linear form

$$1714+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{5+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{2+\cfrac{1}{15+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}$$

Open code

Series representations:

- More

$$\frac{1}{72}\left(\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)+\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)=$$

$$\left(\exp\left(-0.002+0.0925926\,\pi^2\right)+\exp\left(-0.005+1.38889\,\pi^2\right)\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,2^{-k_2}\left(-1+\frac{0.06}{\pi}\right)^{k_1}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(3-\sqrt{5}\right)^{k_2}}{k_1!\,k_2!}\right)\Big/$$

$$\left(72\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k\left(3-\sqrt{5}\right)^k}{k!}\right)$$

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$$\frac{1}{72}\left(\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)+\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)=\left(\exp\left(-0.002+0.0925926\,\pi^2\right)+\right.$$

$$\exp\left(-0.005+1.38889\,\pi^2\right)\sqrt{z_0}^{\,2}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}$$

$$\left.\frac{(-1)^{k_1+k_2}\,2^{-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(5-\sqrt{5}-2z_0\right)^{k_2}\left(\frac{0.06}{\pi}-z_0\right)^{k_1}z_0^{-k_1-k_2}}{k_1!\,k_2!}\right)\Big/$$

$$\left(72\sqrt{z_0}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k\left(5-\sqrt{5}-2z_0\right)^k z_0^{-k}}{k!}\right)$$

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

$$\frac{1}{72}\left(\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)+\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)=$$

$$-\left(\left(4\exp(-0.002+0.0925926\,\pi^2)\sqrt{\pi}^{\,2}+\right.\right.$$

$$\exp(-0.005+1.38889\,\pi^2)\sum_{j_1=0}^{\infty}\sum_{j_2=0}^{\infty}\left(\operatorname{Res}_{s=-j_1}\left(-1+\frac{0.06}{\pi}\right)^{-s}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)$$

$$\left.\left.\left(\operatorname{Res}_{s=-j_2}2^s\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\left(3-\sqrt{5}\right)^{-s}\right)\right)\right/$$

$$\left(144\sqrt{\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}2^s\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\left(3-\sqrt{5}\right)^{-s}\right)\Bigg)$$

1/(1714.82209*3) * (((sqrt((0.12)/(2Pi)) * exp(Pi^2/0.72-0.12/24) + exp(Pi^2/(15*0.72)-0.12/60) /(sqrt((5-sqrt(5))/2)))

Input interpretation:

$$\frac{1}{1714.82209\times 3}\left(\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)+\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)$$

Open code

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Result:

- Fewer digits
- More digits

24.000000037596435756723325575451632652373754164702725983851...

This result is practically equal to 24, are the physical degrees of freedom of the bosonic string, that are the 24 transverse coordinates.

Continued fraction:

- Linear form

$$24+\cfrac{1}{26598266+\cfrac{1}{34+\cfrac{1}{2+\cfrac{1}{7+\cfrac{1}{3+\cfrac{1}{15+\cfrac{1}{2+\cfrac{1}{7+\cfrac{1}{6+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{12+\cfrac{1}{1+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}$$

Open code

Series representations:

- More

$$\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)+\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}{1714.82\times 3}=$$

$$\left(0.000194384\left(\exp\left(-0.002+0.0925926\,\pi^2\right)+\exp\left(-0.005+1.38889\,\pi^2\right)\right.\right.$$

$$\left.\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,2^{-k_2}\left(-1+\frac{0.06}{\pi}\right)^{k_1}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(3-\sqrt{5}\right)^{k_2}}{k_1!\,k_2!}\right)\right)\Big/$$

$$\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k\left(3-\sqrt{5}\right)^k}{k!}\right)$$

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$$\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)+\frac{\exp\left(\frac{\pi^2}{15\times0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}{1714.82\times3}=$$

$$\left(0.000194384\left(\exp(-0.002+0.0925926\,\pi^2)+\exp(-0.005+1.38889\,\pi^2)\sqrt{z_0}^{\,2}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{1}{k_1!\,k_2!}(-1)^{k_1+k_2}\,2^{-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(5-\sqrt{5}-2\,z_0\right)^{k_2}\left(\frac{0.06}{\pi}-z_0\right)^{k_1} z_0^{-k_1-k_2}\right)\right)\Big/\left(\sqrt{z_0}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k\left(5-\sqrt{5}-2\,z_0\right)^k z_0^{-k}}{k!}\right)\text{ for not }((z_0\in\mathbb{R}\text{ and }-\infty<z_0\leq 0))$$

$$\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)+\frac{\exp\left(\frac{\pi^2}{15\times0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}{1714.82\times3}=$$

$$-\left(\left(0.0000971918\left(4\exp(-0.002+0.0925926\,\pi^2)\sqrt{\pi}^{\,2}+\exp(-0.005+1.38889\,\pi^2)\sum_{j_1=0}^{\infty}\sum_{j_2=0}^{\infty}\left(\text{Res}_{s=-j_1}\left(-1+\frac{0.06}{\pi}\right)^{-s}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)\left(\text{Res}_{s=-j_2}\,2^s\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\left(3-\sqrt{5}\right)^{-s}\right)\right)\right)\Big/\left(\sqrt{\pi}\sum_{j=0}^{\infty}\text{Res}_{s=-j}\,2^s\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\left(3-\sqrt{5}\right)^{-s}\right)\right)$$

1/34 (((sqrt((0.12)/(2Pi)) * exp(Pi^2/0.72-0.12/24))) / ((exp(Pi^2/(15*0.72)-0.12/60) /(sqrt((5-sqrt(5))/2)))

Input:

$$\frac{1}{34}\times\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}$$

Open code

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Result:

- Fewer digits
- More digits

1715.1475153796423363655657011433988784684572026839438692 37...

This result 1715,1475 is very near to the mass of $f_0(1710)$ candidate glueball

Continued fraction:

- Linear form

$$1715+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{15+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)34}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}=\frac{\exp\left(-0.005+1.38889\pi^2\right)\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,2^{-k_2}\left(-1+\frac{0.06}{\pi}\right)^{k_1}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(3-\sqrt{5}\right)^{k_2}}{k_1!\,k_2!}}{34\exp\left(-0.002+0.0925926\pi^2\right)}$$

Open code

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$$\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)34}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}} = \left(\exp(-0.005+1.38889\,\pi^2)\sqrt{z_0}^{\,2} \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,2^{-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(5-\sqrt{5}-2\,z_0\right)^{k_2}\left(\frac{0.06}{\pi}-z_0\right)^{k_1} z_0^{-k_1-k_2}}{k_1!\,k_2!}\right) \Big/ \left(34\exp(-0.002+0.0925926\,\pi^2)\right)$$

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

$$\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)34}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}} = \left(\exp(-0.005+1.38889\,\pi^2)\sum_{j_1=0}^{\infty}\sum_{j_2=0}^{\infty}\left(\mathrm{Res}_{s=-j_1}\left(-1+\frac{0.06}{\pi}\right)^{-s}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)\left(\mathrm{Res}_{s=-j_2}\,2^s\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\left(3-\sqrt{5}\right)^{-s}\right)\right) \Big/ \left(136\exp(-0.002+0.0925926\,\pi^2)\sqrt{\pi}^{\,2}\right)$$

1/75 (((sqrt((0.12)/(2Pi)) * exp(Pi^2/0.72-0.12/24))) / ((exp(Pi^2/(15*0.72)-0.12/60) /(sqrt((5-sqrt(5))/2)))

Input:

$$\frac{1}{75}\times\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

777.53354030543785915238978451834082490570059855005455405 44...

This value 777,533 is very near to the rest mass of Charged rho meson

Continued fraction:

- Linear form

$$777+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{20+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{7+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{12+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{5+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)75}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}=$$

$$\frac{\exp\left(-0.005+1.38889\pi^2\right)\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,2^{-k_2}\left(-1+\frac{0.06}{\pi}\right)^{k_1}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(3-\sqrt{5}\right)^{k_2}}{k_1!\,k_2!}}{75\exp\left(-0.002+0.0925926\pi^2\right)}$$

Open code

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$$\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times0.72}-\frac{0.12}{60}\right)75}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}} = \left(\exp(-0.005+1.38889\pi^2)\sqrt{z_0}^2 \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,2^{-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(5-\sqrt{5}-2z_0\right)^{k_2}\left(\frac{0.06}{\pi}-z_0\right)^{k_1} z_0^{-k_1-k_2}}{k_1!\,k_2!}\right) \Big/ \left(75\exp(-0.002+0.0925926\pi^2)\right)$$

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

$$\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times0.72}-\frac{0.12}{60}\right)75}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}} = \left(\exp(-0.005+1.38889\pi^2)\sum_{j_1=0}^{\infty}\sum_{j_2=0}^{\infty}\left(\operatorname{Res}_{s=-j_1}\left(-1+\frac{0.06}{\pi}\right)^{-s}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)\left(\operatorname{Res}_{s=-j_2}2^s\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\left(3-\sqrt{5}\right)^{-s}\right)\right) \Big/ \left(300\exp(-0.002+0.0925926\pi^2)\sqrt{\pi}^2\right)$$

1/(2.61803398) ln (((sqrt((0.12)/(2Pi)) * exp(Pi^2/0.72-0.12/24))) / ((exp(Pi^2/(15*0.72)-0.12/60) /(sqrt((5-sqrt(5))/2)))

Input interpretation:

$$\frac{1}{2.61803398}\log\left(\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- Fewer digits
- More digits

4.191547924567337461288822920219450138966980129192222049580...

This result 4,19154 is in the range of the mass of hypothetical dark matter particles

Continued fraction:

- Linear form

$$4+\cfrac{1}{5+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{16+\cfrac{1}{1+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

Alternative representations:

$$\frac{\log\left(\frac{\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)}{2.61803}=\frac{\log_e\left(\frac{\frac{\exp\left(-\frac{0.12}{24}+\frac{\pi^2}{0.72}\right)\sqrt{\frac{0.12}{2\pi}}}{\exp\left(-\frac{0.12}{60}+\frac{\pi^2}{10.8}\right)}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)}{2.61803}$$

Open code

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$$\frac{\log\left(\frac{\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)}{2.61803}=\frac{\log(a)\log_a\left(\frac{\frac{\exp\left(-\frac{0.12}{24}+\frac{\pi^2}{0.72}\right)\sqrt{\frac{0.12}{2\pi}}}{\exp\left(-\frac{0.12}{60}+\frac{\pi^2}{10.8}\right)}}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}\right)}{2.61803}$$

Open code

Series representation:

$$\frac{\log\left(\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}\right)}{2.61803} = 0.381966\log\left(-1+\frac{\exp(-0.005+1.38889\pi^2)\sqrt{\frac{0.06}{\pi}}\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}{\exp(-0.002+0.0925926\pi^2)}\right) - 0.381966\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\exp(-0.005+1.38889\pi^2)\sqrt{\frac{0.06}{\pi}}\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}{\exp(-0.002+0.0925926\pi^2)}\right)^{-k}}{k}$$

Open code

Integral representations:

$$\frac{\log\left(\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}\right)}{2.61803} = 0.381966\int_1^{\frac{\exp(-0.005+1.38889\pi^2)\sqrt{\frac{0.06}{\pi}}\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}{\exp(-0.002+0.0925926\pi^2)}}\frac{1}{t}\,dt$$

Open code

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$$\frac{\log\left(\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}\right)}{2.61803} = \frac{0.190983}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)\left(-1+\frac{\exp(-0.005+1.38889\pi^2)\sqrt{\frac{0.06}{\pi}}\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}{\exp(-0.002+0.0925926\pi^2)}\right)^{-s}}{\Gamma(1-s)}\,ds$$

for $-1 < \gamma < 0$

Open code

1/6.626 ln (((sqrt((0.12)/(2Pi)) * exp(Pi^2/0.72-0.12/24))) / ((exp(Pi^2/(15*0.72)-0.12/60) /(sqrt((5-sqrt(5))/2)))

Input:

$$\frac{1}{6.626}\log\left(\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- Fewer digits
- More digits

1.6561447170715010974616771807028900574601986230319992872 78...

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{54+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

Alternative representations:

$$\frac{\log\left(\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}\right)}{6.626} = \frac{\log_e\left(\frac{\exp\left(-\frac{0.12}{24}+\frac{\pi^2}{0.72}\right)\sqrt{\frac{0.12}{2\pi}}}{\frac{\exp\left(-\frac{0.12}{60}+\frac{\pi^2}{10.8}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}\right)}{6.626}$$

Open code

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$$\frac{\log\left(\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}\right)}{6.626} = \frac{\log(a)\log_a\left(\frac{\exp\left(-\frac{0.12}{24}+\frac{\pi^2}{0.72}\right)\sqrt{\frac{0.12}{2\pi}}}{\frac{\exp\left(-\frac{0.12}{60}+\frac{\pi^2}{10.8}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}\right)}{6.626}$$

Open code

Series representation:

$$\frac{\log\left(\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}\right)}{6.626} =$$

$$0.150921\log\left(-1+\frac{\exp\left(-0.005+1.38889\pi^2\right)\sqrt{\frac{0.06}{\pi}}\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}{\exp\left(-0.002+0.0925926\pi^2\right)}\right) - 0.150921\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\exp\left(-0.005+1.38889\pi^2\right)\sqrt{\frac{0.06}{\pi}}\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}{\exp\left(-0.002+0.0925926\pi^2\right)}\right)^{-k}}{k}$$

Open code

Integral representations:

$$\frac{\log\left(\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}\right)}{6.626} = 0.150921\int_1^{\frac{\exp(-0.005+1.38889\pi^2)\sqrt{\frac{0.06}{\pi}}\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}{\exp(-0.002+0.0925926\pi^2)}} \frac{1}{t}\,dt$$

Open code

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$$\frac{\log\left(\frac{\sqrt{\frac{0.12}{2\pi}}\exp\left(\frac{\pi^2}{0.72}-\frac{0.12}{24}\right)}{\frac{\exp\left(\frac{\pi^2}{15\times 0.72}-\frac{0.12}{60}\right)}{\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}}\right)}{6.626} =$$

$$\frac{0.0754603}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)\left(-1+\frac{\exp(-0.005+1.38889\pi^2)\sqrt{\frac{0.06}{\pi}}\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}{\exp(-0.002+0.0925926\pi^2)}\right)^{-s}}{\Gamma(1-s)}\,ds$$

for $-1 < \gamma < 0$

Open code

We have that:

I have proved that if

$$f(q) = 1 + \frac{q}{(1+q)^2} + \frac{q^4}{(1+q)^2(1+q^2)^2} + \dots$$

then

$$f(q) + (1-q)(1-q^3)(1-q^5)\dots(1-2q+2q^4-2q^9+\dots) = O(1)$$

at all the points $q=-1, q^3=-1, q^5=-1, q^7=-1, \dots$, and at the same time

$$f(q) - (1-q)(1-q^3)(1-q^5)\dots(1-2q+2q^4-\dots) = O(1)$$

at all the points $q^2=-1, q^4=-1, q^6=-1, \dots$ Also obviously $f(q)=O(1)$ at all the points $q=1, q^3=1, q^5=1, \dots$ And so $f(q)$ is a Mock ϑ function. When $q=-e^{-t}$ and $t\to 0$

$$f(q) + \sqrt{\frac{\pi}{t}}\exp\left(\frac{\pi^2}{24t}-\frac{t}{24}\right) \to 4.$$

From:

$$f(q) = 1 + \frac{q}{(1+q)^2} + \frac{q^4}{(1+q)^2(1+q^2)^2} + \dots$$

We obtain, for q = -e^{-t} for t = 0.5; q = -0,606530

1+[((-0.606530)/(1-0.606530)^2))]+(((-0.606530)^4)))/[(((1-0.606530)^2))*((1-0.606530^2)^2)))]

Input interpretation:

$$1 - \frac{0.606530}{(1-0.606530)^2} + \frac{(-0.606530)^4}{(1-0.606530)^2\,(1-0.606530^2)^2}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-0.729994800774430475383627769914205675403460485535548 29328\dots$

Open code

and:

$$\sqrt{\frac{\pi}{t}}\exp\left(\frac{\pi^2}{24t} - \frac{t}{24}\right)$$

sqrt(Pi/0.5) exp((Pi^2/(24*0.5))-(0.5/24))

Input:

$$\sqrt{\frac{\pi}{0.5}}\exp\left(\frac{\pi^2}{24\times 0.5} - \frac{0.5}{24}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

5.58773...

Series representations:

- More

$$\sqrt{\frac{\pi}{0.5}}\exp\left(\frac{\pi^2}{24\times 0.5}-\frac{0.5}{24}\right)=$$
$$\exp(-0.0208333+0.0833333\,\pi^2)\sqrt{-1+2\pi}\sum_{k=0}^{\infty}(-1+2\pi)^{-k}\binom{\frac{1}{2}}{k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\sqrt{\frac{\pi}{0.5}}\exp\left(\frac{\pi^2}{24\times 0.5}-\frac{0.5}{24}\right)=$$
$$\exp(-0.0208333+0.0833333\,\pi^2)\sqrt{-1+2\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+2\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$\sqrt{\frac{\pi}{0.5}}\exp\left(\frac{\pi^2}{24\times 0.5}-\frac{0.5}{24}\right)=$$
$$\exp(-0.0208333+0.0833333\,\pi^2)\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2\pi-z_0)^k z_0^{-k}}{k!}$$
$$\text{for not }((z_0\in\mathbb{R}\text{ and }-\infty<z_0\leq 0))$$

Open code

Thence:

-0.7299948 + sqrt(Pi/0.5) exp((Pi^2/(24*0.5))-(0.5/24))

Input interpretation:

$$-0.7299948+\sqrt{\frac{\pi}{0.5}}\exp\left(\frac{\pi^2}{24\times 0.5}-\frac{0.5}{24}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

4.85773...

Series representations:

- More

$$-0.729995+\sqrt{\frac{\pi}{0.5}}\exp\left(\frac{\pi^2}{24\times 0.5}-\frac{0.5}{24}\right)=$$
$$-0.729995+\exp(-0.0208333+0.0833333\,\pi^2)\sqrt{-1+2\pi}\sum_{k=0}^{\infty}(-1+2\pi)^{-k}\binom{\frac{1}{2}}{k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$-0.729995+\sqrt{\frac{\pi}{0.5}}\exp\left(\frac{\pi^2}{24\times 0.5}-\frac{0.5}{24}\right)=$$

$$-0.729995+\exp(-0.0208333+0.0833333\,\pi^2)\sqrt{-1+2\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+2\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$-0.729995+\sqrt{\frac{\pi}{0.5}}\exp\left(\frac{\pi^2}{24\times 0.5}-\frac{0.5}{24}\right)=$$

$$-0.729995+\exp(-0.0208333+0.0833333\,\pi^2)\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2\pi-z_0)^k z_0^{-k}}{k!}$$

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

Open code

For t = 0.6, we obtain:

1+[((-0.548811)/(1-0.548811)^2))]+(((-0.548811)^4)))/[((((1-0.548811)^2))*((1-0.548811^2)^2)))]

Input interpretation:

$$1-\frac{0.548811}{(1-0.548811)^2}+\frac{(-0.548811)^4}{(1-0.548811)^2\,(1-0.548811^2)^2}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-0.78335478262647730587745118425104872042845623277574448731\ldots$

Open code

-0.7833547826264773 + sqrt(Pi/0.6) exp((Pi^2/(24*0.6))-(0.6/24))

Input interpretation:

$$-0.7833547826264773+\sqrt{\frac{\pi}{0.6}}\exp\left(\frac{\pi^2}{24\times 0.6}-\frac{0.6}{24}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

3.64561...

Series representations:

- More

$$-0.78335478262647730000+\sqrt{\frac{\pi}{0.6}}\exp\left(\frac{\pi^2}{24\times 0.6}-\frac{0.6}{24}\right)=$$
$$-0.78335478262647730000+\exp(-0.025+0.0694444\pi^2)\sqrt{-1+1.66667\pi}\sum_{k=0}^{\infty}(-1+1.66667\pi)^{-k}\binom{\frac{1}{2}}{k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$-0.78335478262647730000+\sqrt{\frac{\pi}{0.6}}\exp\left(\frac{\pi^2}{24\times 0.6}-\frac{0.6}{24}\right)=$$
$$-0.78335478262647730000+\exp(-0.025+0.0694444\pi^2)\sqrt{-1+1.66667\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+1.66667\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$-0.78335478262647730000+\sqrt{\frac{\pi}{0.6}}\exp\left(\frac{\pi^2}{24\times 0.6}-\frac{0.6}{24}\right)=$$
$$-0.78335478262647730000+\exp(-0.025+0.0694444\pi^2)\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(1.66667\pi-z_0)^k z_0^{-k}}{k!}$$

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

Open code

For t = 0,57721566... (Euler-Mascheroni Constant) we obtain:

-0.81745701519423421359+sqrt(Pi/0.57721566490153286) exp((Pi^2/(24*0.57721566490153286))-(0.57721566490153286/24))

Input interpretation:

$$-0.81745701519423421359+\sqrt{\frac{\pi}{0.57721566490153286}}\exp\left(\frac{\pi^2}{24\times 0.57721566490153286}-\frac{0.57721566490153286}{24}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

3.8263169561696472...

Continued fraction:

- Linear form

$$3+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{22+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$-0.8174570151942342135900000+\sqrt{\frac{\pi}{0.5772156649015328600000}}\exp\left(\frac{\pi^2}{24\times 0.5772156649015328600000}-\frac{0.5772156649015328600000}{24}\right)=$$
$$-0.8174570151942342135900000+\exp(-0.0240506527042305358333+0.0721856131083597281418\,\pi^2)\sqrt{-1+1.732454714600633475 40\,\pi}\sum_{k=0}^{\infty}(-1+1.73245471460063347540\,\pi)^{-k}\binom{\frac{1}{2}}{k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$-0.8174570151942342135900000+\sqrt{\frac{\pi}{0.5772156649015328600000}}\exp\left(\frac{\pi^2}{24\times 0.5772156649015328600000}-\frac{0.5772156649015328600000}{24}\right)=$$
$$-0.8174570151942342135900000+\exp(-0.0240506527042305358333+0.0721856131083597281418\,\pi^2)\sqrt{-1+1.73245471460063347540\,\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+1.73245471460063347540\,\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$-0.8174570151942342135900000 + \sqrt{\frac{\pi}{0.5772156649015328600000}} \exp\left(\frac{\pi^2}{24 \times 0.5772156649015328600000} - \frac{0.5772156649015328600000}{24}\right) =$$

$$-0.8174570151942342135900000 + \exp(-0.0240506527042305358333 + 0.0721856131083597281418\,\pi^2) \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (1.7324547146006334754 0\,\pi - z_0)^k\, z_0^{-k}}{k!}$$

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

Open code

3.8263169561696472... + 3.64561... + 4.85773... / 3 =

= Input interpretation:

$$\frac{1}{3}(3.8263169561696472 + 3.64561 + 4.85773)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

4.10988565205654906666666666666666666666666666666666666...

Open code

This result 4,1098 is the mean between 0,5 - 0,57721566... - 0,6 and can be considered the best range so that:

$$f(q) + \sqrt{\frac{\pi}{t}} \exp\left(\frac{\pi^2}{24t} - \frac{t}{24}\right) \to 4.$$

Furthermore, this result 4,1098 is also in the range of the mass of hypothetical dark matter particles

From the first fundamental expression of PAGE 4, i.e.

$$(-1)^{n-1} \frac{\exp\left(\pi\sqrt{\frac{n}{6} - \frac{1}{144}}\right)}{2\sqrt{n - \frac{1}{24}}} + O\left(\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6} - \frac{1}{144}}\right)}{\sqrt{n - \frac{1}{24}}}\right)$$

we have, for n = 64, if we replaced $\frac{\pi}{6}$ with $\frac{\pi^2}{6}$, a similar result. Indeed:

[-(exp(Pi*sqrt(64/6-1/144)) / (2sqrt(64-1/24)) + (exp(Pi/2*sqrt(Pi/6-1/144)) / (sqrt(64-1/24))]

Input:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{64-\frac{1}{24}}}\right)$$

Open code

Exact result:

$$-\sqrt{\frac{6}{1535}}\, e^{\left(\sqrt{1535}\,\pi\right)/12}-2\sqrt{\frac{6}{1535}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi}$$

Decimal approximation:

- More digits

−1781.145849977065284715761326442188688403291914158103909 47...

This result -1781,1458 is in the range of the mass of $f_0(1710)$ candidate glueball, with minus sign

Alternate forms:

$$-\sqrt{\frac{6}{1535}}\left(e^{\left(\sqrt{1535}\,\pi\right)/12}+2\,e^{1/24\,\pi\sqrt{24\,\pi-1}}\right)$$

Open code

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$$-\sqrt{\frac{6}{1535}}\, e^{\left(\sqrt{1535}\,\pi\right)/12}-2\sqrt{\frac{6}{1535}}\, e^{1/24\,\pi\sqrt{24\,\pi-1}}$$

Continued fraction:

- Linear form

$$-1781+\cfrac{1}{-6+\cfrac{1}{-1+\cfrac{1}{-5+\cfrac{1}{-1+\cfrac{1}{-25+\cfrac{1}{-4+\cfrac{1}{-2+\cfrac{1}{-10+\cfrac{1}{-5+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-8+\cfrac{1}{-1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}$$

Series representations:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\,\pi\right)}{\sqrt{64-\frac{1}{24}}}\right)=$$
$$-\left(\left(\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+\right.\right.$$
$$\left.\left.2\exp\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\right/$$
$$\left(2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right) \quad \text{for not } ((z_0\in\mathbb{R} \text{ and } -\infty<z_0\le 0))$$

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$$-\left(\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\ \pi\right)}{\sqrt{64-\frac{1}{24}}}\right)=$$

$$-\left(\left(\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1535}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1535}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+\right.\right.$$
$$2\exp\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\right.$$
$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/$$
$$\left.\left(2\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1535}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1535}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\ \pi\right)}{\sqrt{64-\frac{1}{24}}}\right)=$$

$$-\left(\left(\left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{1535}{144}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{1535}{144}-z_0\right)/(2\pi)\right\rfloor\right)}\right.\right.\right.\right.$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+$$
$$2\exp\left(\frac{1}{2}\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor\right)}\right.$$
$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$
$$\left.\left(\frac{1}{z_0}\right)^{-1/2\left\lfloor\arg\left(\frac{1535}{24}-z_0\right)/(2\pi)\right\rfloor} z_0^{-1/2-1/2\left\lfloor\arg\left(\frac{1535}{24}-z_0\right)/(2\pi)\right\rfloor}\right)\Big/$$
$$\left.\left(2\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$

[-(exp(Pi*sqrt(64/6-1/144)) / (2sqrt(64-1/24)) + (exp(Pi/2*sqrt(Pi^2/6-1/144)) / (sqrt(64-1/24))]

Input:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{64-\frac{1}{24}}}\right)$$

Open code

Exact result:

$$-\sqrt{\frac{6}{1535}}\,e^{\left(\sqrt{1535}\,\pi\right)/12}-2\sqrt{\frac{6}{1535}}\,e^{1/2\,\pi\sqrt{\pi^2/6-1/144}}$$

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Decimal approximation:

- More digits

$-1781.69268916956715292273155970926095696562359453667315382...$

Alternate forms:

This result -1781,692 is in the range of the mass of $f_0(1710)$ candidate glueball, with minus sign

$$-\sqrt{\frac{6}{1535}}\left(e^{\left(\sqrt{1535}\,\pi\right)/12}+2\,e^{1/24\,\pi\sqrt{24\,\pi^2-1}}\right)$$

Open code

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$$-\sqrt{\frac{6}{1535}}\,e^{\left(\sqrt{1535}\,\pi\right)/12}-2\sqrt{\frac{6}{1535}}\,e^{1/24\,\pi\sqrt{24\,\pi^2-1}}$$

Continued fraction:

- Linear form

$$-1781+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-3+\cfrac{1}{-1+\cfrac{1}{-14+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-7+\cfrac{1}{-154+\cfrac{1}{-3+\cfrac{1}{-17+\cfrac{1}{-3+\cfrac{1}{\dots}}}}}}}}}}}}}}$$

Series representations:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\ \pi\right)}{\sqrt{64-\frac{1}{24}}}\right)=$$

$$-\left(\left(\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+2\exp\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\text{ for not }((z_0\in\mathbb{R}\text{ and }-\infty<z_0\leq 0))$$

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$$-\left(\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\ \pi\right)}{\sqrt{64-\frac{1}{24}}}\right)=$$

$$-\left(\left(\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1535}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1535}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+2\exp\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi^2}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi^2}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(2\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1535}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1535}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\text{ for }(x\in\mathbb{R}\text{ and }x<0)$$

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\,\pi\right)}{\sqrt{64-\frac{1}{24}}}\right)=$$

$$-\left(\left(\left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{1535}{144}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{1535}{144}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+2\exp\left(\frac{1}{2}\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\left(\frac{1}{z_0}\right)^{-1/2\left\lfloor\arg\left(\frac{1535}{24}-z_0\right)/(2\pi)\right\rfloor} z_0^{-1/2-1/2\left\lfloor\arg\left(\frac{1535}{24}-z_0\right)/(2\pi)\right\rfloor}\right)\Big/\left(2\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$

Thence, results practically equals: -1781.1458 and -1781.6926 with the important difference that $\frac{\pi^2}{6}$ is equal to

Decimal approximation:

- More digits

  1.6449340668482264364724151666460251892189499012067984377355...

  Open code

Property:

$\frac{\pi^2}{6}$ is a transcendental number

And represent zeta of 2

Alternative representations:

- More

  $\frac{\pi^2}{6}=\frac{1}{6}(180\,°)^2$

  Open code

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$$\frac{\pi^2}{6} = \zeta(2)$$

Open code

$$\frac{\pi^2}{6} = \frac{1}{6}(-i\log(-1))^2$$

Series representations:

- More

$$\frac{\pi^2}{6} = \sum_{k=1}^{\infty} \frac{1}{k^2}$$

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$$\frac{\pi^2}{6} = -2\sum_{k=1}^{\infty} \frac{(-1)^k}{k^2}$$

Open code

$$\frac{\pi^2}{6} = \frac{4}{3}\sum_{k=0}^{\infty} \frac{1}{(1+2k)^2}$$

Integral representations:

- More

$$\frac{\pi^2}{6} = \frac{8}{3}\left(\int_0^1 \sqrt{1-t^2}\,dt\right)^2$$

Open code

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$$\frac{\pi^2}{6} = \frac{2}{3}\left(\int_0^{\infty} \frac{1}{1+t^2}\,dt\right)^2$$

Open code

$$\frac{\pi^2}{6} = \frac{2}{3}\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt\right)^2$$

We note that:

54 + [-(exp(Pi*sqrt(64/6-1/144)) / (2sqrt(64-1/24)) + (exp(Pi/2*sqrt(Pi^2/6-1/144)) / (sqrt(64-1/24))]

Input:

$$54 - \left(\frac{\exp\left(\pi \sqrt{\frac{64}{6} - \frac{1}{144}}\right)}{2\sqrt{64 - \frac{1}{24}}} + \frac{\exp\left(\frac{\pi}{2} \sqrt{\frac{\pi^2}{6} - \frac{1}{144}}\right)}{\sqrt{64 - \frac{1}{24}}} \right)$$

Open code

Exact result:

$$54 - \sqrt{\frac{6}{1535}}\, e^{\left(\sqrt{1535}\,\pi\right)/12} - 2\sqrt{\frac{6}{1535}}\, e^{1/2\,\pi\sqrt{\pi^2/6 - 1/144}}$$

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Decimal approximation:

- More digits

$-1727.692689169567152922731559709260956965623594536673153 82\ldots$

This result -1727,692 is very near to the mass of $f_0(1710)$ candidate glueball, with minus sign

Alternate forms:

$$54 - \sqrt{\frac{6}{1535}}\, e^{\left(\sqrt{1535}\,\pi\right)/12} - 2\sqrt{\frac{6}{1535}}\, e^{1/24\,\pi\sqrt{24\pi^2 - 1}}$$

Open code

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$$\frac{82\,890 - \sqrt{9210}\, e^{\left(\sqrt{1535}\,\pi\right)/12} - 2\sqrt{9210}\, e^{1/24\,\pi\sqrt{24\pi^2 - 1}}}{1535}$$

Continued fraction:

- Linear form

$$-1727 + \cfrac{1}{-1 + \cfrac{1}{-2 + \cfrac{1}{-3 + \cfrac{1}{-1 + \cfrac{1}{-14 + \cfrac{1}{-1 + \cfrac{1}{-2 + \cfrac{1}{-1 + \cfrac{1}{-7 + \cfrac{1}{-154 + \cfrac{1}{-3 + \cfrac{1}{-17 + \cfrac{1}{-3 + \cfrac{1}{\ldots}}}}}}}}}}}}}}$$

Series representations:

$$54-\left(\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\,\pi\right)}{\sqrt{64-\frac{1}{24}}}\right)=$$

$$-\left(\left(\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+\right.\right.$$
$$2\exp\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)^k z_0^{-k}}{k!}\right)-$$
$$\left.108\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\Bigg/$$
$$\left.\left(2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1535}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$

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

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$$54-\left(\frac{\exp\left(\pi\sqrt{\frac{64}{6}-\frac{1}{144}}\right)}{2\sqrt{64-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\,\pi\right)}{\sqrt{64-\frac{1}{24}}}\right)=$$

$$\left(-\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1535}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1535}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)-\right.$$
$$2\exp\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi^2}{6}-x\right)}{2\pi}\right\rfloor\right)\right.$$
$$\left.\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi^2}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+$$
$$\left.108\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1535}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1535}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Bigg/$$
$$\left(2\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1535}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1535}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

$$54 - \left(\frac{\exp\left(\pi \sqrt{\frac{64}{6} - \frac{1}{144}}\right)}{2 \sqrt{64 - \frac{1}{24}}} + \frac{\exp\left(\frac{1}{2} \sqrt{\frac{\pi^2}{6} - \frac{1}{144}}\, \pi\right)}{\sqrt{64 - \frac{1}{24}}} \right) =$$

$$\Bigg(\left(\frac{1}{z_0}\right)^{-1/2 \left\lfloor \arg\left(\frac{1535}{24} - z_0\right)/(2\pi) \right\rfloor} z_0^{-1/2 - 1/2 \left\lfloor \arg\left(\frac{1535}{24} - z_0\right)/(2\pi) \right\rfloor} \Bigg(-\exp\Bigg(\pi \left(\frac{1}{z_0}\right)^{1/2 \left\lfloor \arg\left(\frac{1535}{144} - z_0\right)/(2\pi) \right\rfloor}$$

$$z_0^{1/2 \left(1 + \left\lfloor \arg\left(\frac{1535}{144} - z_0\right)/(2\pi) \right\rfloor\right)} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(\frac{1535}{144} - z_0\right)^k z_0^{-k}}{k!} \Bigg) -$$

$$2 \exp\Bigg(\frac{1}{2} \pi \left(\frac{1}{z_0}\right)^{1/2 \left\lfloor \arg\left(-\frac{1}{144} + \frac{\pi^2}{6} - z_0\right)/(2\pi) \right\rfloor} z_0^{1/2 \left(1 + \left\lfloor \arg\left(-\frac{1}{144} + \frac{\pi^2}{6} - z_0\right)/(2\pi) \right\rfloor\right)}$$

$$\sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(-\frac{1}{144} + \frac{\pi^2}{6} - z_0\right)^k z_0^{-k}}{k!} \Bigg) +$$

$$108 \left(\frac{1}{z_0}\right)^{1/2 \left\lfloor \arg\left(\frac{1535}{24} - z_0\right)/(2\pi) \right\rfloor} z_0^{1/2 + 1/2 \left\lfloor \arg\left(\frac{1535}{24} - z_0\right)/(2\pi) \right\rfloor}$$

$$\sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(\frac{1535}{24} - z_0\right)^k z_0^{-k}}{k!} \Bigg) \Bigg) \Bigg/ \left(2 \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(\frac{1535}{24} - z_0\right)^k z_0^{-k}}{k!} \right)$$

1/sqrt(2e) * [-(exp(Pi*sqrt(64/6-1/144)) / (2sqrt(64-1/24)) + (exp(Pi/2*sqrt(Pi^2/6-1/144)) / (sqrt(64-1/24))]

Input:

$$\frac{1}{\sqrt{2e}} \left(-\left(\frac{\exp\left(\pi \sqrt{\frac{64}{6} - \frac{1}{144}}\right)}{2 \sqrt{64 - \frac{1}{24}}} + \frac{\exp\left(\frac{\pi}{2} \sqrt{\frac{\pi^2}{6} - \frac{1}{144}}\right)}{\sqrt{64 - \frac{1}{24}}} \right) \right)$$

Open code

Exact result:

$$\frac{-\sqrt{\frac{6}{1535}}\, e^{\left(\sqrt{1535}\, \pi\right)/12} - 2 \sqrt{\frac{6}{1535}}\, e^{1/2\, \pi \sqrt{\pi^2/6 - 1/144}}}{\sqrt{2e}}$$

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Decimal approximation:

- More digits

−764.1358214340884657070466540090894935048127482623038315 08...

This value -764,1358 is very near to the rest mass of Charged rho meson, with minus sign

Open code
Alternate forms:

- More

$$-\sqrt{\frac{3}{1535\,e}}\left(e^{\left(\sqrt{1535}\,\pi\right)/12}+2\,e^{1/24\,\pi\sqrt{24\,\pi^2-1}}\right)$$

Open code

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$$\frac{-\sqrt{\frac{3}{1535}}\,e^{\left(\sqrt{1535}\,\pi\right)/12}-2\sqrt{\frac{3}{1535}}\,e^{1/24\,\pi\sqrt{24\,\pi^2-1}}}{\sqrt{e}}$$

$$-\sqrt{\frac{3}{1535}}\,e^{\left(\sqrt{1535}\,\pi\right)/12-1/2}-2\sqrt{\frac{3}{1535}}\,e^{1/24\,\pi\sqrt{24\,\pi^2-1}-1/2}$$

Continued fraction:

- Linear form

$$-764+\cfrac{1}{-7+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-3+\cfrac{1}{-7+\cfrac{1}{-1+\cfrac{1}{-3+\cfrac{1}{-3+\cfrac{1}{-1+\cfrac{1}{-7+\cfrac{1}{-1+\cfrac{1}{-16+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}$$

Now:

[-(exp(Pi*sqrt(2/6-1/144)) / (2sqrt(2-1/24)) + (exp(Pi/2*sqrt(Pi/6-1/144)) / (sqrt(2-1/24))]

Input:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{2}{6}-\frac{1}{144}}\right)}{2\sqrt{2-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{2-\frac{1}{24}}}\right)$$

Open code

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Exact result:

$$-\sqrt{\frac{6}{47}}\, e^{\left(\sqrt{47}\,\pi\right)/12} - 2\sqrt{\frac{6}{47}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi}$$

Decimal approximation:

- More digits

$$-4.360372344473719427635056153729384152850814289546564048 65\ldots$$

Alternate forms:

$$-\sqrt{\frac{6}{47}}\left(e^{\left(\sqrt{47}\,\pi\right)/12} + 2\, e^{1/24\,\pi\sqrt{24\,\pi-1}}\right)$$

Open code

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$$-\sqrt{\frac{6}{47}}\, e^{\left(\sqrt{47}\,\pi\right)/12} - 2\sqrt{\frac{6}{47}}\, e^{1/24\,\pi\sqrt{24\,\pi-1}}$$

Continued fraction:

- Linear form

$$-4+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-3+\cfrac{1}{-2+\cfrac{1}{-3+\cfrac{1}{-1+\cfrac{1}{-5+\cfrac{1}{-1+\cfrac{1}{-435+\cfrac{1}{-1+\cfrac{1}{-31+\cfrac{1}{-20+\cfrac{1}{-1+\cfrac{1}{-8+\cfrac{1}{\ldots}}}}}}}}}}}}}}}$$

Series representations:

- More

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{2}{6}-\frac{1}{144}}\right)}{2\sqrt{2-\frac{1}{24}}} + \frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\,\pi\right)}{\sqrt{2-\frac{1}{24}}}\right) = -\frac{\exp\left(\pi\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{97}{144}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right) + 2\exp\left(\frac{1}{2}\,\pi\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{145}{144}+\frac{\pi}{6}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)}{2\sum_{k=0}^{\infty}\frac{\left(-\frac{23}{24}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}$$

Open code

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$$-\left(\frac{\exp\left(\pi\sqrt{\frac{2}{6}-\frac{1}{144}}\right)}{2\sqrt{2-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\,\pi\right)}{\sqrt{2-\frac{1}{24}}}\right)=$$

$$-\left(\left(\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{47}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+2\exp\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Bigg/\left(2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{47}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right) \quad \text{for not } ((z_0\in\mathbb{R} \text{ and } -\infty<z_0\leq 0))$$

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{2}{6}-\frac{1}{144}}\right)}{2\sqrt{2-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\,\pi\right)}{\sqrt{2-\frac{1}{24}}}\right)=$$

$$\left(\left(\exp\left(-\frac{\pi\sum_{j=0}^{\infty}\text{Res}_{s=-j}\left(-\frac{97}{144}\right)^{-s}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)+2\exp\left(-\frac{\pi\sum_{j=0}^{\infty}\text{Res}_{s=-j}\left(-\frac{145}{144}+\frac{\pi}{6}\right)^{-s}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{4\sqrt{\pi}}\right)\right)\sqrt{\pi}\right)\Bigg/\left(\sum_{j=0}^{\infty}\text{Res}_{s=-j}\left(\frac{24}{23}\right)^{s}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)$$

[-(exp(Pi*sqrt(8/6-1/144)) / (2sqrt(8-1/24)) + (exp(Pi/2*sqrt(Pi/6-1/144)) / (sqrt(8-1/24))]

Input:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{8}{6}-\frac{1}{144}}\right)}{2\sqrt{8-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{8-\frac{1}{24}}}\right)$$

Open code

Exact result:

$$-\sqrt{\frac{6}{191}}\,e^{\left(\sqrt{191}\,\pi\right)/12}-2\sqrt{\frac{6}{191}}\,e^{1/2\sqrt{\pi/6-1/144}\,\pi}$$

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Decimal approximation:

- More digits

$-7.701685762325053646440570763397296637234847314108839929 66...$

Alternate forms:

$$-\sqrt{\frac{6}{191}}\left(e^{\left(\sqrt{191}\,\pi\right)/12}+2\,e^{1/24\,\pi\sqrt{24\,\pi-1}}\right)$$

Open code

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$$-\sqrt{\frac{6}{191}}\,e^{\left(\sqrt{191}\,\pi\right)/12}-2\sqrt{\frac{6}{191}}\,e^{1/24\,\pi\sqrt{24\,\pi-1}}$$

Continued fraction:

- Linear form

$$-7+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-5+\cfrac{1}{-4+\cfrac{1}{-3+\cfrac{1}{-4+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-2+\cfrac{1}{-2+\cfrac{1}{-7+\cfrac{1}{-4+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}$$

Series representations:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{8}{6}-\frac{1}{144}}\right)}{2\sqrt{8-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\,\pi\right)}{\sqrt{8-\frac{1}{24}}}\right)=$$

$$-\left(\left(\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{191}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+2\exp\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{191}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$

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

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$$-\left(\frac{\exp\left(\pi\sqrt{\frac{8}{6}-\frac{1}{144}}\right)}{2\sqrt{8-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\;\pi\right)}{\sqrt{8-\frac{1}{24}}}\right)=$$

$$-\left(\left(\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{191}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{191}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+\right.\right.$$
$$2\exp\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\right.$$
$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/$$
$$\left.\left(2\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{191}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{191}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right) \text{ for } (x\in\mathbb{R} \text{ and } x<0)$$

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{8}{6}-\frac{1}{144}}\right)}{2\sqrt{8-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\;\pi\right)}{\sqrt{8-\frac{1}{24}}}\right)=$$

$$-\left(\left(\left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{191}{144}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{191}{144}-z_0\right)/(2\pi)\right\rfloor\right)}\right.\right.\right.\right.$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{191}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+$$
$$2\exp\left(\frac{1}{2}\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor\right)}\right.$$
$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$
$$\left.\left(\frac{1}{z_0}\right)^{-1/2\left\lfloor\arg\left(\frac{191}{24}-z_0\right)/(2\pi)\right\rfloor} z_0^{-1/2-1/2\left\lfloor\arg\left(\frac{191}{24}-z_0\right)/(2\pi)\right\rfloor}\right)\Big/$$
$$\left.\left(2\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{191}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$

[-(exp(Pi*sqrt(16/6-1/144)) / (2sqrt(16-1/24)) + (exp(Pi/2*sqrt(Pi/6-1/144)) / (sqrt(16-1/24))]

Input:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{16}{6}-\frac{1}{144}}\right)}{2\sqrt{16-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{16-\frac{1}{24}}}\right)$$

Open code

Exact result:

$$-\sqrt{\frac{6}{383}}\, e^{\left(\sqrt{383}\,\pi\right)/12}-2\sqrt{\frac{6}{383}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi}$$

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Decimal approximation:

- More digits

$-21.792160456625474712745942462166244348096753140572326 7207...$

This result -21,79216 is very near to the value of black hole entropy (see Tables), with minus sign

Alternate forms:

$$-\sqrt{\frac{6}{383}}\left(e^{\left(\sqrt{383}\,\pi\right)/12}+2\,e^{1/24\,\pi\sqrt{24\,\pi-1}}\right)$$

Open code

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$$-\sqrt{\frac{6}{383}}\, e^{\left(\sqrt{383}\,\pi\right)/12}-2\sqrt{\frac{6}{383}}\, e^{1/24\,\pi\sqrt{24\,\pi-1}}$$

Continued fraction:

- Linear form

$$-21+\cfrac{1}{-1+\cfrac{1}{-3+\cfrac{1}{-1+\cfrac{1}{-4+\cfrac{1}{-3+\cfrac{1}{-3+\cfrac{1}{-3+\cfrac{1}{-1+\cfrac{1}{-42+\cfrac{1}{-1+\cfrac{1}{-4+\cfrac{1}{-3+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{\dots}}}}}}}}}}}}}}}$$

Series representations:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{16}{6}-\frac{1}{144}}\right)}{2\sqrt{16-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\ \pi\right)}{\sqrt{16-\frac{1}{24}}}\right)=$$

$$-\left(\left(\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{383}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+\right.\right.$$
$$\left.\left.2\exp\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\right/$$
$$\left(2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{383}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$ for not $((z_0\in\mathbb{R}$ and $-\infty<z_0\leq 0))$

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$$-\left(\frac{\exp\left(\pi\sqrt{\frac{16}{6}-\frac{1}{144}}\right)}{2\sqrt{16-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\ \pi\right)}{\sqrt{16-\frac{1}{24}}}\right)=$$

$$-\left(\left(\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{383}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{383}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+\right.\right.$$
$$2\exp\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\right.$$
$$\left.\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\right/$$
$$\left(2\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{383}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{383}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$ for $(x\in\mathbb{R}$ and $x<0)$

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{16}{6}-\frac{1}{144}}\right)}{2\sqrt{16-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\,\pi\right)}{\sqrt{16-\frac{1}{24}}}\right)=$$

$$-\left(\left(\left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{383}{144}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{383}{144}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{383}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+2\exp\left(\frac{1}{2}\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\left(\frac{1}{z_0}\right)^{-1/2\left\lfloor\arg\left(\frac{383}{24}-z_0\right)/(2\pi)\right\rfloor} z_0^{-1/2-1/2\left\lfloor\arg\left(\frac{383}{24}-z_0\right)/(2\pi)\right\rfloor}\right)\Big/\left(2\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{383}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$

[-(exp(Pi*sqrt(24/6-1/144)) / (2sqrt(24-1/24)) + (exp(Pi/2*sqrt(Pi/6-1/144)) / (sqrt(24-1/24))]

Input:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{24}{6}-\frac{1}{144}}\right)}{2\sqrt{24-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{24-\frac{1}{24}}}\right)$$

Open code

Exact result:

$$-\frac{1}{5}\sqrt{\frac{6}{23}}\,e^{\left(5\sqrt{23}\,\pi\right)/12}-\frac{2}{5}\sqrt{\frac{6}{23}}\,e^{1/2\sqrt{\pi/6-1/144}\,\pi}$$

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Decimal approximation:

- More digits

-55.0350864316374396091524112838137802449821710998154612076...

Alternate forms:

$$-\frac{1}{5}\sqrt{\frac{6}{23}}\left(e^{\left(5\sqrt{23}\,\pi\right)/12}+2\,e^{1/24\,\pi\sqrt{24\pi-1}}\right)$$

Open code

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$$-\frac{1}{5}\sqrt{\frac{6}{23}}\,e^{\left(5\sqrt{23}\,\pi\right)/12}-\frac{2}{5}\sqrt{\frac{6}{23}}\,e^{1/24\,\pi\,\sqrt{24\,\pi-1}}$$

Continued fraction:

- Linear form

$$-55+\cfrac{1}{-28+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-238+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-12+\cfrac{1}{-2+\cfrac{1}{-22+\cfrac{1}{-2+\cfrac{1}{-3+\cfrac{1}{-1+\cfrac{1}{-3+\cfrac{1}{\cdots}}}}}}}}}}}}}}$$

Series representations:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{24}{6}-\frac{1}{144}}\right)}{2\sqrt{24-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\,\pi\right)}{\sqrt{24-\frac{1}{24}}}\right)=$$

$$-\left(\left(\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{575}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+\right.\right.$$
$$\left.\left.2\exp\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\right/$$
$$\left(2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{575}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\quad \text{for not } ((z_0\in\mathbb{R}\text{ and }-\infty<z_0\le 0))$$

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$$-\left(\frac{\exp\left(\pi\sqrt{\frac{24}{6}-\frac{1}{144}}\right)}{2\sqrt{24-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\;\pi\right)}{\sqrt{24-\frac{1}{24}}}\right)=$$

$$-\left(\left(\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{575}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{575}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+2\exp\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(2\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{575}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{575}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$ for ($x \in \mathbb{R}$ and $x < 0$)

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{24}{6}-\frac{1}{144}}\right)}{2\sqrt{24-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\;\pi\right)}{\sqrt{24-\frac{1}{24}}}\right)=$$

$$-\left(\left(\left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{575}{144}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{575}{144}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{575}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+2\exp\left(\frac{1}{2}\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\left(\frac{1}{z_0}\right)^{-1/2\left\lfloor\arg\left(\frac{575}{24}-z_0\right)/(2\pi)\right\rfloor} z_0^{-1/2-1/2\left\lfloor\arg\left(\frac{575}{24}-z_0\right)/(2\pi)\right\rfloor}\right)\Big/\left(2\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{575}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$

[-(exp(Pi*sqrt(48/6-1/144)) / (2sqrt(48-1/24)) + (exp(Pi/2*sqrt(Pi/6-1/144)) / (sqrt(48-1/24))]

Exact result:

$$-\sqrt{\frac{6}{1151}}\, e^{\left(\sqrt{1151}\,\pi\right)/12} - 2\sqrt{\frac{6}{1151}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi}$$

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Decimal approximation:

- More digits

$-520.3249771754152262190453751496029668305626206171 04898006\ldots$

A good approximation to the rest mass of Eta meson

Alternate forms:

$$-\sqrt{\frac{6}{1151}}\left(e^{\left(\sqrt{1151}\,\pi\right)/12} + 2\, e^{1/24\,\pi\sqrt{24\,\pi-1}}\right)$$

Open code

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$$-\sqrt{\frac{6}{1151}}\, e^{\left(\sqrt{1151}\,\pi\right)/12} - 2\sqrt{\frac{6}{1151}}\, e^{1/24\,\pi\sqrt{24\,\pi-1}}$$

Continued fraction:

- Linear form

$$-520+\cfrac{1}{-3+\cfrac{1}{-12+\cfrac{1}{-1+\cfrac{1}{-26+\cfrac{1}{-2+\cfrac{1}{-5+\cfrac{1}{-2+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-5+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}$$

Series representations:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{48}{6}-\frac{1}{144}}\right)}{2\sqrt{48-\frac{1}{24}}} + \frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\,\pi\right)}{\sqrt{48-\frac{1}{24}}}\right) = -\left(\left(\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1151}{144}-z_0\right)^k z_0^{-k}}{k!}\right) + 2\exp\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1151}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right) \quad \text{for not } \left(\left(z_0\in\mathbb{R} \text{ and } -\infty < z_0 \le 0\right)\right)$$

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$$-\left(\frac{\exp\left(\pi\sqrt{\frac{48}{6}-\frac{1}{144}}\right)}{2\sqrt{48-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\ \pi\right)}{\sqrt{48-\frac{1}{24}}}\right)=$$

$$-\left(\left(\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1151}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1151}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+\right.\right.$$
$$2\exp\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\right.$$
$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/$$
$$\left(2\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1151}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1151}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right) \text{ for } (x\in\mathbb{R} \text{ and } x<0)$$

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{48}{6}-\frac{1}{144}}\right)}{2\sqrt{48-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\ \pi\right)}{\sqrt{48-\frac{1}{24}}}\right)=$$

$$-\left(\left(\left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{1151}{144}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{1151}{144}-z_0\right)/(2\pi)\right\rfloor\right)}\right.\right.\right.\right.$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1151}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+$$
$$2\exp\left(\frac{1}{2}\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor\right)}\right.$$
$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$
$$\left.\left(\frac{1}{z_0}\right)^{-1/2\left\lfloor\arg\left(\frac{1151}{24}-z_0\right)/(2\pi)\right\rfloor} z_0^{-1/2-1/2\left\lfloor\arg\left(\frac{1151}{24}-z_0\right)/(2\pi)\right\rfloor}\right)\Big/$$
$$\left.\left(2\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{1151}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$

[-(exp(Pi*sqrt(54/6-1/144)) / (2sqrt(54-1/24)) + (exp(Pi/2*sqrt(Pi/6-1/144)) / (sqrt(54-1/24))]

Input:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{54}{6}-\frac{1}{144}}\right)}{2\sqrt{54-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{54-\frac{1}{24}}}\right)$$

Open code

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Exact result:

$$-\sqrt{\frac{6}{1295}}\, e^{\left(\sqrt{1295}\,\pi\right)/12}-2\sqrt{\frac{6}{1295}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi}$$

Decimal approximation:

- More digits

$$-840.829384784908297995410706810926169820451153617261985029\ldots$$

Alternate forms:

$$-\sqrt{\frac{6}{1295}}\left(e^{\left(\sqrt{1295}\,\pi\right)/12}+2\,e^{1/24\,\pi\sqrt{24\,\pi-1}}\right)$$

Open code

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$$-\sqrt{\frac{6}{1295}}\, e^{\left(\sqrt{1295}\,\pi\right)/12}-2\sqrt{\frac{6}{1295}}\, e^{1/24\,\pi\sqrt{24\,\pi-1}}$$

We note that:

Pi [-(exp(Pi*sqrt(54/6-1/144)) / (2sqrt(54-1/24)) + (exp(Pi/2*sqrt(Pi^2/6-1/144)) / (sqrt(54-1/24))] Pi [-(exp(Pi*sqrt(54/6-1/144)) / (2sqrt(54-1/24)) + (exp(Pi/2*sqrt(Pi^2/6-1/144)) / (sqrt(54-1/24))]

Input:

$$\pi\left(-\left(\frac{\exp\left(\pi\sqrt{\frac{54}{6}-\frac{1}{144}}\right)}{2\sqrt{54-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{54-\frac{1}{24}}}\right)\right)$$

Open code

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Exact result:

$$\left(-\sqrt{\frac{6}{1295}}\, e^{\left(\sqrt{1295}\,\pi\right)/12} - 2\sqrt{\frac{6}{1295}}\, e^{1/2\,\pi\sqrt{\pi^2/6-1/144}}\right)\pi$$

Decimal approximation:

- More digits

$-2643.4137936914294434293756361427097003047469550912601446 6\ldots$

This result is very near to the rest mass of charmed Xi baryon

Alternate forms:

$$-\sqrt{\frac{6}{1295}}\left(e^{\left(\sqrt{1295}\,\pi\right)/12} + 2\, e^{1/24\,\pi\sqrt{24\,\pi^2-1}}\right)\pi$$

Open code

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$$-\sqrt{\frac{6}{1295}}\, e^{\left(\sqrt{1295}\,\pi\right)/12}\,\pi - 2\sqrt{\frac{6}{1295}}\, e^{1/2\,\pi\sqrt{\pi^2/6-1/144}}\,\pi$$

Continued fraction:

- Linear form

$$-2643+\cfrac{1}{-2+\cfrac{1}{-2+\cfrac{1}{-2+\cfrac{1}{-2+\cfrac{1}{-2021+\cfrac{1}{-1+\cfrac{1}{-6+\cfrac{1}{-3+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{\ldots}}}}}}}}}}}}}}$$

and that the result -2643,4137... is practically equal to the rest mass of charmed Xi baryon 2645.9±0.5 with minus sign.

[-(exp(Pi*sqrt(256/6-1/144)) / (2sqrt(256-1/24)) + (exp(Pi/2*sqrt(Pi/6-1/144)) / (sqrt(256-1/24))]

Input:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{256}{6}-\frac{1}{144}}\right)}{2\sqrt{256-\frac{1}{24}}} + \frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{256-\frac{1}{24}}}\right)$$

Open code

Exact result:

$$-\sqrt{\frac{6}{6143}}\, e^{\left(\sqrt{6143}\,\pi\right)/12} - 2\sqrt{\frac{6}{6143}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi}$$

Decimal approximation:

- More digits

$$-2.5481741128894845511527240984310489334247038391341796\ldots \times 10^7$$

Open code

Enlarge Data Customize A Plaintext Interactive

Alternate forms:

$$-\sqrt{\frac{6}{6143}}\left(e^{\left(\sqrt{6143}\,\pi\right)/12} + 2\, e^{1/24\,\pi\sqrt{24\,\pi-1}}\right)$$

Open code

$$-\sqrt{\frac{6}{6143}}\, e^{\left(\sqrt{6143}\,\pi\right)/12} - 2\sqrt{\frac{6}{6143}}\, e^{1/24\,\pi\sqrt{24\,\pi-1}}$$

Continued fraction:

- Linear form

$$-25\,481\,741 + \cfrac{1}{-7 + \cfrac{1}{-1 + \cfrac{1}{-3 + \cfrac{1}{-7 + \cfrac{1}{-3 + \cfrac{1}{-5 + \cfrac{1}{-1 + \cfrac{1}{-1 + \cfrac{1}{-1 + \cfrac{1}{-1 + \cfrac{1}{-5 + \cfrac{1}{-1 + \cfrac{1}{-38 + \cfrac{1}{\ldots}}}}}}}}}}}}}}$$

((-[-(exp(Pi*sqrt(256/6-1/144)) / (2sqrt(256-1/24)) + (exp(Pi/2*sqrt(Pi/6-1/144)) / (sqrt(256-1/24))]))^1/3 * 2Pi

Input:

$$-\left(-\sqrt[3]{\frac{\exp\left(\pi\sqrt{\frac{256}{6}-\frac{1}{144}}\right)}{2\sqrt{256-\frac{1}{24}}} + \frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{256-\frac{1}{24}}}} \times 2\,\pi\right)$$

Open code

- Units »

Exact result:

$$2\sqrt[3]{\sqrt{\frac{6}{6143}}\, e^{\left(\sqrt{6143}\,\pi\right)/12} + 2\sqrt{\frac{6}{6143}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi}}\;\pi$$

- Units »

Enlarge Data Customize A Plaintext Interactive

Decimal approximation:

- More digits

1848.940355032163723639557516290408915880979834826482144597...

Open code

Alternate form:

$$2\sqrt[6]{\frac{6}{6143}}\sqrt[3]{e^{\left(\sqrt{6143}\,\pi\right)/12} + 2\,e^{1/24\,\pi\sqrt{24\,\pi-1}}}\;\pi$$

Continued fraction:

- Linear form

$$1848+\cfrac{1}{1+\cfrac{1}{15+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{21+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{7+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}$$

The result 1848.94 is a good approximation to the rest mass of D meson 1864.84±0.17

[-(exp(Pi*sqrt(496/6-1/144)) / (2sqrt(496-1/24)) + (exp(Pi/2*sqrt(Pi^2/6-1/144)) / (sqrt(496-1/24))]

Input:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{496}{6}-\frac{1}{144}}\right)}{2\sqrt{496-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{496-\frac{1}{24}}}\right)$$

Open code

Exact result:

$$-\sqrt{\frac{6}{11903}}\ e^{\left(\sqrt{11903}\ \pi\right)/12}-2\sqrt{\frac{6}{11903}}\ e^{1/2\,\pi\sqrt{\pi^2/6-1/144}}$$

Decimal approximation:

- More digits

$-5.6990363731664635536247801023765932903622620075767 23\ldots\times 10^{10}$

Open code

Alternate forms:

$$-\sqrt{\frac{6}{11903}}\left(e^{\left(\sqrt{11903}\ \pi\right)/12}+2\,e^{1/24\,\pi\sqrt{24\,\pi^2-1}}\right)$$

Open code

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$$-\sqrt{\frac{6}{11903}}\ e^{\left(\sqrt{11903}\ \pi\right)/12}-2\sqrt{\frac{6}{11903}}\ e^{1/24\,\pi\sqrt{24\,\pi^2-1}}$$

(((27-[-(exp(Pi*sqrt(496/6-1/144)) / (2sqrt(496-1/24)) + (exp(Pi/2*sqrt(Pi^2/6-1/144)) / (sqrt(496-1/24))]))^1/4 * 2Pi

Input:

$$27--\sqrt[4]{\frac{\exp\left(\pi\sqrt{\frac{496}{6}-\frac{1}{144}}\right)}{2\sqrt{496-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{496-\frac{1}{24}}}}\times 2\,\pi$$

Open code

Exact result:

$$27+2\sqrt[4]{\sqrt{\frac{6}{11903}}\ e^{\left(\sqrt{11903}\ \pi\right)/12}+2\sqrt{\frac{6}{11903}}\ e^{1/2\,\pi\sqrt{\pi^2/6-1/144}}}\ \pi$$

Decimal approximation:

- More digits

3096.9423892754151191961413967292122788861600290498262 29679...

Open code

Enlarge Data Customize A Plaintext Interactive

Alternate forms:

$$27+2\sqrt[8]{\frac{6}{11903}}\ \sqrt[4]{e^{\left(\sqrt{11903}\ \pi\right)/12}+2\,e^{1/24\,\pi\sqrt{24\,\pi^2-1}}}\ \pi$$

Open code

$$\frac{321381 + 2\sqrt[8]{6}\ 11903^{7/8}\sqrt[4]{e^{(\sqrt{11903}\ \pi)/12} + 2\, e^{1/24\,\pi\sqrt{24\pi^2-1}}\ \pi}}{11903}$$

Continued fraction:

- Linear form

$$3096 + \cfrac{1}{1 + \cfrac{1}{16 + \cfrac{1}{2 + \cfrac{1}{1 + \cfrac{1}{3 + \cfrac{1}{1 + \cfrac{1}{6 + \cfrac{1}{7 + \cfrac{1}{1991 + \cfrac{1}{1 + \cfrac{1}{4 + \cfrac{1}{30 + \cfrac{1}{1 + \cfrac{1}{12 + \cfrac{1}{1 + \cfrac{1}{5 + \cfrac{1}{2 + \cfrac{1}{11 + \cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}$$

The result 3096,94 is practically equal to the rest mass of the J/Psi meson 3096.916±0.011

[-(exp(Pi*sqrt(1024/6-1/144)) / (2sqrt(1024-1/24)) + (exp(Pi/2*sqrt(Pi/6-1/144)) / (sqrt(1024-1/24))]

Input:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{1024}{6} - \frac{1}{144}}\right)}{2\sqrt{1024 - \frac{1}{24}}} + \frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6} - \frac{1}{144}}\right)}{\sqrt{1024 - \frac{1}{24}}}\right)$$

Open code

Exact result:

$$-\frac{1}{5}\sqrt{\frac{6}{983}}\ e^{(5\sqrt{983}\ \pi)/12} - \frac{2}{5}\sqrt{\frac{6}{983}}\ e^{1/2\sqrt{\pi/6-1/144}\ \pi}$$

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Decimal approximation:

- More digits

$-1.0413681084062793994131559579046067548067830370957726\ldots \times 10^{16}$

Open code

Alternate forms:

$$-\frac{1}{5}\sqrt{\frac{6}{983}}\left(e^{\left(5\sqrt{983}\,\pi\right)/12}+2\,e^{1/24\,\pi\sqrt{24\,\pi-1}}\right)$$

Open code

$$-\frac{1}{5}\sqrt{\frac{6}{983}}\,e^{\left(5\sqrt{983}\,\pi\right)/12}-\frac{2}{5}\sqrt{\frac{6}{983}}\,e^{1/24\,\pi\sqrt{24\,\pi-1}}$$

Continued fraction:

- Linear form

$$-10\,413\,681\,084\,062\,793+\cfrac{1}{-1+\cfrac{1}{-169+\cfrac{1}{-2+\cfrac{1}{-2+\cfrac{1}{-12+\cfrac{1}{-1+\cfrac{1}{-4+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{\dots}}}}}}}}}}$$

(((-[-(exp(Pi*sqrt(1024/6-1/144)) / (2sqrt(1024-1/24)) + (exp(Pi/2*sqrt(Pi/6-1/144)) / (sqrt(1024-1/24))]))^1/6 * 2Pi

Input:

$$-\left(-\sqrt[6]{\frac{\exp\left(\pi\sqrt{\frac{1024}{6}-\frac{1}{144}}\right)}{2\sqrt{1024-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{1024-\frac{1}{24}}}}\times 2\,\pi\right)$$

Open code

Exact result:

$$2\sqrt[6]{\frac{1}{5}\sqrt{\frac{6}{983}}\,e^{\left(5\sqrt{983}\,\pi\right)/12}+\frac{2}{5}\sqrt{\frac{6}{983}}\,e^{1/2\sqrt{\pi/6-1/144}\,\pi}}\;\pi$$

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Decimal approximation:

- More digits

2936.165832636106007583223363922232337304567574612003522605...

Open code

Alternate form:

$$\frac{2\sqrt[12]{\frac{6}{983}}\,\pi}{\sqrt[6]{\frac{5}{e^{(5\sqrt{983}\,\pi)/12}+2\,e^{1/24\,\pi\sqrt{24\,\pi-1}}}}}$$

- Continued fraction:
  Linear form

$$2936+\cfrac{1}{6+\cfrac{1}{33+\cfrac{1}{7+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{25+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{15+\cfrac{1}{71+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}$$

The result 2936,1658 is a good approximation to the rest mass of the Charmed eta meson 2980.3±1.2

In conclusion, we have:

[-(exp(Pi*sqrt(4096/6-1/144)) / (2sqrt(4096-1/24)) + (exp(Pi/2*sqrt(Pi^2/6-1/144)) / (sqrt(4096-1/24))]

Input:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{4096}{6}-\frac{1}{144}}\right)}{2\sqrt{4096-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{4096-\frac{1}{24}}}\right)$$

Open code

Exact result:

$$-\sqrt{\frac{6}{98\,303}}\,e^{(\sqrt{98\,303}\,\pi)/12}-2\sqrt{\frac{6}{98\,303}}\,e^{1/2\,\pi\sqrt{\pi^2/6-1/144}}$$

- Decimal approximation:
  More digits

$-3.4744576197027010194944611897424702234743707300635 89\ldots\times10^{33}$

Open code

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Alternate forms:

$$-\sqrt{\frac{6}{98303}}\left(e^{\left(\sqrt{98303}\,\pi\right)/12}+2\,e^{1/24\,\pi\sqrt{24\,\pi^2-1}}\right)$$

Open code

$$-\sqrt{\frac{6}{98303}}\,e^{\left(\sqrt{98303}\,\pi\right)/12}-2\sqrt{\frac{6}{98303}}\,e^{1/24\,\pi\sqrt{24\,\pi^2-1}}$$

Continued fraction:

- Linear form

$$-3474457619702701019494461189742470+\cfrac{1}{-4+\cfrac{1}{-2+\cfrac{1}{-9+\cfrac{1}{-2+\cfrac{1}{-2+\cfrac{1}{\dots}}}}}}$$

2Pi * ln(((-[-(exp(Pi*sqrt(4096/6-1/144)) / (2sqrt(4096-1/24)) + (exp(Pi/2*sqrt(Pi^2/6-1/144)) / (sqrt(4096-1/24))])))

Input:

$$2\,\pi\log\left(-\left(-\left(\frac{\exp\left(\pi\sqrt{\frac{4096}{6}-\frac{1}{144}}\right)}{2\sqrt{4096-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{4096-\frac{1}{24}}}\right)\right)\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Exact result:

$$2\,\pi\log\left(\sqrt{\frac{6}{98303}}\,e^{\left(\sqrt{98303}\,\pi\right)/12}+2\sqrt{\frac{6}{98303}}\,e^{1/2\,\pi\sqrt{\pi^2/6-1/144}}\right)$$

Decimal approximation:

- More digits

485.2550913884254054893620260853642044016470740645878905363...

Alternate forms:

- More

$$\log\left(\left(\frac{6}{98303}\right)^{\pi}\left(e^{\left(\sqrt{98303}\,\pi\right)/12}+2\,e^{1/24\,\pi\sqrt{24\,\pi^2-1}}\right)^{2\,\pi}\right)$$

Open code

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$$2\pi\log\left(\sqrt{\frac{6}{98303}}\left(e^{\left(\sqrt{98303}\,\pi\right)/12}+2\,e^{1/24\,\pi\sqrt{24\,\pi^2-1}}\right)\right)$$

Open code

$$2\pi\log\left(e^{\left(\sqrt{98303}\,\pi\right)/12}+2\,e^{1/24\,\pi\sqrt{24\,\pi^2-1}}\right)-\pi\log\left(\frac{98303}{6}\right)$$

Continued fraction:

- Linear form

$$485+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{11+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{14+\cfrac{1}{48+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}}$$

Alternative representations:

$$2\pi\log\left(-(-1)\left(\frac{\exp\left(\pi\sqrt{\frac{4096}{6}-\frac{1}{144}}\right)}{2\sqrt{4096-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{4096-\frac{1}{24}}}\right)\right)=$$

$$2\pi\log_e\left(\frac{\exp\left(\frac{1}{2}\pi\sqrt{-\frac{1}{144}+\frac{\pi^2}{6}}\right)}{\sqrt{4096-\frac{1}{24}}}+\frac{\exp\left(\pi\sqrt{\frac{4096}{6}-\frac{1}{144}}\right)}{2\sqrt{4096-\frac{1}{24}}}\right)$$

Open code

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$$2\pi\log\left(-(-1)\left(\frac{\exp\left(\pi\sqrt{\frac{4096}{6}-\frac{1}{144}}\right)}{2\sqrt{4096-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{4096-\frac{1}{24}}}\right)\right)=$$

$$2\pi\log(a)\log_a\left(\frac{\exp\left(\frac{1}{2}\pi\sqrt{-\frac{1}{144}+\frac{\pi^2}{6}}\right)}{\sqrt{4096-\frac{1}{24}}}+\frac{\exp\left(\pi\sqrt{\frac{4096}{6}-\frac{1}{144}}\right)}{2\sqrt{4096-\frac{1}{24}}}\right)$$

Series representations:

- More

$$2\pi\log\left(-(-1)\left(\frac{\exp\left(\pi\sqrt{\frac{4096}{6}-\frac{1}{144}}\right)}{2\sqrt{4096-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{4096-\frac{1}{24}}}\right)\right)=$$

$$2\pi\log\left(-1+\sqrt{\frac{6}{98\,303}}\,e^{\left(\sqrt{98\,303}\,\pi\right)/12}+2\sqrt{\frac{6}{98\,303}}\,e^{1/24\,\pi\sqrt{-1+24\pi^2}}\right)-$$

$$2\pi\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{-1+\sqrt{\frac{6}{98\,303}}\,e^{\left(\sqrt{98\,303}\,\pi\right)/12}+2\sqrt{\frac{6}{98\,303}}\,e^{1/24\,\pi\sqrt{-1+24\pi^2}}}\right)^k}{k}$$

Open code

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$$2\pi\log\left(-(-1)\left(\frac{\exp\left(\pi\sqrt{\frac{4096}{6}-\frac{1}{144}}\right)}{2\sqrt{4096-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{4096-\frac{1}{24}}}\right)\right)=$$

$$4i\pi^2\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+2\pi\log(z_0)-$$

$$2\pi\sum_{k=1}^{\infty}\frac{(-1)^k\left(\sqrt{\frac{6}{98\,303}}\,e^{\left(\sqrt{98\,303}\,\pi\right)/12}+2\sqrt{\frac{6}{98\,303}}\,e^{1/24\,\pi\sqrt{-1+24\pi^2}}-z_0\right)^k z_0^{-k}}{k}$$

Open code

$$2\pi\log\left(-(-1)\left(\frac{\exp\left(\pi\sqrt{\frac{4096}{6}-\frac{1}{144}}\right)}{2\sqrt{4096-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{4096-\frac{1}{24}}}\right)\right)=$$

$$2\pi\log\left(-1+\sqrt{\frac{6}{98303}}\,e^{\left(\sqrt{98303}\,\pi\right)/12}+2\sqrt{\frac{6}{98303}}\,e^{1/2\,\pi\sqrt{-1/144+\pi^2/6}}\right)-$$

$$2\pi\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{-1+\sqrt{\frac{6}{98303}}\,e^{\left(\sqrt{98303}\,\pi\right)/12}+2\sqrt{\frac{6}{98303}}\,e^{1/24\,\pi\sqrt{-1+24\,\pi^2}}}\right)^k}{k}$$

Integral representations:

$$2\pi\log\left(-(-1)\left(\frac{\exp\left(\pi\sqrt{\frac{4096}{6}-\frac{1}{144}}\right)}{2\sqrt{4096-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{4096-\frac{1}{24}}}\right)\right)=$$

$$2\pi\int_1^{\sqrt{\frac{6}{98303}}\left(e^{\left(\sqrt{98303}\,\pi\right)/12}+2\,e^{1/24\,\pi\sqrt{-1+24\,\pi^2}}\right)}\frac{1}{t}\,dt$$

Open code

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$$2\pi\log\left(-(-1)\left(\frac{\exp\left(\pi\sqrt{\frac{4096}{6}-\frac{1}{144}}\right)}{2\sqrt{4096-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{4096-\frac{1}{24}}}\right)\right)=-i\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}$$

$$\frac{\left(-1+\sqrt{\frac{6}{98303}}\,e^{\left(\sqrt{98303}\,\pi\right)/12}+2\sqrt{\frac{6}{98303}}\,e^{1/24\,\pi\sqrt{-1+24\,\pi^2}}\right)^{-s}\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}$$

$$ds \quad \text{for } -1<\gamma<0$$

The result 485,25 is very near to the value of the rest mass of the Kaon meson 493.677±0.016

From:

Black Hole Entropy and Long Strings

Andreas Blommaert

Academic year 2015-2016
Faculty of Engineering and Architecture
Chair: Prof. dr. Dirk Ryckbosch
Vakgroep Fysica en Sterrenkunde
Master's dissertation submitted in order to obtain the academic degree of Master of Science in Engineering Physics

Counsellor: Prof. dr. Henri Verschelde
Supervisor: Prof. dr. Henri Verschelde

Furthermore, we have that:

The only remaining problem is thus the summation over α. To solve this, it is important to realize that the value M^2 only actually depends on the value of $N^\perp$ of a certain state. The question is thus now how many string states there are in the full open bosonic string spectrum for each value of $N^\perp$. Following the literature we call this number $P_{24}\left(N^\perp\right)$. The number 24 refers to the number of transverse coordinates the oscillators of which contribute to the mass of a certain string state. As explained e.g. in section 2.4, for bosonic open strings in uncompactified 26 dimensional spacetime this number equals 24. $P_{24}\left(N^\perp\right)$ is called the number of partitions of $N^\perp$ (we will not mention the number of transverse coordinates explicitly when talking of the number of partitions in what follows). The single open string partition function is now reduced to

$$Z_1 = \sum_{N^\perp} P_{24}\left(N^\perp\right) Z_{part}\left(N^\perp\right). \tag{3.5}$$

Since we are interested only in the high energy behavior of the single string partition function, we are interested in finding a asymptotic formula for $P_{24}\left(N^\perp\right)$ for high values of $N^\perp$. Although this might not seem difficult for the reader, the problem is tougher than is looks. Luckily for us, is was solved before by Hardy and Ramanujan [22] who found

$$P_{24}(N^\perp) = \frac{1}{\sqrt{2}} N^{\perp -\frac{27}{4}} e^{4\pi\sqrt{N^\perp}} \tag{3.6}$$

or for a more general number of transverse oscillators

$$P_b(N) = \frac{1}{\sqrt{2}} \left(\frac{b}{24}\right)^{\frac{b+1}{4}} N^{-\frac{b+3}{4}} e^{2\pi\sqrt{\frac{Nb}{6}}}. \tag{3.7}$$

And from:

Chapter 16
String thermodynamics and black holes

The result (16.2.29) is only the leading term of the celebrated Hardy-Ramanujan asymptotic expansion of $p(N)$:

$$\boxed{p(N) \simeq \frac{1}{4N\sqrt{3}} \exp\Big(2\pi\sqrt{\frac{N}{6}}\Big)\,.} \qquad (16.2.31)$$

This is not an exact formula either, but is an accurate estimate of $p(N)$, as opposed to our accurate estimate of the logarithm of $p(N)$. We will not give here a derivation of the Hardy-Ramanujan result. It is fun, however, to test the accuracy of the Hardy-Ramanujan expansion. In Table 16.2 we compare the values of $p(N)$, as calculated exactly, with the estimate $p_{\rm est}(N)$ provided by (16.2.31). The estimate gives an error of about one-half of a percent for $N = 10000$.

We now need a minor generalization of (16.2.31). Assume the string can vibrate in d transverse directions. Then, for each frequency $\ell\omega_0$, we must have d harmonic oscillators representing the possible polarizations of the motion. Furthermore, the associated occupation numbers need a superscript labelling the d polarizations:

$$\begin{array}{cccc} n_1^{(1)} & n_1^{(2)} & \ldots & n_1^{(d)} \\ n_2^{(1)} & n_2^{(2)} & \ldots & n_2^{(d)} \\ \ldots & \ldots & \ldots & \ldots \\ n_l^{(1)} & n_l^{(2)} & \ldots & n_l^{(d)} \\ \ldots & \ldots & \ldots & \ldots \end{array} \qquad (16.2.32)$$

In order to sum over all possible states in the new partition function Z_d, we must sum over all possible values of the occupation numbers $n_k^{(q)}$, where

N	$p(N)$	$p(N)_{\text{est}}$	$p(N)/p_{\text{est}}(N)$
5	7	8.94	0.7829
10	42	48.10	0.8731
100	190569292	199281893.25	0.9563
1000	2.406×10^{31}	2.440×10^{31}	0.9860
10000	3.617×10^{106}	3.633×10^{106}	0.9956

Table 16.2: Comparing the exact values of $p(N)$ with the estimate $p(N)_{\text{est}}$ provided by the Hardy-Ramanujan formula.

$k = 1, 2, \ldots, \infty$, and $q = 1, 2, \ldots, d$. This gives

$$Z_d = \sum_{n_k^{(1)}, \ldots, n_k^{(d)}} \exp\Big[-\frac{\hbar\omega_0}{kT} \sum_{\ell=0}^{\infty} \sum_{q=1}^{d} \ell n_\ell^{(q)}\Big]. \tag{16.2.33}$$

The sums over the various $n^{(q)}$ factorize, so,

$$Z_d = \sum_{n_k^{(1)}} \exp\Big[-\frac{\hbar\omega_0}{kT} \sum_{\ell=0}^{\infty} \ell n_\ell^{(1)}\Big] \cdots \sum_{n_k^{(d)}} \exp\Big[-\frac{\hbar\omega_0}{kT} \sum_{\ell=0}^{\infty} \ell n_\ell^{(d)}\Big]. \tag{16.2.34}$$

Each factor here is equal to the previously calculated partition function Z. We therefore have

$$Z_d = (Z)^d. \tag{16.2.35}$$

The new free energy F_d is also easy to calculate:

$$F_d = -kT \ln Z_d = -kT\, d \ln Z = F\, d. \tag{16.2.36}$$

The entropy, obtained by differentiation of the free energy, also acquires a multiplicative factor of d:

$$S_d = S\, d. \tag{16.2.37}$$

For the energy E_d, the same multiplicative factor exists on account of (16.1.6). We also note that E_d is equal to $\hbar\omega_0 N$, where N is now the total occupation number

$$E_d = E\,d = \hbar\omega_0 N\,, \qquad N = \sum_{\ell,q} \ell n_\ell^{(q)}\,. \tag{16.2.38}$$

Using our earlier result for S in (16.2.28) we now have

$$S_d = d\,(k\,2\pi)\sqrt{\frac{1}{6}\frac{E}{\hbar\omega_0}} = k\,2\pi\sqrt{\frac{d}{6}\frac{E\,d}{\hbar\omega_0}} = k\,2\pi\sqrt{\frac{Nd}{6}}\,, \tag{16.2.39}$$

where we made use of (16.2.38).

Let us call $p_d(N)$ the number of partitions of N when we have a d-fold degeneracy. This means, for example, that the partition $\{3,2,1\}$ of 6 now gives rise to many partitions written like $\{3_{p_1}, 2_{p_2}, 1_{p_3}\}$, where we include subscripts p_i that can take all possible values from one to d. A partition with different subscripts is considered a different partition. We now see that, for a given energy, with associated number N, the number of states is $p_d(N)$. Therefore $S_d = k\ln p_d(N)$, and comparing with (16.2.39) we conclude that for large N

$$\ln\, p_d(N) \simeq 2\pi\sqrt{\frac{Nd}{6}}\,. \tag{16.2.40}$$

The more accurate version of this result can be shown to be

$$p_d(N) \simeq \frac{1}{\sqrt{2}}\left(\frac{d}{24}\right)^{(d+1)/4} N^{-(d+3)/4}\exp\left(2\pi\sqrt{\frac{Nd}{6}}\right)\,. \tag{16.2.41}$$

You can see that for $d = 1$ this reduces to $p(N)$, as given in (16.2.31). For $d = 24$, the number of transverse light-cone directions in the bosonic string, the expression simplifies a little:

$$\boxed{p_{24}(N) \simeq \frac{1}{\sqrt{2}} N^{-27/4}\exp\left(4\pi\sqrt{N}\right)\,.} \tag{16.2.42}$$

Note that, from the Table 16.2, and utilizing the Ramanujan equation, we obtain:

0.57516 ((((((-[-(exp(Pi*sqrt(10000/6-1/144)) / (2sqrt(10000-1/24)) + (exp(Pi/2*sqrt(Pi^2/6-1/144)) / (sqrt(10000-1/24))])))))))^2

Input:

$$0.57516\left(-\left(-\left(\frac{\exp\left(\pi\sqrt{\frac{10000}{6}-\frac{1}{144}}\right)}{2\sqrt{10000-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{10000-\frac{1}{24}}}\right)\right)\right)^2$$

Open code

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Result:

- More digits

$3.61711\ldots \times 10^{106}$

Series representations:

$$0.57516(-1)\left(-\left(\frac{\exp\left(\pi\sqrt{\frac{10000}{6}-\frac{1}{144}}\right)}{2\sqrt{10000-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{10000-\frac{1}{24}}}\right)^2\right)=$$

$$\left(0.14379\left(\exp^2\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{239999}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+\right.\right.$$
$$4\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{239999}{144}-z_0\right)^k z_0^{-k}}{k!}\right)$$
$$\exp\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)^k z_0^{-k}}{k!}\right)+$$
$$\left.\left.4\exp^2\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\right)\Big/$$
$$\left(\sqrt{z_0}^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{239999}{24}-z_0\right)^k z_0^{-k}}{k!}\right)^2\right)$$

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

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$$0.57516(-1)\left(-\left(\frac{\exp\left(\pi\sqrt{\frac{10000}{6}-\frac{1}{144}}\right)}{2\sqrt{10000-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{10000-\frac{1}{24}}}\right)\right)^2=$$

$$\left(0.14379\left(\exp^2\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{239999}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{239999}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+\right.\right.$$

$$4\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{239999}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{239999}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\exp\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi^2}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\right.$$

$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi^2}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+$$

$$4\exp^2\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi^2}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\right.$$

$$\left.\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi^2}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\right)\Big/$$

$$\left(\exp^2\left(i\pi\left\lfloor\frac{\arg\left(\frac{239999}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{239999}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^2\right)$$

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

$$0.57516(-1)\left(\left(-\left(\frac{\exp\left(\pi\sqrt{\frac{10000}{6}-\frac{1}{144}}\right)}{2\sqrt{10000-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{10000-\frac{1}{24}}}\right)\right)\right)^2=$$

$$\Bigg(0.14379\Bigg(\exp^2\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{239999}{144}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{239999}{144}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{239999}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+$$

$$4\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{239999}{144}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{239999}{144}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{239999}{144}-z_0\right)^k z_0^{-k}}{k!}\right)$$

$$\exp\left(\frac{1}{2}\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)^k z_0^{-k}}{k!}\right)+$$

$$4\exp^2\left(\frac{1}{2}\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\Bigg)$$

$$\left(\frac{1}{z_0}\right)^{-\left\lfloor\arg\left(\frac{239999}{24}-z_0\right)/(2\pi)\right\rfloor} z_0^{-1-\left\lfloor\arg\left(\frac{239999}{24}-z_0\right)/(2\pi)\right\rfloor}\Bigg)\Bigg/\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{239999}{24}-z_0\right)^k z_0^{-k}}{k!}\right)^2$$

Result practically equal to the value as in the Table, i.e. for N = 10000 p(N) = 3,617 * 10^{106}. Also for N = 5, N = 10, N = 100 and N = 1000, we obtain similar results.

0.1329 ((((((-[-(exp(Pi*sqrt(5/6-1/144)) / (2sqrt(5-1/24)) + (exp(Pi/2*sqrt(Pi^2/6-1/144)) / (sqrt(5-1/24))])))))))^2

Input:

$$0.1329\left(-\left(-\left(\frac{\exp\left(\pi\sqrt{\frac{5}{6}-\frac{1}{144}}\right)}{2\sqrt{5-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{5-\frac{1}{24}}}\right)^2\right)\right)$$

Open code

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Result:

- Fewer digits
- More digits

7.000489715690419184227742861162617611770809936686792152198...

Series representations:

$$0.1329(-1)\left(-\left(\frac{\exp\left(\pi\sqrt{\frac{5}{6}-\frac{1}{144}}\right)}{2\sqrt{5-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{5-\frac{1}{24}}}\right)^2\right)=$$

$$\left(0.033225\left(\exp^2\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{119}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+\right.\right.$$

$$4\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{119}{144}-z_0\right)^k z_0^{-k}}{k!}\right)$$

$$\exp\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)^k z_0^{-k}}{k!}\right)+$$

$$\left.\left.4\exp^2\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\right)\Bigg/$$

$$\left(\sqrt{z_0}^{\,2}\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{119}{24}-z_0\right)^k z_0^{-k}}{k!}\right)^2\right)$$

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

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$$0.1329\,(-1)\left(-\left(\frac{\exp\left(\pi\sqrt{\frac{5}{6}-\frac{1}{144}}\right)}{2\sqrt{5-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{5-\frac{1}{24}}}\right)\right)^2 =$$

$$\Bigg(0.033225\left(\exp^2\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{119}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{119}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+\right.$$

$$4\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{119}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{119}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\exp\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi^2}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\right.$$

$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi^2}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+$$

$$4\exp^2\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi^2}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\right.$$

$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi^2}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Bigg)\Bigg/$$

$$\left(\exp^2\left(i\pi\left\lfloor\frac{\arg\left(\frac{119}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{119}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^2\right)$$

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

$$0.1329(-1)\left(-\left(\frac{\exp\left(\pi\sqrt{\frac{5}{6}-\frac{1}{144}}\right)}{2\sqrt{5-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{5-\frac{1}{24}}}\right)\right)^2=$$

$$\Bigg(0.033225\Bigg(\exp^2\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{119}{144}-z_0\right)/(2\pi)\right\rfloor}z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{119}{144}-z_0\right)/(2\pi)\right\rfloor\right)}\right.$$

$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{119}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+4\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{119}{144}-z_0\right)/(2\pi)\right\rfloor}\right.$$

$$\left.z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{119}{144}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{119}{144}-z_0\right)^k z_0^{-k}}{k!}\right)$$

$$\exp\left(\frac{1}{2}\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)/(2\pi)\right\rfloor}z_0^{1/2\left(1+\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)/(2\pi)\right\rfloor\right)}\right.$$

$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)^k z_0^{-k}}{k!}\right)+$$

$$4\exp^2\left(\frac{1}{2}\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)/(2\pi)\right\rfloor}z_0^{1/2\left(1+\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)/(2\pi)\right\rfloor\right)}\right.$$

$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi^2}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$

$$\left.\left(\frac{1}{z_0}\right)^{-\left\lfloor\arg\left(\frac{119}{24}-z_0\right)/(2\pi)\right\rfloor}z_0^{-1-\left\lfloor\arg\left(\frac{119}{24}-z_0\right)/(2\pi)\right\rfloor}\right)\Bigg/$$

$$\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{119}{24}-z_0\right)^k z_0^{-k}}{k!}\right)^2$$

0.321158 ((((((-[-(exp(Pi*sqrt(10/6-1/144)) / (2sqrt(10-1/24)) + (exp(Pi/2*sqrt(Pi^2/6-1/144)) / (sqrt(10-1/24))])))))))^2

Input interpretation:

$$0.321158\left(-\left(-\left(\frac{\exp\left(\pi\sqrt{\frac{10}{6}-\frac{1}{144}}\right)}{2\sqrt{10-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{10-\frac{1}{24}}}\right)^2\right)\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

42.00078768262369264059794486211334619364672129732630395117...

0.554792 ((((((-[-(exp(Pi*sqrt(100/6-1/144)) / (2sqrt(100-1/24)) + (exp(Pi/2*sqrt(Pi^2/6-1/144)) / (sqrt(100-1/24))])))))))^2

Input interpretation:

$$0.554792\left(-\left(-\left(\frac{\exp\left(\pi\sqrt{\frac{100}{6}-\frac{1}{144}}\right)}{2\sqrt{100-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{100-\frac{1}{24}}}\right)^2\right)\right)$$

Open code

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Result:

- More digits

$1.90569... \times 10^8$

0.57032 ((((((-[-(exp(Pi*sqrt(1000/6-1/144)) / (2sqrt(1000-1/24)) + (exp(Pi/2*sqrt(Pi^2/6-1/144)) / (sqrt(1000-1/24))])))))))^2

Input:

$$0.57032\left(-\left(-\left(\frac{\exp\left(\pi\sqrt{\frac{1000}{6}-\frac{1}{144}}\right)}{2\sqrt{1000-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi^2}{6}-\frac{1}{144}}\right)}{\sqrt{1000-\frac{1}{24}}}\right)^2\right)\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$2.40652... \times 10^{31}$

Now, we take the expression

[-(exp(Pi*sqrt(16/6-1/144)) / (2sqrt(16-1/24)) + (exp(Pi/2*sqrt(Pi/6-1/144)) / (sqrt(16-1/24))]

Input:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{16}{6}-\frac{1}{144}}\right)}{2\sqrt{16-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{16-\frac{1}{24}}}\right)$$

Open code

Exact result:

$$-\sqrt{\frac{6}{383}}\,e^{(\sqrt{383}\,\pi)/12}-2\sqrt{\frac{6}{383}}\,e^{1/2\sqrt{\pi/6-1/144}\,\pi}$$

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Decimal approximation:

- More digits

$-21.79216045662547471274594246216624434809675314057232672 07...$

The result is about -21,79216. This is the coefficient of q^n in the next mathematical expressions.

We have that:

When $q=-e^{-t}$ and $t\to 0$

$$f(q)+\sqrt{\frac{\pi}{t}}\exp\left(\frac{\pi^2}{24t}-\frac{t}{24}\right)\to 4.$$

The coefficient of q^n in $f(q)$ is

$$(-1)^{n-1}\frac{\exp\left(\pi\sqrt{\frac{n}{6}-\frac{1}{144}}\right)}{2\sqrt{n-\frac{1}{24}}}+O\left(\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{n-\frac{1}{24}}}\right)$$

Now, we take n = 16 and obtain, considering the following develop of the above formula:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{16}{6}-\frac{1}{144}}\right)}{2\sqrt{16-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{16-\frac{1}{24}}}\right)$$

the value -21.79216 (the coefficient).

Thence q = coefficient * $-e^{-t}$;   for t = 0.5, q = ($-e^{-0.5}$) -21.79216   for each q.

For example: $q^5 = ((-e^{-0.5})* -21.79216)^5$ and so on.

Now:

The coefficient of q^n in $f(q)$ is

$$(-1)^{n-1}\frac{\exp\left(\pi\sqrt{\frac{n}{6}-\frac{1}{144}}\right)}{2\sqrt{n-\frac{1}{24}}}+O\left(\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{n-\frac{1}{24}}}\right)$$

It is inconceivable that a single ϑ function could be found to cut out the singularities of $f(q)$.

<u>Mock ϑ-functions</u>

$$\phi(q)=1+\frac{q}{1+q^2}+\frac{q^4}{(1+q^2)(1+q^4)}+\dots$$

$$\psi(q)=\frac{q}{1-q}+\frac{q^4}{(1-q)(1-q^3)}+\frac{q^9}{(1-q)(1-q^3)(1-q^5)}+\dots$$

$$\chi(q)=1+\frac{q}{1-q+q^2}+\frac{q^4}{(1-q+q^2)(1-q^2+q^4)}+\dots$$

These are related to $f(q)$ as shown below.

$$2\phi(-q)-f(q)=f(q)+4\psi(-q)$$

$$=\frac{1-2q+2q^4-2q^9+\dots}{(1+q)(1+q^2)(1+q^3)\dots}$$

$$4\chi(q)-f(q)=\frac{(1-2q^3+2q^{12}-\dots)^2}{(1-q)(1-q^2)(1-q^3)\dots}$$

These are of the 3rd order.

We have that, for t = 2:

((((1- 2((-e^-2 *(-21.79216))+2((-e^-2 *(-21.79216))^4-2((-e^-2 *(-21.79216))^9)))) / (((((1+((-e^-2 *(-21.79216)))(((1+((-e^-2 *(-21.79216))^2))))(((((1+((-e^-2 *(-21.79216))^3))))

Input interpretation:

$$\frac{1-\frac{2(-(-21.79216))}{e^2}+2\left(\left(-\frac{-21.79216}{e^2}\right)^4-2\left(-\frac{-21.79216}{e^2}\right)^9\right)}{\left(1--\frac{21.79216}{e^2}\right)\left(1+\left(-\frac{-21.79216}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.79216}{e^2}\right)^3\right)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

−66.0051133800458917738884796007671739802453535254896602167...

Alternative representation:

$$\frac{1-\frac{2(-1)(-21.7922)}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}=\frac{1-\frac{2(-1)(-21.7922)}{\exp^2(z)}+2\left(\left(-\frac{-21.7922}{\exp^2(z)}\right)^4-2\left(-\frac{-21.7922}{\exp^2(z)}\right)^9\right)}{\left(1--\frac{21.7922}{\exp^2(z)}\right)\left(1+\left(-\frac{-21.7922}{\exp^2(z)}\right)^2\right)\left(1+\left(-\frac{-21.7922}{\exp^2(z)}\right)^3\right)} \text{ for } z=1$$

Open code

Series representations:

- More

$$\frac{1-\frac{2(-1)(-21.7922)}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}=\frac{9.33681\times10^{-9}\left(1+\sum_{k=0}^{\infty}\frac{-4.43366\times10^{12}(-18)^k+451057.(-8)^k-43.5843(-2)^k}{k!}\right)}{\left(0.0000966271+\sum_{k=0}^{\infty}\frac{(-6)^k}{k!}\right)\left(0.00210571+\sum_{k=0}^{\infty}\frac{(-4)^k}{k!}\right)\left(0.0458881+\sum_{k=0}^{\infty}\frac{(-2)^k}{k!}\right)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{1-\frac{2(-1)(-21.7922)}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}=$$

$$-\left(\left(41\,396.2\left(z^{18}-1.01735\times10^{-7}\,z^8\left(\sum_{k=0}^{\infty}\frac{-1+k+z}{k!}\right)^{10}+9.83032\times10^{-12}\,z^2\left(\sum_{k=0}^{\infty}\frac{-1+k+z}{k!}\right)^{16}-2.25547\times10^{-13}\left(\sum_{k=0}^{\infty}\frac{-1+k+z}{k!}\right)^{18}\right)\right)\Big/\left(\left(\sum_{k=0}^{\infty}\frac{-1+k+z}{k!}\right)^6\left(z^2+0.0458881\left(\sum_{k=0}^{\infty}\frac{-1+k+z}{k!}\right)^2\right)\left(z^4+0.00210571\left(\sum_{k=0}^{\infty}\frac{-1+k+z}{k!}\right)^4\right)\left(z^6+0.0000966271\left(\sum_{k=0}^{\infty}\frac{-1+k+z}{k!}\right)^6\right)\right)\right)$$

$$\frac{1-\frac{2(-1)(-21.7922)}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}=$$

$$\left(7.10543\times10^{-15}\left(-6.23982\times10^{26}+6.34806\times10^{19}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{10}-6.13395\times10^{15}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{16}+1.40737\times10^{14}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{18}\right)\right)\Big/\left(\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^6\left(21.7922+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2\right)^2\left(21.7922-8.08557\sum_{k=0}^{\infty}\frac{1}{k!}+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2\right)\left(21.7922-6.60184\sum_{k=0}^{\infty}\frac{1}{k!}+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2\right)\left(21.7922+6.60184\sum_{k=0}^{\infty}\frac{1}{k!}+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2\right)\left(21.7922+8.08557\sum_{k=0}^{\infty}\frac{1}{k!}+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2\right)\right)$$

Continued fraction:

- Linear form

$$-66+\cfrac{1}{-195+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-3+\cfrac{1}{-3+\cfrac{1}{-13+\cfrac{1}{-7+\cfrac{1}{-1+\cfrac{1}{-14+\cfrac{1}{-4+\cfrac{1}{-21+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{\cdots}}}}}}}}}}}}}}$$

Open code

((((1- 2((-e^-2 *(-21.79216))^3))+2((-e^-2 *(-21.79216))^12))))^2 / ((((1-((-e^-2 *(-21.79216))))(((1-((-e^-2 *(-21.79216))^2)))((((1+((-e^-2 *(-21.79216))^3))))

Input interpretation:

$$\frac{\left(\left(1-2\left(-\frac{-21.79216}{e^2}\right)^3\right)+2\left(-\frac{-21.79216}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.79216}{e^2}\right)\left(1-\left(-\frac{-21.79216}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.79216}{e^2}\right)^3\right)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

$1.8753847367314931118301101116809764749468335921559806 8... \times 10^9$

Alternative representation:

$$\frac{\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)} = \frac{\left(\left(1-2\left(-\frac{-21.7922}{\exp^2(z)}\right)^3\right)+2\left(-\frac{-21.7922}{\exp^2(z)}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{\exp^2(z)}\right)\left(1-\left(-\frac{-21.7922}{\exp^2(z)}\right)^2\right)\left(1+\left(-\frac{-21.7922}{\exp^2(z)}\right)^3\right)} \text{ for } z=1$$

Open code

Series representations:

- More

$$\frac{\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)} = \left(9.33681\times10^{-9}\left(1+2\sum_{k=0}^{\infty}\frac{2.29421\times10^{16}(-24)^k-20\,698.1(-6)^k}{k!}+\left(\sum_{k=0}^{\infty}\frac{2.29421\times10^{16}(-24)^k-20\,698.1(-6)^k}{k!}\right)^2\right)\right)\Big/\left(\left(0.0000966271+\sum_{k=0}^{\infty}\frac{(-6)^k}{k!}\right)\left(-0.00210571+\sum_{k=0}^{\infty}\frac{(-4)^k}{k!}\right)\left(-0.0458881+\sum_{k=0}^{\infty}\frac{(-2)^k}{k!}\right)\right)$$

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$$\frac{\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)} =$$

$$\left(4.91434\times10^{24}\,z^{48}-8.86732\times10^{12}\,z^{30}\left(\sum_{k=0}^{\infty}\frac{-1+k+z}{k!}\right)^{18}+ 4.28412\times10^{8}\,z^{24}\left(\sum_{k=0}^{\infty}\frac{-1+k+z}{k!}\right)^{24}+4\,z^{12}\left(\sum_{k=0}^{\infty}\frac{-1+k+z}{k!}\right)^{36}- 0.000386509\,z^{6}\left(\sum_{k=0}^{\infty}\frac{-1+k+z}{k!}\right)^{42}+9.33681\times10^{-9}\left(\sum_{k=0}^{\infty}\frac{-1+k+z}{k!}\right)^{48}\right)\Big/ \left(\left(\sum_{k=0}^{\infty}\frac{-1+k+z}{k!}\right)^{36}\left(z^2-0.0458881\left(\sum_{k=0}^{\infty}\frac{-1+k+z}{k!}\right)^{2}\right) \left(z^4-0.00210571\left(\sum_{k=0}^{\infty}\frac{-1+k+z}{k!}\right)^{4}\right)\left(z^6+0.0000966271\left(\sum_{k=0}^{\infty}\frac{-1+k+z}{k!}\right)^{6}\right)\right)$$

$$\frac{\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)} =$$

$$\left(5.2634\times10^{32}-9.49717\times10^{20}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{18}+4.58842\times10^{16}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{24}+ 4.28412\times10^{8}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{36}-41\,396.2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{42}+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{48}\right)\Big/ \left(\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{36}\left(-4.66821+\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2\left(4.66821+\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2\left(21.7922+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2\right)^2 \left(21.7922-8.08557\sum_{k=0}^{\infty}\frac{1}{k!}+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2\right)\left(21.7922+8.08557\sum_{k=0}^{\infty}\frac{1}{k!}+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2\right)\right)$$

ln [[[(((((1- 2((-e^-2 *(-21.79216))^3))+2((-e^-2 *(-21.79216))^12))))^2 / ((((1-((-e^-2 *(-21.79216))))(((1-((-e^-2 *(-21.79216))^2))))((((1+((-e^-2 *(-21.79216))^3))))]]]

Input interpretation:

$$\log\left(\frac{\left(\left(1-2\left(-\frac{-21.79216}{e^2}\right)^3\right)+2\left(-\frac{-21.79216}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.79216}{e^2}\right)\left(1-\left(-\frac{-21.79216}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.79216}{e^2}\right)^3\right)}\right)$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

21.35207966824305974769486763276860398561069308852414622005...

This result 21,352 is very near to the value of black hole entropy (see Tables)

Alternative representations:

- More

$$\log\left(\frac{\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=$$

$$\log_e\left(\frac{\left(1-2\left(\frac{21.7922}{e^2}\right)^3+2\left(\frac{21.7922}{e^2}\right)^{12}\right)^2}{\left(1-\frac{21.7922}{e^2}\right)\left(1-\left(\frac{21.7922}{e^2}\right)^2\right)\left(1+\left(\frac{21.7922}{e^2}\right)^3\right)}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\log\left(\frac{\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=$$

$$\log(a)\log_a\left(\frac{\left(1-2\left(\frac{21.7922}{e^2}\right)^3+2\left(\frac{21.7922}{e^2}\right)^{12}\right)^2}{\left(1-\frac{21.7922}{e^2}\right)\left(1-\left(\frac{21.7922}{e^2}\right)^2\right)\left(1+\left(\frac{21.7922}{e^2}\right)^3\right)}\right)$$

Open code

$$\log\left(\frac{\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=$$

$$-\text{Li}_1\left(1-\frac{\left(1-2\left(\frac{21.7922}{e^2}\right)^3+2\left(\frac{21.7922}{e^2}\right)^{12}\right)^2}{\left(1-\frac{21.7922}{e^2}\right)\left(1-\left(\frac{21.7922}{e^2}\right)^2\right)\left(1+\left(\frac{21.7922}{e^2}\right)^3\right)}\right)$$

Open code

Series representations:

- More

$$\log\left(\frac{\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=$$

$$\log\left(-1+\frac{\left(1+\frac{2.29421\times10^{16}}{e^{24}}-\frac{20\,698.1}{e^6}\right)^2}{\left(1+\frac{10\,349.1}{e^6}\right)\left(1-\frac{474.898}{e^4}\right)\left(1-\frac{21.7922}{e^2}\right)}\right)-$$

$$\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\left(2.29421\times10^{16}-20\,698.1\,e^{18}+e^{24}\right)^2}{e^{36}\left(-21.7922+e^2\right)\left(-474.898+e^4\right)\left(10\,349.1+e^6\right)}\right)^{-k}}{k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\log\left(\frac{\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=$$

$$2\,i\,\pi\left\lfloor-\frac{-\pi+\arg\left(\frac{(2.29421\times10^{16}-20\,698.1\,e^{18}+e^{24})^2}{e^{36}\,(-21.7922+e^2)(-474.898+e^4)(10\,349.1+e^6)\,z_0}\right)+\arg(z_0)}{2\,\pi}\right\rfloor+$$

$$\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{(2.29421\times10^{16}-20\,698.1\,e^{18}+e^{24})^2}{e^{36}\,(-21.7922+e^2)(-474.898+e^4)(10\,349.1+e^6)}-z_0\right)^k z_0^{-k}}{k}$$

$$\log\left(\frac{\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=$$

$$2\,i\,\pi\left\lfloor\frac{\arg\left(\frac{\left(1+\frac{2.29421\times10^{16}}{e^{24}}-\frac{20698.1}{e^6}\right)^2}{\left(1+\frac{10\,349.1}{e^6}\right)\left(1-\frac{474.898}{e^4}\right)\left(1-\frac{21.7922}{e^2}\right)}-x\right)}{2\,\pi}\right\rfloor+\log(x)-$$

$$\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{(2.29421\times10^{16}-20\,698.1\,e^{18}+e^{24})^2}{e^{36}\,(-21.7922+e^2)(-474.898+e^4)(10\,349.1+e^6)}-x\right)^k x^{-k}}{k}\quad\text{for } x<0$$

Integral representations:

$$\log\left(\frac{\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=$$

$$\int_1^{\frac{(2.29421\times10^{16}-20698.1\,e^{18}+e^{24})^2}{e^{36}\,(-21.7922+e^2)(-474.898+e^4)(10\,349.1+e^6)}}\frac{1}{t}\,dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\log\left(\frac{\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=$$

$$\frac{1}{2\,i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\left(-1+\frac{(2.29421\times10^{16}-20\,698.1\,e^{18}+e^{24})^2}{e^{36}\,(-21.7922+e^2)(-474.898+e^4)(10\,349.1+e^6)}\right)^{-s}\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\quad\text{for } -1<\gamma<0$$

Open code

ln [[[(((-(1- 2((-e^-2 *(-21.79216))+2((-e^-2 *(-21.79216))^4-2((-e^-2 *(-21.79216))^9)))) / ((((1+((-e^-2 *(-21.79216)))(((1+((-e^-2 *(-21.79216))^2))))((((1+((-e^-2 *(-21.79216))^3))))]]]

Input interpretation:

$$\log\left(-\frac{1-\frac{2(-(-21.79216))}{e^2}+2\left(\left(-\frac{-21.79216}{e^2}\right)^4-2\left(-\frac{-21.79216}{e^2}\right)^9\right)}{\left(1--\frac{21.79216}{e^2}\right)\left(1+\left(-\frac{-21.79216}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.79216}{e^2}\right)^3\right)}\right)$$

Open code

- log(x) is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

4.189732214480598252020155238278436967247158861726685147661...

This result 4,1897 is in the range of the mass of hypothetical dark matter particles

Alternative representations:

- More

$$\log\left(-\frac{1-\frac{2(-(-21.7922))}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=\log_e\left(\frac{-1+\frac{43.5843}{e^2}-2\left(\left(\frac{21.7922}{e^2}\right)^4-2\left(\frac{21.7922}{e^2}\right)^9\right)}{\left(1+\frac{21.7922}{e^2}\right)\left(1+\left(\frac{21.7922}{e^2}\right)^2\right)\left(1+\left(\frac{21.7922}{e^2}\right)^3\right)}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\log\left(-\frac{1-\frac{2(-(-21.7922))}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=\log(a)\log_a\left(\frac{-1+\frac{43.5843}{e^2}-2\left(\left(\frac{21.7922}{e^2}\right)^4-2\left(\frac{21.7922}{e^2}\right)^9\right)}{\left(1+\frac{21.7922}{e^2}\right)\left(1+\left(\frac{21.7922}{e^2}\right)^2\right)\left(1+\left(\frac{21.7922}{e^2}\right)^3\right)}\right)$$

Open code

$$\log\left(-\frac{1-\frac{2(-(-21.7922))}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=-\text{Li}_1\left(1-\frac{-1+\frac{43.5843}{e^2}-2\left(\left(\frac{21.7922}{e^2}\right)^4-2\left(\frac{21.7922}{e^2}\right)^9\right)}{\left(1+\frac{21.7922}{e^2}\right)\left(1+\left(\frac{21.7922}{e^2}\right)^2\right)\left(1+\left(\frac{21.7922}{e^2}\right)^3\right)}\right)$$

Open code

Series representations:

- More

$$\log\left(-\frac{1-\frac{2(-(-21.7922))}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=$$

$$\log\left(-1+\frac{-1-2\left(-\frac{2.21683\times10^{12}}{e^{18}}+\frac{225528.}{e^8}\right)+\frac{43.5843}{e^2}}{\left(1+\frac{10349.1}{e^6}\right)\left(1+\frac{474.898}{e^4}\right)\left(1+\frac{21.7922}{e^2}\right)}\right)-$$

$$\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{4.43366\times10^{12}-451057.\,e^{10}+43.5843\,e^{16}-e^{18}}{e^6\,(21.7922+e^2)(474.898+e^4)(10349.1+e^6)}\right)^{-k}}{k}$$

Open code

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$$\log\left(-\frac{1-\frac{2(-(-21.7922))}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=$$

$$2\,i\,\pi\left\lfloor-\frac{-\pi+\arg\left(\frac{4.43366\times10^{12}-451057.\,e^{10}+43.5843\,e^{16}-e^{18}}{e^6\,(21.7922+e^2)(474.898+e^4)(10349.1+e^6)\,z_0}\right)+\arg(z_0)}{2\pi}\right\rfloor+$$

$$\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{4.43366\times10^{12}-451057.\,e^{10}+43.5843\,e^{16}-e^{18}}{e^6\,(21.7922+e^2)(474.898+e^4)(10349.1+e^6)}-z_0\right)^k z_0^{-k}}{k}$$

$$\log\left(-\frac{1-\frac{2(-(-21.7922))}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=$$

$$2\,i\,\pi\left\lfloor\frac{\arg\left(\frac{-1-2\left(-\frac{2.21683\times10^{12}}{e^{18}}+\frac{225528.}{e^8}\right)+\frac{43.5843}{e^2}}{\left(1+\frac{10349.1}{e^6}\right)\left(1+\frac{474.898}{e^4}\right)\left(1+\frac{21.7922}{e^2}\right)}-x\right)}{2\pi}\right\rfloor+\log(x)-$$

$$\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{4.43366\times10^{12}-451057.\,e^{10}+43.5843\,e^{16}-e^{18}}{e^6\,(21.7922+e^2)(474.898+e^4)(10349.1+e^6)}-x\right)^k x^{-k}}{k}\quad\text{for } x<0$$

Integral representations:

$$\log\left(-\frac{1-\frac{2(-(-21.7922))}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=$$

$$\int_1^{\frac{4.43366\times10^{12}-451057.\,e^{10}+43.5843\,e^{16}-e^{18}}{e^6\,(21.7922+e^2)(474.898+e^4)(10\,349.1+e^6)}}\frac{1}{t}\,dt$$

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$$\log\left(-\frac{1-\frac{2(-(-21.7922))}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=$$

$$\frac{1}{2\,i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\left(-1+\frac{4.43366\times10^{12}-451057.\,e^{10}+43.5843\,e^{16}-e^{18}}{e^6\,(21.7922+e^2)(474.898+e^4)(10\,349.1+e^6)}\right)^{-s}\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\quad\text{for}\quad -1<\gamma<0$$

Open code

Continued fraction:

- Linear form

$$4+\cfrac{1}{5+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{69+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{12+\cfrac{1}{2+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

3 ln [[[(((-(1- 2((-e^-2 *(-21.79216))+2((-e^-2 *(-21.79216))^4-2((-e^-2 *(-21.79216))^9)))) / ((((1+((-e^-2 *(-21.79216)))(((1+((-e^-2 *(-21.79216))^2))))((((1+((-e^-2 *(-21.79216))^3))))]]]

Input interpretation:

$$3\log\left(-\frac{1-\frac{2(-(-21.79216))}{e^2}+2\left(\left(-\frac{-21.79216}{e^2}\right)^4-2\left(-\frac{-21.79216}{e^2}\right)^9\right)}{\left(1--\frac{21.79216}{e^2}\right)\left(1+\left(-\frac{-21.79216}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.79216}{e^2}\right)^3\right)}\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- Fewer digits
- More digits

12.56919664344179475606046571483531090174147658518005544298...

This result 12,5691 is practically equal to the value of black hole entropy (see Tables)

Alternative representations:

- More

$$3\log\left(-\frac{1-\frac{2(-(-21.7922))}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right) = 3\log_e\left(\frac{-1+\frac{43.5843}{e^2}-2\left(\left(\frac{21.7922}{e^2}\right)^4-2\left(\frac{21.7922}{e^2}\right)^9\right)}{\left(1+\frac{21.7922}{e^2}\right)\left(1+\left(\frac{21.7922}{e^2}\right)^2\right)\left(1+\left(\frac{21.7922}{e^2}\right)^3\right)}\right)$$

Open code

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$$3\log\left(-\frac{1-\frac{2(-(-21.7922))}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right) = 3\log(a)\log_a\left(\frac{-1+\frac{43.5843}{e^2}-2\left(\left(\frac{21.7922}{e^2}\right)^4-2\left(\frac{21.7922}{e^2}\right)^9\right)}{\left(1+\frac{21.7922}{e^2}\right)\left(1+\left(\frac{21.7922}{e^2}\right)^2\right)\left(1+\left(\frac{21.7922}{e^2}\right)^3\right)}\right)$$

Open code

$$3\log\left(-\frac{1-\frac{2(-(-21.7922))}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right) = -3\,\text{Li}_1\left(1-\frac{-1+\frac{43.5843}{e^2}-2\left(\left(\frac{21.7922}{e^2}\right)^4-2\left(\frac{21.7922}{e^2}\right)^9\right)}{\left(1+\frac{21.7922}{e^2}\right)\left(1+\left(\frac{21.7922}{e^2}\right)^2\right)\left(1+\left(\frac{21.7922}{e^2}\right)^3\right)}\right)$$

Open code

Series representations:

- More

$$3\log\left(-\frac{1-\frac{2(-(-21.7922))}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=$$
$$3\log\left(-1+\frac{-1-2\left(-\frac{2.21683\times10^{12}}{e^{18}}+\frac{225528.}{e^8}\right)+\frac{43.5843}{e^2}}{\left(1+\frac{10\,349.1}{e^6}\right)\left(1+\frac{474.898}{e^4}\right)\left(1+\frac{21.7922}{e^2}\right)}\right)-$$
$$3\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{4.43366\times10^{12}-451057.\,e^{10}+43.5843\,e^{16}-e^{18}}{e^6\left(21.7922+e^2\right)\left(474.898+e^4\right)\left(10\,349.1+e^6\right)}\right)^{-k}}{k}$$

Open code

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$$3\log\left(-\frac{1-\frac{2(-(-21.7922))}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=$$
$$6\,i\,\pi\left\lfloor-\frac{-\pi+\arg\left(\frac{4.43366\times10^{12}-451057.\,e^{10}+43.5843\,e^{16}-e^{18}}{e^6\left(21.7922+e^2\right)\left(474.898+e^4\right)\left(10\,349.1+e^6\right)z_0}\right)+\arg(z_0)}{2\pi}\right\rfloor+$$
$$3\log(z_0)-3\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{4.43366\times10^{12}-451057.\,e^{10}+43.5843\,e^{16}-e^{18}}{e^6\left(21.7922+e^2\right)\left(474.898+e^4\right)\left(10\,349.1+e^6\right)}-z_0\right)^k z_0^{-k}}{k}$$

$$3\log\left(-\frac{1-\frac{2(-(-21.7922))}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=$$
$$6\,i\,\pi\left\lfloor\frac{\arg\left(\frac{-1-2\left(-\frac{2.21683\times10^{12}}{e^{18}}+\frac{225528.}{e^8}\right)+\frac{43.5843}{e^2}}{\left(1+\frac{10\,349.1}{e^6}\right)\left(1+\frac{474.898}{e^4}\right)\left(1+\frac{21.7922}{e^2}\right)}-x\right)}{2\pi}\right\rfloor+3\log(x)-$$
$$3\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{4.43366\times10^{12}-451057.\,e^{10}+43.5843\,e^{16}-e^{18}}{e^6\left(21.7922+e^2\right)\left(474.898+e^4\right)\left(10\,349.1+e^6\right)}-x\right)^k x^{-k}}{k}\quad\text{for } x<0$$

Integral representations:

$$3\log\left(-\frac{1-\frac{2(-(-21.7922))}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)=$$
$$3\int_1^{\frac{4.43366\times10^{12}-451057.\,e^{10}+43.5843\,e^{16}-e^{18}}{e^6\left(21.7922+e^2\right)\left(474.898+e^4\right)\left(10\,349.1+e^6\right)}}\frac{1}{t}\,dt$$

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$$3 \log\left(-\frac{1-\frac{2(-(-21.7922))}{e^2}+2\left(\left(-\frac{-21.7922}{e^2}\right)^4-2\left(-\frac{-21.7922}{e^2}\right)^9\right)}{\left(1--\frac{21.7922}{e^2}\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right) = \frac{3}{2 i \pi} \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\left(-1+\frac{4.43366\times10^{12}-451057.\,e^{10}+43.5843\,e^{16}-e^{18}}{e^6\,(21.7922+e^2)(474.898+e^4)(10349.1+e^6)}\right)^{-s} \Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for} \quad -1<\gamma<0$$

Open code

Continued fraction:

- Linear form

$$12+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{23+\cfrac{1}{23+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{4+\cfrac{1}{7+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{12+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Open code

ln ((-(-66.00511338004589177388847 96 * ((((1- 2((-e^-2 *(-21.79216))^3))+2((-e^-2 *(-21.79216))^12))))^2 / ((((1-((-e^-2 *(-21.79216)))((((1-((-e^-2 *(-21.79216))^2))))((((1+((-e^-2 *(-21.79216))^3)))

Input interpretation:

$$\log\left(-\left(-66.00511338004589177388847 96 \times \frac{\left(\left(1-2\left(-\frac{-21.79216}{e^2}\right)^3\right)+2\left(-\frac{-21.79216}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.79216}{e^2}\right)\left(1-\left(-\frac{-21.79216}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.79216}{e^2}\right)^3\right)}\right)\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- Fewer digits
- More digits

25.54181188272365799971502287103541800516547999711591434900...

This result 25,5418 is very near to the value of black hole entropy (see Tables)

Alternative representations:

- More

$$\log\left(-\frac{-66.0051133800458917738884796000\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)$$

$$=\log_e\left(\frac{66.0051133800458917738884796000\left(1-2\left(\frac{21.7922}{e^2}\right)^3+2\left(\frac{21.7922}{e^2}\right)^{12}\right)^2}{\left(1-\frac{21.7922}{e^2}\right)\left(1-\left(\frac{21.7922}{e^2}\right)^2\right)\left(1+\left(\frac{21.7922}{e^2}\right)^3\right)}\right)$$

Open code

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$$\log\left(-\frac{-66.0051133800458917738884796000\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)$$

$$=\log(a)\log_a\left(\frac{66.0051133800458917738884796000\left(1-2\left(\frac{21.7922}{e^2}\right)^3+2\left(\frac{21.7922}{e^2}\right)^{12}\right)^2}{\left(1-\frac{21.7922}{e^2}\right)\left(1-\left(\frac{21.7922}{e^2}\right)^2\right)\left(1+\left(\frac{21.7922}{e^2}\right)^3\right)}\right)$$

Open code

$$\log\left(-\frac{-66.005113380045891773888479600000\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right) = -\mathrm{Li}_1\left(1-\frac{66.005113380045891773888479600000\left(1-2\left(\frac{21.7922}{e^2}\right)^3+2\left(\frac{21.7922}{e^2}\right)^{12}\right)^2}{\left(1-\frac{21.7922}{e^2}\right)\left(1-\left(\frac{21.7922}{e^2}\right)^2\right)\left(1+\left(\frac{21.7922}{e^2}\right)^3\right)}\right)$$

Series representations:

- More

$$\log\left(-\frac{-66.005113380045891773888479600000\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right) = \log\left(-1+\frac{66.005113380045891773888479600000\left(1+\frac{2.29421\times10^{16}}{e^{24}}-\frac{20\,698.1}{e^6}\right)^2}{\left(1+\frac{10\,349.1}{e^6}\right)\left(1-\frac{474.898}{e^4}\right)\left(1-\frac{21.7922}{e^2}\right)}\right) - \sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{66.0051\left(2.29421\times10^{16}-20\,698.1\,e^{18}+e^{24}\right)^2}{e^{36}\left(-21.7922+e^2\right)\left(-474.898+e^4\right)\left(10\,349.1+e^6\right)}\right)^{-k}}{k}$$

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$$\log\left(-\frac{-66.005113380045891773888479600000\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right) = 2\,i\,\pi\left\lfloor-\frac{-\pi+\arg\left(\frac{66.0051\left(2.29421\times10^{16}-20\,698.1\,e^{18}+e^{24}\right)^2}{e^{36}\left(-21.7922+e^2\right)\left(-474.898+e^4\right)\left(10\,349.1+e^6\right)z_0}\right)+\arg(z_0)}{2\,\pi}\right\rfloor + \log(z_0) - \sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{66.0051\left(2.29421\times10^{16}-20\,698.1\,e^{18}+e^{24}\right)^2}{e^{36}\left(-21.7922+e^2\right)\left(-474.898+e^4\right)\left(10\,349.1+e^6\right)}-z_0\right)^k z_0^{-k}}{k}$$

$$\log\left(-\left(\left(-66.00511338004589177388847960000\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2\right)/\left(\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)\right)\right)\right)=$$

$$2 i \pi \left\lfloor \frac{\arg\left(\frac{66.00511338004589177388847960000\left(1+\frac{2.29421\times10^{16}}{e^{24}}-\frac{20698.1}{e^6}\right)^2}{\left(1+\frac{10349.1}{e^6}\right)\left(1-\frac{474.898}{e^4}\right)\left(1-\frac{21.7922}{e^2}\right)}-x\right)}{2\pi} \right\rfloor +$$

$$\log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k \left(\frac{66.0051\left(2.29421\times10^{16}-20698.1 e^{18}+e^{24}\right)^2}{e^{36}\left(-21.7922+e^2\right)\left(-474.898+e^4\right)\left(10349.1+e^6\right)}-x\right)^k x^{-k}}{k} \quad \text{for } x<0$$

Integral representations:

$$\log\left(-\frac{-66.00511338004589177388847960000\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)}\right)$$

$$= \int_1^{\frac{66.0051\left(2.29421\times10^{16}-20698.1 e^{18}+e^{24}\right)^2}{e^{36}\left(-21.7922+e^2\right)\left(-474.898+e^4\right)\left(10349.1+e^6\right)}} \frac{1}{t}\, dt$$

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$$\log\left(-\left(\left(-66.00511338004589177388847960000\left(\left(1-2\left(-\frac{-21.7922}{e^2}\right)^3\right)+2\left(-\frac{-21.7922}{e^2}\right)^{12}\right)^2\right)/\left(\left(1--\frac{-21.7922}{e^2}\right)\left(1-\left(-\frac{-21.7922}{e^2}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^2}\right)^3\right)\right)\right)\right)=$$

$$\frac{1}{2 i \pi}\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\left(-1+\frac{66.0051\left(2.29421\times10^{16}-20698.1 e^{18}+e^{24}\right)^2}{e^{36}\left(-21.7922+e^2\right)\left(-474.898+e^4\right)\left(10349.1+e^6\right)}\right)^{-s}\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\, ds$$

for $-1<\gamma<0$

Open code

Continued fraction:

- Linear form

$$25+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{11+\cfrac{1}{2+\cfrac{1}{83+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{71+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}$$

Open code

For $\phi(q)$ $q = -e^{-t}$, $t = 0.5$ $q^n = -21.79216 * -e^{-0.5}$

from the expression on pag. 93, we obtain:

$$\phi(q) = 1 + \frac{q}{1+q^2} + \frac{q^4}{(1+q^2)(1+q^4)} + \ldots$$

$$\psi(q) = \frac{q}{1-q} + \frac{q^4}{(1-q)(1-q^3)} + \frac{q^9}{(1-q)(1-q^3)(1-q^5)} + \ldots$$

$$\chi(q) = 1 + \frac{q}{1-q+q^2} + \frac{q^4}{(1-q+q^2)(1-q^2+q^4)} + \ldots$$

φ(q) = 1.075226 + 0.00572374 = 1.08094974

ψ(q) = -1.08185 + 1.08232 – 1.08232 = – 1.08185

χ(q) = 1.081345 + 0.00618954 = 1.08753454

The sum of φ(q) + ψ(q) + χ(q) = 1.08663428 very near to the value 1.08643 already calculated from Ramanujan

((((1- 2((-e^-0.5 *(-21.79216))^1)+2((-e^-0.5 *(-21.79216))^4-2((-e^-0.5 *(-21.79216))^9)))) / ((((1+((-e^-0.5 *(-21.79216))))(((1+((-e^-0.5 *(-21.79216))^2))))(((1+((-e^-0.5 *(-21.79216))^3))))

Input interpretation:

$$1-2\left(-\frac{-21.79216}{e^{0.5}}\right)^1+2\left(-\frac{-21.79216}{e^{0.5}}\right)^4-2\left(-\frac{-21.79216}{e^{0.5}}\right)^9$$

Result:

- More digits

$-2.46267\ldots \times 10^{10}$

Open code

$$-\frac{2.46267\times 10^{10}}{\left(1--\frac{21.79216}{e^{0.5}}\right)\left(1+\left(-\frac{-21.79216}{e^{0.5}}\right)^2\right)\left(1+\left(-\frac{-21.79216}{e^{0.5}}\right)^3\right)}$$

Result:

- More digits

$-4267.24\ldots$

3/2 ln-(-4267.2444554438560108265646624842827176448432928322 31)

Input interpretation:

$$\frac{3}{2}\log(-(-4267.244455443856010826564662484282717644843292832231))$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

12.538085356973841583836496939105618470070512336019490...

This result 12,538 is very near to the value of black hole entropy (see Tables)

Series representations:

- More

$$\frac{1}{2}\log(-(-4267.2444554438560108265646624842827176448432928322310000))3=\frac{3\log(4266.2444554438560108265646624842827176448432928322310000)}{2}-\frac{3}{2}\sum_{k=1}^{\infty}\frac{(-1)^k e^{-8.3584892005878088134998295670694835221325364493099970758\,k}}{k}$$

Open code

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$$\frac{1}{2}\log(-(-4267.244455443856010826564662484282717644843292832231 0000))3 = 3 i \pi \left\lfloor \frac{1}{2\pi}\arg(4267.2444554438560108265646624842827176448432928322310000 - x)\right\rfloor + \frac{3\log(x)}{2} - \frac{3}{2}\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k (4267.2444554438560108265646624842827176448432928322310000 - x)^k x^{-k} \quad \text{for } x < 0$$

Open code

$$\frac{1}{2}\log(-(-4267.2444554438560108265646624842827176448432928322310000))3 = \frac{3}{2}\left\lfloor \frac{1}{2\pi}\arg(4267.2444554438560108265646624842827176448432928322310000 - z_0)\right\rfloor \log\left(\frac{1}{z_0}\right) + \frac{3\log(z_0)}{2} + \frac{3}{2}\left\lfloor \frac{1}{2\pi}\arg(4267.2444554438560108265646624842827176448432928322310000 - z_0)\right\rfloor \log(z_0) - \frac{3}{2}\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k (4267.2444554438560108265646624842827176448432928322310000 - z_0)^k z_0^{-k}$$

Integral representations:

$$\frac{1}{2}\log(-(-4267.2444554438560108265646624842827176448432928322310000))3 = \frac{3}{2}\int_1^{4267.2444554438560108265646624842827176448432928322310000}\frac{1}{t}\,dt$$

Open code

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$$\frac{1}{2}\log(-(-4267.2444554438560108265646624842827176448432928322310000))3 = \frac{3}{4 i \pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{-8.358489200587808813499829567069483522132536449309997 0758 s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1 < \gamma < 0$$

(72*2-6) * 3/2 ln-(-4267.244455443856010826564662484282717644843292832231)

Input interpretation:

$(72 \times 2 - 6) \times \frac{3}{2}$
$\log(-(-4267.244455443856010826564662484282717644843292832231))$
Open code

- $\log(x)$ is the natural logarithm

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Result:
- More digits
$1730.255779262390138569436577596575348869730702370689 6...$

This result 1730,2557 is very near to the mass of $f_0(1710)$ candidate glueball

Alternative representations:
- More
$$\frac{1}{2}\left((72 \times 2 - 6) \log(-(-4267.2444554438560108265646624842827176448432928322310000))\right) 3 = 207 \log_e(4267.2444554438560108265646624842827176448432928322310000)$$
Open code

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$$\frac{1}{2}\left((72 \times 2 - 6) \log(-(-4267.2444554438560108265646624842827176448432928322310000))\right) 3 = 207 \log(a) \log_a(4267.2444554438560108265646624842827176448432928322310000)$$
Open code

$$\frac{1}{2}\left((72 \times 2 - 6) \log(-(-4267.2444554438560108265646624842827176448432928322310000))\right) 3 = -207 \operatorname{Li}_1(-4266.2444554438560108265646624842827176448432928322310000)$$
Open code

Series representations:
- More
$$\frac{1}{2}\left((72 \times 2 - 6) \log(-(-4267.2444554438560108265646624842827176448432928322310000))\right) 3 = 207 \log(4266.2444554438560108265646624842827176448432928322310000) - 207 \sum_{k=1}^{\infty} \frac{(-1)^k e^{-8.358489200587808813499829567069483522132536449309970758 k}}{k}$$

Open code

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$$\frac{1}{2}((72\times 2-6)\log(-(-4267.24445544385601082656466248428271764484329283223100\dots 00)))\,3 = 414\, i\,\pi \left\lfloor \frac{1}{2\pi}\arg(4267.24445544385601082656466248428271764484329283223100000-x)\right\rfloor + 207\log(x) - 207\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k (4267.24445544385601082656466248428271764484329283223100000-x)^k x^{-k} \quad \text{for } x<0$$

Open code

$$\frac{1}{2}((72\times 2-6)\log(-(-4267.24445544385601082656466248428271764484329283223100000)))\,3 = 207\left\lfloor \frac{1}{2\pi}\arg(4267.24445544385601082656466248428271764484329283223100000-z_0)\right\rfloor \log\left(\frac{1}{z_0}\right) + 207\log(z_0) + 207\left\lfloor \frac{1}{2\pi}\arg(4267.24445544385601082656466248428271764484329283223100000-z_0)\right\rfloor \log(z_0) - 207\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k (4267.24445544385601082656466248428271764484329283223100000-z_0)^k z_0^{-k}$$

Integral representations:

$$\frac{1}{2}((72\times 2-6)\log(-(-4267.24445544385601082656466248428271764484329283223100000)))\,3 = 207\int_1^{4267.24445544385601082656466248428271764484329283223100000}\frac{1}{t}\,dt$$

Open code

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$$\frac{1}{2}((72\times 2-6)\log(-(-4267.24445544385601082656466248428271764484329283223100\dots 00)))\,3 = \frac{207}{2\,i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-8.358489200587808813499829567069483522132536449309970758\,s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

Open code

Continued fraction:

- Linear form

$$1730+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{10+\cfrac{1}{15+\cfrac{1}{2+\cfrac{1}{81+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{104+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{25+\cfrac{1}{6+\cfrac{1}{3+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}$$

Open code

(89+3) ln-(-4267.2444554438560108265646624842827176448432928322231)

Alternative representations:

- More

$$(89+3)\log(-(-1)\ 4267.2444554438560108265646624842827176448432928322310000) = 92\log_e(4267.2444554438560108265646624842827176448432928322310000)$$

Open code

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$$(89+3)\log(-(-1)\ 4267.2444554438560108265646624842827176448432928322310000) = 92\log(a)\log_a(4267.2444554438560108265646624842827176448432928322310000)$$

Open code

$$(89+3)\log(-(-1)\ 4267.2444554438560108265646624842827176448432928322310000) = -92\,\mathrm{Li}_1(-4266.2444554438560108265646624842827176448432928322310000)$$

Open code

Series representations:

- More

$$(89+3)\log(-(-1)\,4267.24445544385601082656466248428271764484329283223100000) = 92\log(4266.24445544385601082656466248428271764484329283223100000) - 92\sum_{k=1}^{\infty}\frac{(-1)^k e^{-8.35848920058780881349982956706948352213253644930999970758\,k}}{k}$$

Open code

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$$(89+3)\log(-(-1)\,4267.24445544385601082656466248428271764484329283223100000) = 184\,i\,\pi\left\lfloor\frac{1}{2\pi}\arg(4267.24445544385601082656466248428271764484329283223100000 - x)\right\rfloor + 92\log(x) - 92\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k (4267.24445544385601082656466248428271764484329283223100000 - x)^k x^{-k} \quad \text{for } x < 0$$

Open code

$$(89+3)\log(-(-1)\,4267.24445544385601082656466248428271764484329283223100000) = 92\left\lfloor\frac{1}{2\pi}\arg(4267.24445544385601082656466248428271764484329283223100000 - z_0)\right\rfloor \log\left(\frac{1}{z_0}\right) + 92\log(z_0) + 92\left\lfloor\frac{1}{2\pi}\arg(4267.24445544385601082656466248428271764484329283223100000 - z_0)\right\rfloor \log(z_0) - 92\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k (4267.24445544385601082656466248428271764484329283223100000 - z_0)^k z_0^{-k}$$

Open code

Integral representations:

$$(89+3)\log(-(-1)\,4267.24445544385601082656466248428271764484329283223100000) = 92\int_1^{4267.24445544385601082656466248428271764484329283223100000}\frac{1}{t}\,dt$$

Open code

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$(89 + 3) \log(-(-1)$
$4267.2444554438560108265646624842827176448432928322310000) =$

$$\frac{46}{i\pi} \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{e^{-8.3584892005878088134998295670694835221325364493099970758\,s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1 < \gamma < 0$$

Open code

((((1- 2((-e^-0.5 *(-21.79216))^3))+2((-e^-0.5 *(-21.79216))^12))))^2 / ((((1-((-e^-0.5 *(-21.79216))))(((1-((-e^-0.5 *(-21.79216))^2))))((((1+((-e^-0.5 *(-21.79216))^3))))

Input interpretation:

$$\frac{\left(\left(1-2\left(-\frac{-21.79216}{e^{0.5}}\right)^3\right)+2\left(-\frac{-21.79216}{e^{0.5}}\right)^{12}\right)^2}{\left(1--\frac{-21.79216}{e^{0.5}}\right)\left(1-\left(-\frac{-21.79216}{e^{0.5}}\right)^2\right)\left(1+\left(-\frac{-21.79216}{e^{0.5}}\right)^3\right)}$$

Open code

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Result:

- Fewer digits
- More digits

$6.5960861587739343651331914888154239698536251608680987... \times 10^{20}$

Alternative representation:

$$\frac{\left(\left(1-2\left(-\frac{-21.7922}{e^{0.5}}\right)^3\right)+2\left(-\frac{-21.7922}{e^{0.5}}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^{0.5}}\right)\left(1-\left(-\frac{-21.7922}{e^{0.5}}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^{0.5}}\right)^3\right)} = \frac{\left(\left(1-2\left(-\frac{-21.7922}{\exp^{0.5}(z)}\right)^3\right)+2\left(-\frac{-21.7922}{\exp^{0.5}(z)}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{\exp^{0.5}(z)}\right)\left(1-\left(-\frac{-21.7922}{\exp^{0.5}(z)}\right)^2\right)\left(1+\left(-\frac{-21.7922}{\exp^{0.5}(z)}\right)^3\right)} \quad \text{for } z = 1$$

Open code

Series representations:

- More

$$\frac{\left(\left(1-2\left(-\frac{-21.7922}{e^{0.5}}\right)^3\right)+2\left(-\frac{-21.7922}{e^{0.5}}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^{0.5}}\right)\left(1-\left(-\frac{-21.7922}{e^{0.5}}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^{0.5}}\right)^3\right)} = \left(5.2634\times10^{32}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{4.5} - 9.49717\times10^{20}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{9} + 4.58842\times10^{16}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{10.5} + 4.28412\times10^{8}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{13.5} - 41\,396.2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{15} + \left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{16.5}\right) \Big/ \left(\left(-21.7922+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.5}\right)\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{13.5}\left(-474.898+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1}\right)\left(10\,349.1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.5}\right)\right)$$

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$$\frac{\left(\left(1-2\left(-\frac{-21.7922}{e^{0.5}}\right)^3\right)+2\left(-\frac{-21.7922}{e^{0.5}}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^{0.5}}\right)\left(1-\left(-\frac{-21.7922}{e^{0.5}}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^{0.5}}\right)^3\right)} = \left(2.15589\times10^{36}\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{4.5} - 1.71917\times10^{23}\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{9} + 2.93659\times10^{18}\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{10.5} + 3.4273\times10^{9}\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{13.5} - 117\,086.\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{15} + \left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{16.5}\right) \Big/ \left(\left(-30.8188+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.5}\right)\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{13.5}\left(-949.796+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{1}\right)\left(29\,271.6+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{1.5}\right)\right)$$

$$\frac{\left(\left(1-2\left(-\frac{-21.7922}{e^{0.5}}\right)^3\right)+2\left(-\frac{-21.7922}{e^{0.5}}\right)^{12}\right)^2}{\left(1--\frac{-21.7922}{e^{0.5}}\right)\left(1-\left(-\frac{-21.7922}{e^{0.5}}\right)^2\right)\left(1+\left(-\frac{-21.7922}{e^{0.5}}\right)^3\right)} = \left(5.2634\times10^{32}\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{4.5} - 9.49717\times10^{20}\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{9} + 4.58842\times10^{16}\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{10.5} + 4.28412\times10^{8}\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{13.5} - 41\,396.2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{15} + \left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{16.5}\right) \Big/ \left(\left(-21.7922+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.5}\right)\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{13.5}\left(-474.898+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1}\right)\left(10\,349.1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.5}\right)\right)$$

(-4267.244455443856010826564662484282717644843292832231) * ((((1- 2((-e^-0.5 *(-21.79216))^3))+2((-e^-0.5 *(-21.79216))^12))))^2 / (4.90283*10^6)

Input interpretation:

$$-4267.244455443856010826564662484282717644843292832231 \times \frac{\left(\left(1-2\left(-\frac{-21.79216}{e^{0.5}}\right)^3\right)+2\left(-\frac{-21.79216}{e^{0.5}}\right)^{12}\right)^2}{4.90283 \times 10^6}$$

Open code

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Result:

- More digits

$-2.81471... \times 10^{24}$

1/(2.61803398) ln -(-2.8147095673908046130256778529964805112284843919 × 10^24)

Input interpretation:

$$\frac{1}{2.61803398} \log(-(-2.8147095673908046130256778529964805112284843919 \times 10^{24}))$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

21.5035029...

This result 21,503 is very near to the value of black hole entropy (see Tables)

1/2 ln (6.59608615877393436513319148 * 10^20)

Input interpretation:

$$\frac{1}{2} \log(6.59608615877393436513319148 \times 10^{20})$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

23.969089163384586714340873596...

This result 23,969 is very near to the value of black hole entropy (see Tables), and equal to 24, are the physical degrees of freedom of the bosonic string, that are the 24 transverse coordinates.

Alternative representations:

- More

$$\frac{1}{2}\log(6.5960861587739343651331914800000\times 10^{20}) = \frac{\log_e(6.5960861587739343651331914800000\times 10^{20})}{2}$$

Open code

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$$\frac{1}{2}\log(6.5960861587739343651331914800000\times 10^{20}) = \frac{1}{2}\log(a)\log_a(6.5960861587739343651331914800000\times 10^{20})$$

Open code

$$\frac{1}{2}\log(6.5960861587739343651331914800000\times 10^{20}) = -\frac{1}{2}\mathrm{Li}_1(1-6.5960861587739343651331914800000\times 10^{20})$$

Open code

Series representations:

- More

$$\frac{1}{2}\log(6.5960861587739343651331914800000\times 10^{20}) = \frac{\log(6.5960861587739343651231914800000\times 10^{20})}{2} - \frac{1}{2}\sum_{k=1}^{\infty}\frac{(-1)^k e^{-47.9381783267691734286802311413 85 k}}{k}$$

Open code

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$$\frac{1}{2}\log(6.5960861587739343651331914800000\times 10^{20}) = i\pi\left\lfloor\frac{\arg(6.5960861587739343651331914800000\times 10^{20}-x)}{2\pi}\right\rfloor + \frac{\log(x)}{2} - \frac{1}{2}\sum_{k=1}^{\infty}\frac{(-1)^k(6.5960861587739343651331914800000\times 10^{20}-x)^k x^{-k}}{k} \quad \text{for } x < 0$$

Open code

$$\frac{1}{2}\log(6.5960861587739343651331914800000\times 10^{20}) = \frac{1}{2}\left\lfloor\frac{\arg(6.5960861587739343651331914800000\times 10^{20}-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\frac{\log(z_0)}{2}+\frac{1}{2}\left\lfloor\frac{\arg(6.5960861587739343651331914800000\times 10^{20}-z_0)}{2\pi}\right\rfloor\log(z_0)-\frac{1}{2}\sum_{k=1}^{\infty}\frac{(-1)^k(6.5960861587739343651331914800000\times 10^{20}-z_0)^k z_0^{-k}}{k}$$

Open code

- $\arg(z)$ is the complex argument

- Integral representations:

$$\frac{1}{2}\log(6.5960861587739343651331914800000\times 10^{20}) = \frac{1}{2}\int_1^{6.5960861587739343651331914800000\times 10^{20}}\frac{1}{t}\,dt$$

- Open code

- Enlarge Data Customize A Plaintext Interactive

$$\frac{1}{2}\log(6.5960861587739343651331914800000\times 10^{20}) = \frac{1}{4i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{-47.938178326769173428680231141385\,s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

- Open code

(((sqrt(5)-1)/2))) ln (6.59608615877393436513319148 * 10^20)

Input interpretation:

$$\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\log(6.59608615877393436513319148\times 10^{20})$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

29.627423564696912369148797588...

This result 29,627 is very near to the value of black hole entropy (see Tables)

Alternative representations:

- More

$$\frac{1}{2}\log(6.5960861587739343651331914800000\times10^{20})\left(\sqrt{5}-1\right)=$$
$$\frac{1}{2}\log_e(6.5960861587739343651331914800000\times10^{20})\left(-1+\sqrt{5}\right)$$

Open code

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$$\frac{1}{2}\log(6.5960861587739343651331914800000\times10^{20})\left(\sqrt{5}-1\right)=$$
$$\frac{1}{2}\log(a)\log_a(6.5960861587739343651331914800000\times10^{20})\left(-1+\sqrt{5}\right)$$

Open code

$$\frac{1}{2}\log(6.5960861587739343651331914800000\times10^{20})\left(\sqrt{5}-1\right)=$$
$$-\frac{1}{2}\operatorname{Li}_1(1-6.5960861587739343651331914800000\times10^{20})\left(-1+\sqrt{5}\right)$$

Open code

Series representations:

- More

$$\frac{1}{2}\log(6.5960861587739343651331914800000\times10^{20})\left(\sqrt{5}-1\right)=$$
$$-\frac{\log(6.5960861587739343651331914800000\times10^{20})}{2}+$$
$$\frac{1}{2}\log(6.5960861587739343651331914800000\times10^{20})\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}$$

Open code

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$$\frac{1}{2}\log(6.5960861587739343651331914800000\times10^{20})\left(\sqrt{5}-1\right)=$$
$$\frac{1}{2}\left(\log(6.5960861587739343651231914800000\times10^{20})-\right.$$
$$\left.\sum_{k=1}^{\infty}\frac{(-1)^k e^{-47.938178326769173428680231141385k}}{k}\right)\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)$$

Open code

$$\frac{1}{2}\log(6.5960861587739343651331914800000\times10^{20})\left(\sqrt{5}-1\right)=$$
$$\frac{1}{2}\left(\log(6.5960861587739343651231914800000\times10^{20})-\right.$$
$$\left.\sum_{k=1}^{\infty}\frac{(-1)^k e^{-47.938178326769173428680231141385k}}{k}\right)\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

Open code

Integral representations:

$$\frac{1}{2}\log(6.5960861587739343651331914800000\times 10^{20})\left(\sqrt{5}-1\right) = \frac{1}{2}\left(-1+\sqrt{5}\right)\int_1^{6.5960861587739343651331914800000\times10^{20}}\frac{1}{t}\,dt$$

Open code

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$$\frac{1}{2}\log(6.5960861587739343651331914800000\times 10^{20})\left(\sqrt{5}-1\right) = \frac{-1+\sqrt{5}}{4\,i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-47.9381783267691734286802311413 85\,s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

Open code

Now the point here is that the entropy of a black hole is also known from semi-classical arguments (i.e. neglecting the quantisation of gravity) by a formula known as the Bekenstein-Hawking formula, which in this case becomes $S = 4\pi\sqrt{k}$. So for k = 1 we expect the result $4\pi = 12.566$, which compares with Witten's 12.190, and for k = 4 we expect $8\pi = 25.133$ which compares with Wittens' 25.118. The comparison for the first 4 values of k is,

k	Bekenstein-Hawking	Witten	Difference (%)
1	12.566	12.190	3.0%
2	17.772	17.576	1.1%
3	21.766	21.676	0.4%
4	25.133	25.118	0.06%

For k = 15 for S = 4π√k = 48,66934411168...

ln (6.59608615877393436513319148 * 10^20)

Input interpretation:

$$\log(6.59608615877393436513319148\times 10^{20})$$

Open code

- $\log(x)$ is the natural logarithm

Result:

- More digits

47.9381783267691734286817471 92...

Alternative representations:

- More

$$\log(6.596086158773934365133191480000 \times 10^{20}) = \log_e(6.596086158773934365133191480000 \times 10^{20})$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\log(6.596086158773934365133191480000 \times 10^{20}) = \log(a) \log_a(6.596086158773934365133191480000 \times 10^{20})$$

Open code

$$\log(6.596086158773934365133191480000 \times 10^{20}) = -\text{Li}_1(1 - 6.596086158773934365133191480000 \times 10^{20})$$

Series representations:

- More

$$\log(6.596086158773934365133191480000 \times 10^{20}) = \log(6.596086158773934365123191480000 \times 10^{20}) - \sum_{k=1}^{\infty} \frac{(-1)^k e^{-47.93817832676917342868023114138 5 k}}{k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\log(6.596086158773934365133191480000 \times 10^{20}) = 2 i \pi \left\lfloor \frac{\arg(6.596086158773934365133191480000 \times 10^{20} - x)}{2 \pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (6.596086158773934365133191480000 \times 10^{20} - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

Open code

$$\log(6.596086158773934365133191480000 \times 10^{20}) = \left\lfloor \frac{\arg(6.596086158773934365133191480000 \times 10^{20} - z_0)}{2 \pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(6.596086158773934365133191480000 \times 10^{20} - z_0)}{2 \pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (6.596086158773934365133191480000 \times 10^{20} - z_0)^k z_0^{-k}}{k}$$

Integral representations:

$$\log(6.596086158773934365133191480000\times 10^{20}) = \int_1^{6.596086158773934365133191480000\times 10^{20}} \frac{1}{t}\,dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\log(6.596086158773934365133191480000\times 10^{20}) = \frac{1}{2 i \pi}\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{e^{-47.938178326769173428680231141385\, s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

Now:

$$F(q) = 1 + \frac{q^2}{1-q} + \frac{q^8}{(1-q)(1-q^3)} + \ldots$$

$$\phi(-q) + \chi(q) = 2F(q).$$

$$f(-q) + 2F(q^2) - 2 = \phi(-q^2) + \psi(-q)$$

$$= \ 2\phi(-q^2) - f(q) = \frac{1 - 2q + 2q^4 - 2q^9 + \ldots}{(1-q)(1-q^4)(1-q^6)(1-q^9)\ldots}$$

$$\psi(q) - F(q^2) + 1 = q\frac{1 + q^2 + q^6 + q^{12} + \ldots}{(1-q^8)(1-q^{12})(1-q^{28})\ldots}$$

((((1- (2(-e^-0.5 *(-21.79216))+((2((-e^-0.5 *(-21.79216))^4))-((2((-e^-0.5 *(-21.79216))^9)))

Input interpretation:

$$\left(1 - 2\left(-\frac{-21.79216}{e^{0.5}}\right)^1\right) + \left(2\left(-\frac{-21.79216}{e^{0.5}}\right)^4 - 2\left(-\frac{-21.79216}{e^{0.5}}\right)^9\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

$-2.4626702325489266770162189447923150997792288511264 16\ldots \times 10^{10}$

(1-((-e^-0.5 *(-21.79216)^1))) * (1-((-e^-0.5 *(-21.79216))^4))) * (1-(-e^-0.5 *(-21.79216))^6))) * (1-(-e^-0.5 *(-21.79216))^9)))

Input interpretation:

$$\left(1-\frac{(-21.79216)^1}{e^{0.5}}\right)\left(1-\left(-\frac{-21.79216}{e^{0.5}}\right)^4\right)\left(1-\left(-\frac{-21.79216}{e^{0.5}}\right)^6\right)\left(1-\left(-\frac{-21.79216}{e^{0.5}}\right)^9\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

$2.448385398414080181553215779282783332424386239259287 5... \times 10^{22}$

(-2.4626702325489266770162189447923150997792288511 * 10^10) / ((((((((1-((-e^-0.5 *(-21.79216)^1)))*(1-((-e^-0.5 *(-21.79216))^4)))*(1-(-e^-0.5 *(-21.79216))^6)))*(1-(-e^-0.5 *(-21.79216))^9))))))))

Input interpretation:

$$\frac{-2.4626702325489266770162189447923150997792288511\times 10^{10}}{\left(\left(\left(1-\frac{(-21.79216)^1}{e^{0.5}}\right)\left(1-\left(-\frac{-21.79216}{e^{0.5}}\right)^4\right)\right)\left(1-\left(-\frac{-21.79216}{e^{0.5}}\right)^6\right)\right)\left(1-\left(-\frac{-21.79216}{e^{0.5}}\right)^9\right)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

$-1.0058343895303816831483204821832143425984103877503 60... \times 10^{-12}$

Thence:

Pi + ln -(-1.0058343895303816831483204821832143425984103 87 × 10^-12)

Input interpretation:

$\pi + \log(-(-1.005834389530381683148320482183214342598410387 \times 10^{-12}))$

Open code

- log(x) is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-24.483611026946235966067286739667167615827087684...$

This result -24,483 is very near to the value of black hole entropy (see Tables), with minus sign

(64+6) * ((Pi + ln -(-1.0058343895303816831483204821832143425984l0387 × 10^-12)))

Input interpretation:

$(64+6)\left(\pi+\log\left(-\left(-1.0058343895303816831483204821832143425984l0387\times 10^{-12}\right)\right)\right)$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

−1713.852771886236517624710071776701733107896l379...

This result 1713,852 is very near to the mass of $f_0(1710)$ candidate glueball

32 * ((Pi + ln -(-1.0058343895303816831483204821832143425984l0387 × 10^-12)))

Input interpretation:

$32\left(\pi+\log\left(-\left(-1.0058343895303816831483204821832143425984l0387\times 10^{-12}\right)\right)\right)$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

−783.47555286227955091415317566934936370646680588...

This value is practically equal to the rest mass of Omega meson with minus sign

1/6.626 ln -(-1.0058343895303816831483204821832143425984l0387 × 10^-12)))

Input interpretation:

$\frac{1}{6.626}\log\left(-\left(-1.0058343895303816831483204821832143425984l0387\times 10^{-12}\right)\right)$

Open code

- $\log(x)$ is the natural logarithm

Result:

- More digits

−4.16921...

This result -4,16921 is in the range of the mass of hypothetical dark matter particles with minus sign

Now:

$$-\frac{-21.79216\left(\left(\left(1+\left(-\frac{-21.79216}{e^{0.5}}\right)^{2}\right)+\left(-\frac{-21.79216}{e^{0.5}}\right)^{6}\right)+\left(-\frac{-21.79216}{e^{0.5}}\right)^{12}\right)}{e^{0.5}}$$

3.7582838213624412933987326486202281989113112090736723... × 10^{14}

$$\left(1-\left(-\frac{-21.79216}{e^{0.5}}\right)^{8}\right)\left(\left(1-\left(-\frac{-21.79216}{e^{0.5}}\right)^{12}\right)\left(1-\left(-\frac{-21.79216}{e^{0.5}}\right)^{28}\right)\right)$$

- Fewer digits
- More digits

−6.536508342258849896114505619942924476936123331637070... × 10^{53}

((-e^-0.5 *(-21.79216)) ((((1+ ((-e^-0.5 *(-21.79216))^2))+((-e^-0.5 *(-21.79216))^6))+((-e^-0.5 *(-21.79216))^12)))) / (-6.53651*10^53)

Input interpretation:

$$-\frac{-\frac{-21.79216\left(\left(\left(1+\left(-\frac{-21.79216}{e^{0.5}}\right)^{2}\right)+\left(-\frac{-21.79216}{e^{0.5}}\right)^{6}\right)+\left(-\frac{-21.79216}{e^{0.5}}\right)^{12}\right)}{e^{0.5}}}{6.53651\times 10^{53}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

−5.74968... × 10^{-40}

Result: -5,74968 * 10^{-40}

Or:

(3.758283821362441293398732 * 10^14) / (-6.5365083422588498961145 * 10^53)

Input interpretation:

$$-\frac{3.758283821362441293398732\times 10^{14}}{6.5365083422588498961145\times 10^{53}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

−5.749681059939831189605844527957593202706898451414516... × 10^{-40}

(ln-(-5.749681059939831189605844527957593202706898451414516 × 10^-40)

Input interpretation:

$\log(-(-5.74968105993983118960584452795759320270689845141 4516 \times 10^{-40}))$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-90.354259334327516720014390222780605872488273068123566 3...$

Continued fraction:

- Linear form

$$-90+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-4+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-4+\cfrac{1}{-26+\cfrac{1}{-2+\cfrac{1}{-2+\cfrac{1}{-5+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}$$

For k = 52 for S = 4π√k = 90,617387193111821540

Or:

1/(Pi*(sqrt(5)+1)/2)) (ln-(-5.749681059939831189605844527 × 10^-40)

Input interpretation:

$\frac{1}{\pi\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)} \log(-(-5.749681059939831189605844527 \times 10^{-40}))$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-17.7750617137228334461446315225...$

This result -17,775 is very near to the value of black hole entropy (see Tables) with minus sign

1.674*5 ln -(-5.74968 * 10^-40)

$$1.674\times 5\log\left(-\left(-\frac{5.74968}{10^{40}}\right)\right)$$

Open code

- $\log(x)$ is the natural logarithm

Result:

- More digits

$-756.265\ldots$

This value -756,265 is very near to the rest mass of Charged rho meson with minus sign

Alternative representations:

- More

$$1.674\times 5\log\left(-\frac{-5.74968}{10^{40}}\right)=8.37\log_e\left(\frac{5.74968}{10^{40}}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$1.674\times 5\log\left(-\frac{-5.74968}{10^{40}}\right)=8.37\log(a)\log_a\left(\frac{5.74968}{10^{40}}\right)$$

Open code

$$1.674\times 5\log\left(-\frac{-5.74968}{10^{40}}\right)=\left(-8.37\,\text{Li}_1\left(1-\frac{5.74968}{10^{40}}\right)=-8.37\,\text{Li}_1(1)\right)$$

Open code

- Series representations:

$$1.674\times 5\log\left(-\frac{-5.74968}{10^{40}}\right)=16.74\,i\,\pi\left\lfloor\frac{\arg(5.74968\times 10^{-40}-x)}{2\,\pi}\right\rfloor+8.37\log(x)-8.37\sum_{k=1}^{\infty}\frac{(-1)^k\,(5.74968\times 10^{-40}-x)^k\,x^{-k}}{k}\quad\text{for } x<0$$

- Open code

- Enlarge Data Customize A Plaintext Interactive

$$1.674\times 5\log\left(-\frac{-5.74968}{10^{40}}\right)=8.37\left\lfloor\frac{\arg(5.74968\times 10^{-40}-z_0)}{2\,\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+8.37\log(z_0)+8.37\left\lfloor\frac{\arg(5.74968\times 10^{-40}-z_0)}{2\,\pi}\right\rfloor\log(z_0)-8.37\sum_{k=1}^{\infty}\frac{(-1)^k\,(5.74968\times 10^{-40}-z_0)^k\,z_0^{-k}}{k}$$

- Open code

-

$$1.674\times 5\log\left(-\frac{-5.74968}{10^{40}}\right)=16.74\, i\,\pi\left\lfloor-\frac{-\pi+\arg\left(\frac{5.74968\times10^{-40}}{z_0}\right)+\arg(z_0)}{2\pi}\right\rfloor+$$
$$8.37\log(z_0)-8.37\sum_{k=1}^{\infty}\frac{(-1)^k\,(5.74968\times10^{-40}-z_0)^k\,z_0^{-k}}{k}$$

-

Integral representation:

$$1.674\times 5\log\left(-\frac{-5.74968}{10^{40}}\right)=8.37\int_1^{5.74968\times10^{-40}}\frac{1}{t}\,dt$$

(27-8) ln -(-5.74968 * 10^-40)

Input interpretation:

$$(27-8)\log\left(-\left(-\frac{5.74968}{10^{40}}\right)\right)$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

$-1716.7309308548272993779620772605024079449019152421047522 7...$

This result -1716,73 is very near to the mass of $f_0(1710)$ candidate glueball, with minus sign

Alternative representations:

- More

$$(27-8)\log\left(-\frac{-5.74968}{10^{40}}\right)=19\log_e\left(\frac{5.74968}{10^{40}}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$(27-8)\log\left(-\frac{-5.74968}{10^{40}}\right)=19\log(a)\log_a\left(\frac{5.74968}{10^{40}}\right)$$

Open code

$$(27-8)\log\left(-\frac{-5.74968}{10^{40}}\right)=\left(-19\,\mathrm{Li}_1\left(1-\frac{5.74968}{10^{40}}\right)=-19\,\mathrm{Li}_1(1)\right)$$

Open code

Series representations:

$$(27-8)\log\left(-\frac{-5.74968}{10^{40}}\right)=38\,i\,\pi\left\lfloor\frac{\arg(5.74968\times10^{-40}-x)}{2\,\pi}\right\rfloor+19\log(x)-19\sum_{k=1}^{\infty}\frac{(-1)^k\,(5.74968\times10^{-40}-x)^k\,x^{-k}}{k}\quad\text{for } x<0$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$(27-8)\log\left(-\frac{-5.74968}{10^{40}}\right)=19\left\lfloor\frac{\arg(5.74968\times10^{-40}-z_0)}{2\,\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+19\log(z_0)+19\left\lfloor\frac{\arg(5.74968\times10^{-40}-z_0)}{2\,\pi}\right\rfloor\log(z_0)-19\sum_{k=1}^{\infty}\frac{(-1)^k\,(5.74968\times10^{-40}-z_0)^k\,z_0^{-k}}{k}$$

Open code

$$(27-8)\log\left(-\frac{-5.74968}{10^{40}}\right)=38\,i\,\pi\left\lfloor-\frac{-\pi+\arg\left(\frac{5.74968\times10^{-40}}{z_0}\right)+\arg(z_0)}{2\,\pi}\right\rfloor+19\log(z_0)-19\sum_{k=1}^{\infty}\frac{(-1)^k\,(5.74968\times10^{-40}-z_0)^k\,z_0^{-k}}{k}$$

Open code

Integral representation:

$$(27-8)\log\left(-\frac{-5.74968}{10^{40}}\right)=19\int_1^{5.74968\times10^{-40}}\frac{1}{t}\,dt$$

Open code

Continued fraction:

Linear form

$$-1716+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-8+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-4+\cfrac{1}{-42+\cfrac{1}{-1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}$$

Open code

1/21.676 ln -(-5.74968 * 10^-40)

Input interpretation:

$$\frac{1}{21.676}\log\left(-\left(-\frac{5.74968}{10^{40}}\right)\right)$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-4.16840...$

This result -4,16840 is in the range of the mass of hypothetical dark matter particles with minus sign

Alternative representations:

- More

$$\frac{\log\left(-\frac{-5.74968}{10^{40}}\right)}{21.676} = \frac{\log_e\left(\frac{5.74968}{10^{40}}\right)}{21.676}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{\log\left(-\frac{-5.74968}{10^{40}}\right)}{21.676} = \frac{\log(a)\log_a\left(\frac{5.74968}{10^{40}}\right)}{21.676}$$

Open code

$$\frac{\log\left(-\frac{-5.74968}{10^{40}}\right)}{21.676} = \left(-\frac{\mathrm{Li}_1\left(1-\frac{5.74968}{10^{40}}\right)}{21.676} = -0.046134\,\mathrm{Li}_1(1)\right)$$

Open code

Series representations:

$$\frac{\log\left(-\frac{-5.74968}{10^{40}}\right)}{21.676} = 0.0922679\, i\,\pi \left\lfloor \frac{\arg(5.74968\times 10^{-40}-x)}{2\pi} \right\rfloor + 0.046134\log(x) - 0.046134\sum_{k=1}^{\infty}\frac{(-1)^k\,(5.74968\times 10^{-40}-x)^k\,x^{-k}}{k} \quad \text{for } x<0$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{\log\left(-\frac{-5.74968}{10^{40}}\right)}{21.676} = 0.046134 \left\lfloor \frac{\arg(5.74968\times10^{-40} - z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + 0.046134 \log(z_0) + 0.046134 \left\lfloor \frac{\arg(5.74968\times10^{-40} - z_0)}{2\pi} \right\rfloor \log(z_0) - 0.046134 \sum_{k=1}^{\infty} \frac{(-1)^k (5.74968\times10^{-40} - z_0)^k z_0^{-k}}{k}$$

Open code

$$\frac{\log\left(-\frac{-5.74968}{10^{40}}\right)}{21.676} = 0.0922679\, i\, \pi \left\lfloor -\frac{-\pi + \arg\left(\frac{5.74968\times10^{-40}}{z_0}\right) + \arg(z_0)}{2\pi} \right\rfloor + 0.046134 \log(z_0) - 0.046134 \sum_{k=1}^{\infty} \frac{(-1)^k (5.74968\times10^{-40} - z_0)^k z_0^{-k}}{k}$$

Open code

Integral representation:

$$\frac{\log\left(-\frac{-5.74968}{10^{40}}\right)}{21.676} = 0.046134 \int_1^{5.74968\times10^{-40}} \frac{1}{t}\, dt$$

Open code

Now, from the two results, we have:

(-5.74968105993983118960584452 7 * 10^-40) * 1/ (-1.005834389530381683148320482183214342598410387 × 10^-12)

Input interpretation:

$$-\frac{5.749681059939831189605844527}{10^{40}} \left(-\frac{1}{1.005834389530381683148320482183214342598410387 \times 10^{-12}}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$5.716329765404346885180760173232640791278422411269985 7\ldots \times 10^{-28}$

Open code

1/0.347835 * (-5.749681059939831189605844527 * 10^-40) * 1/ (-1.005834389530381683148320482183214342598410387 × 10^-12)

Input interpretation:

$$\frac{1}{0.347835}\left(-\frac{5.749681059939831189605844527}{10^{40}}\right)\left(-\frac{1}{1.005834389530381683148320482183214342598410387\times 10^{-12}}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$1.6434026953596811376603160042067764288465572502105842\ldots \times 10^{-27}$

Open code

Value very near to the mass of Proton

Where 0,347835... is a value of special continued fraction 1/√2 -1/√3 +1/√5 -1/√7 +1/√11 -1/√13 +1/√17 -...

1/(sqrt(27)) ln (1.6434026953596811376603160042067764288465572502105842 × 10^-27)

Input interpretation:

$$\frac{1}{\sqrt{27}}\log(1.6434026953596811376603160042067764288465572502105842\times 10^{-27})$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-11.86897988879412041807006094440142026101885469876679117\ldots$

This result -11,868 is very near to the value of black hole entropy (see Tables) with minus sign

Continued fraction:

- Linear form

$$-11+\cfrac{1}{-1+\cfrac{1}{-6+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-2+\cfrac{1}{-2+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}$$

Open code

Enlarge Data Customize A Plaintext

(8+21)*5/(sqrt(27)) ln (1.6434026953596811376603160042067764288465572502105842 × 10^-27)

Input interpretation:

$$(8+21)\times\frac{5}{\sqrt{27}}\log(1.6434026953596811376603160042067764288465572502105842\times 10^{-27})$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

−1721.002083875147460620158836938205937847733931321184720...

This result -1721,002 is very near to the mass of $f_0(1710)$ candidate glueball, with minus sign

Continued fraction:

- Linear form

$$-1721+\cfrac{1}{-479+\cfrac{1}{-1+\cfrac{1}{-7+\cfrac{1}{-78+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-14+\cfrac{1}{-1+\cfrac{1}{-8+\cfrac{1}{-3+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{\cdots}}}}}}}}}}}}}}$$

Open code

4Pi * ln (1.6434026953596811376603160042067764288465572502105842 × 10^-27)

Input interpretation:

$4\pi \log(1.6434026953596811376603160042067764288465572502105842 \times 10^{-27})$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-775.00613435052575878317329463657376616404798289667097\,54\ldots$

This value -775,006 is practically equal to the rest mass of Charged rho meson with minus sign

Continued fraction:

- Linear form

$$-775+\cfrac{1}{-163+\cfrac{1}{-60+\cfrac{1}{-1+\cfrac{1}{-4+\cfrac{1}{-2+\cfrac{1}{-24+\cfrac{1}{-1+\cfrac{1}{-8+\cfrac{1}{-16+\cfrac{1}{-1+\cfrac{1}{-11+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{\cdots}}}}}}}}}}}}}}$$

Now, we have:

Mock ϑ-functions (of 7th order)

$$\text{(i)} \quad 1+\frac{q}{1-q^2}+\frac{q^4}{(1-q^3)(1-q^4)}+\frac{q^9}{(1-q^4)(1-q^5)(1-q^6)}+\ldots$$

$$\text{(ii)} \quad \frac{q}{1-q}+\frac{q^4}{(1-q^2)(1-q^3)}+\frac{q^9}{(1-q^3)(1-q^4)(1-q^5)}+\ldots$$

$$\text{(iii)} \quad \frac{1}{1-q}+\frac{q^2}{(1-q^2)(1-q^3)}+\frac{q^6}{(1-q^3)(1-q^4)(1-q^5)}+\ldots$$

From the (i), we have:

0.9239078+0.000433255+(-1.8754140254243246404383299476354805043847163776 × 10^-7)

Input interpretation:

$0.9239078 + 0.000433255 - 1.8754140254243246404383299476354805043847163776 \times 10^{-7}$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

0.92434086745859745756753595616700523645194956152836224

Open code

The result is

0.92434086745859745756753595616700523645194956152836224

Repeating decimal:

0.924340867458597457567535956167005236451949561528362240

Continued fraction:

- Linear form

$$\cfrac{1}{1+\cfrac{1}{12+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{49+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}}}$$

2Pi * ((exp (0.924340867458597457567535956167005236451949561528 36224)))

Input interpretation:

$2\,\pi\,\exp(0.92434086745859745756753595616700523645194956152836224)$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

15.834924845326022882101195810364752953481611459791164...

This result 15,8349 is very near to the value of black hole entropy (see Tables)

Continued fraction:

- Linear form

$$15+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{17+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{15+\cfrac{1}{138+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{61+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{26+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}$$

2Pi *(27*4) ((exp (0.9243408674585974575675359561670052364519495615283 6224)))

Input interpretation:

$2\pi(27\times 4)\exp(0.92434086745859745756753595616700523645194956152836224)$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

  1710.1718832952104712669291475193933189760140376574457...

This result 1710,1718 is very near to the mass of $f_0(1710)$ candidate glueball

16Pi + 288 * ((exp (0.92434086745859745756753595616700523645194956152836224)))

Input interpretation:

$16\pi+288\exp(0.92434086745859745756753595616700523645194956152836224)$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

  776.08497249265987625649272094034356243641594928890348...

This value 776,084 is practically equal to the rest mass of Charged rho meson

1.6449 ((exp (0.92434086745859745756753595616700523645194956152836224)))

Input interpretation:

1.6449 exp(0.92434086745859745756753595616700523645194956152836224)
Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits
4.14549...

This result 4,14549 is in the range of the mass of hypothetical dark matter particles

Continued fraction:
- Linear form

$$4+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{13+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{19+\cfrac{1}{1+\cfrac{1}{100+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Open code

(8Pi) * (((0.92434086745859745756753595616700523645194956152836224)))

Input interpretation:
$(8\pi)\times 0.92434086745859745756753595616700523645194956152836224$
Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits
23.231219828965972384323403382955795246074975012553105...

This result 23,2312 is very near to the value of black hole entropy (see Tables)

(576Pi) * (((0.92434086745859745756753595616700523645194956152836224)))

Input interpretation:

(576 π) × 0.92434086745859745756753595616700523645194956152836224

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1672.6478276855500116712850435728172577173982009038236...

This result 1672,6478 is practically equal to the value of the rest mass of Omega baryon 1672.45±0.29

From the (ii), we have:

-1.081849047367565973116419938674252971482398018961922 +

0.0761251367814440464022202749466671971676215118725857

-0.000433255719961759072744149660169833646052283127278

Input interpretation:

−1.081849047367565973116419938674252971482398018961922 + 0.0761251367814440464022202749466671971676215118725857 − 0.000433255719961759072744149660169833646052283127278

Open code

Result:

−1.0061571663060836857869438133877556079608287902166143

The result is -1.0061571663…

-1.0061571663060836857869438133877556079608287902166143

Open code

Continued fraction:

- Linear form

$$-1+\cfrac{1}{-162+\cfrac{1}{-2+\cfrac{1}{-2+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-4+\cfrac{1}{-1+\cfrac{1}{-30+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-3+\cfrac{1}{-1+\cfrac{1}{-5+\cfrac{1}{-2+\cfrac{1}{\ldots}}}}}}}}}}}}}}}$$

4Pi * 10^4 ln -(-1.00615716630608368578694381338775560796082879021661439)

Input interpretation:

$$4\pi\times 10^4 \log(-(-1.00615716630608368578694381338775560796082879021661439))$$

Open code

- $\log(x)$ is the natural logarithm

Result:

- More digits

771.3600706731711996344212483263107355399393482535669...

This value 771,36 is very near to the rest mass of Charged rho meson

Enlarge Data Customize A Plaintext

Series representations:

- More

$$4\pi\,10^4 \log(-(-1)\,1.006157166306083685786943813387755607960828790216614390000) = -40000\,\pi \sum_{k=1}^{\infty} \frac{(-0.006157166306083685786943813387755607960828790216614390000)^k}{k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$4\pi\, 10^4 \log(-(-1)\ 1.0061571663060836857869438133877556079608287902166143900000) = 80\,000\, i\, \pi^2 \left\lfloor \frac{1}{2\pi} \arg(1.0061571663060836857869438133877556079608287902166143900000 - x) \right\rfloor + 40\,000\, \pi \log(x) - 40\,000\, \pi \sum_{k=1}^{\infty} \frac{1}{k} (-1)^k (1.0061571663060836857869438133877556079608287902166143900000 - x)^k\, x^{-k} \quad \text{for } x < 0$$

Open code

$$4\pi\, 10^4 \log(-(-1)\ 1.0061571663060836857869438133877556079608287902166143900000) = 80\,000\, i\, \pi^2 \left\lfloor -\frac{1}{2\pi} (-\pi + \arg(1.0061571663060836857869438133877556079608287902166143900000 / z_0) + \arg(z_0)) \right\rfloor + 40\,000\, \pi \log(z_0) - 40\,000\, \pi \sum_{k=1}^{\infty} \frac{1}{k} (-1)^k (1.0061571663060836857869438133877556079608287902166143900000 - z_0)^k\, z_0^{-k}$$

Integral representations:

$$4\pi\, 10^4 \log(-(-1)\ 1.0061571663060836857869438133877556079608287902166143900000) = 40\,000\, \pi \int_1^{1.0061571663060836857869438133877556079608287902166143900000} \frac{1}{t}\, dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$4\pi\, 10^4 \log(-(-1)\ 1.0061571663060836857869438133877556079608287902166143900000) = \frac{20\,000}{i} \int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{e^{5.0901386225223366536389003362428466688609619239262995361\, s}\, \Gamma(-s)^2\, \Gamma(1+s)}{\Gamma(1-s)}\, ds \quad \text{for } -1 < \gamma < 0$$

9Pi * 10^4 ln -(-1.006157166306083685786943813387755607960828790216614390)

Input interpretation:

$$9\pi \times 10^4 \log(-(-1.006157166306083685786943813387755607960828790216614390))$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1735.560159014635199177447808734199154964863533570525...

This result 1735,56 is very near to the mass of $f_0(1710)$ candidate glueball

Series representations:

- More

$$9\pi 10^4 \log(-(-1) 1.0061571663060836857869438133877556079608287902166143900000) = -90000 \pi \sum_{k=1}^{\infty} \frac{(-0.0061571663060836857869438133877556079608287902166143900000)^k}{k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$9\pi 10^4 \log(-(-1) 1.0061571663060836857869438133877556079608287902166143900000) = 180000 i \pi^2 \left\lfloor \frac{1}{2\pi} \arg(1.0061571663060836857869438133877556079608287902166143900000 - x) \right\rfloor + 90000 \pi \log(x) - 90000 \pi \sum_{k=1}^{\infty} \frac{1}{k} (-1)^k (1.0061571663060836857869438133877556079608287902166143900000 - x)^k x^{-k} \quad \text{for } x < 0$$

Open code

$$9\pi 10^4 \log(-(-1) 1.0061571663060836857869438133877556079608287902166143900000) = 180000 i \pi^2 \left\lfloor -\frac{1}{2\pi}(-\pi + \arg(1.00615716630608368578694381338775560796082879021661439 0000 / z_0) + \arg(z_0)) \right\rfloor + 90000 \pi \log(z_0) - 90000 \pi \sum_{k=1}^{\infty} \frac{1}{k} (-1)^k (1.0061571663060836857869438133877556079608287902166143900000 - z_0)^k z_0^{-k}$$

Integral representations:

$$9\pi\, 10^4 \log(-(-1.0061571663060836857869438133877556079608287902166143900000)) = 90\,000\,\pi \int_1^{1.0061571663060836857869438133877556079608287902166143900000} \frac{1}{t}\, dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$9\pi\, 10^4 \log(-(-1.0061571663060836857869438133877556079608287902166143900000)) = \frac{45\,000}{i} \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{e^{5.090138622522336653638900336242846668860961923926299536 1\, s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\, ds \quad \text{for } -1 < \gamma < 0$$

1/144 * 9Pi * 10^4 ln -(-1.0061571663060836857869438133877556079608287902166143 9)

Input interpretation:

$$\frac{1}{144} \times 9\left(\pi \times 10^4\right) \log(-(-1.0061571663060836857869438133877556079608287902166143 9))$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

12.052501104268299994287832005098605242811552316461 98...

This result 12,0525 is very near to the value of black hole entropy (see Tables

Series representations:

- More

$$\frac{1}{144}\left(9\log(-(-1.006157166306083685786943813387755607960828790216614390000))\,\pi\, 10^4\right) = -625\,\pi \sum_{k=1}^{\infty} \frac{(-0.006157166306083685786943813387755607960828790216614390000)^k}{k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{1}{144}\left(9\log\left(-(-1.006157166306083685786943813387755607960828790216614390000)\right)\right)\pi\,10^4 = 1250\,i\,\pi^2\left\lfloor\frac{1}{2\pi}\arg(1.006157166306083685786943813387755607960828790216614390000 - x)\right\rfloor + 625\,\pi\log(x) - 625\,\pi\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k(1.006157166306083685786943813387755607960828790216614390000 - x)^k\,x^{-k} \quad \text{for } x < 0$$

Open code

$$\frac{1}{144}\left(9\log\left(-(-1.006157166306083685786943813387755607960828790216614390000)\right)\right)\pi\,10^4 = 1250\,i\,\pi^2\left\lfloor-\frac{1}{2\pi}\left(-\pi + \arg(1.006157166306083685786943813387755607960828790216614390000 / z_0) + \arg(z_0)\right)\right\rfloor + 625\,\pi\log(z_0) - 625\,\pi\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k(1.006157166306083685786943813387755607960828790216614390000 - z_0)^k\,z_0^{-k}$$

Integral representations:

$$\frac{1}{144}\left(9\log\left(-(-1.006157166306083685786943813387755607960828790216614390000)\right)\right)\pi\,10^4 = 625\,\pi\int_1^{1.006157166306083685786943813387755607960828790216614390000}\frac{1}{t}\,dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{1}{144}\left(9\log\left(-(-1.006157166306083685786943813387755607960828790216614390000)\right)\right)\pi\,10^4 = \frac{625}{2\,i}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{5.0901386225223366536389003362428466688609619239262995361\,s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1 < \gamma < 0$$

1/72 * 9Pi * 10^4 ln -(-1.00615716630608368578694381338775560796082879021661439)

Input interpretation:

$$\frac{1}{72}\times 9\,(\pi\times 10^4)\ \log(-(-1.0061571663060836857869438133877556079608287902166143 9))$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

24.10500220853659998857566401019721048562310463292396...

This result 24,105 is very near to the value of black hole entropy (see Tables) and equal to 24, the physical degrees of freedom of the bosonic string, that are the 24 transverse coordinates.

Series representations:

- More

$$\frac{1}{72}\left(9\log(-(-1.00615716630608368578694381338775560796082879021661439 0000))\right)\pi\,10^4 = -1250\,\pi\sum_{k=1}^{\infty}\frac{(-0.006157166306083685786943813387755607960828790216614390000)^k}{k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{1}{72}\left(9\log(-(-1.00615716630608368578694381338775560796082879021661439 0000))\right)\pi\,10^4 = 2500\,i\,\pi^2\left\lfloor\frac{1}{2\pi}\arg(1.00615716630608368578694381338775560796082879021661439 0000-x)\right\rfloor + 1250\,\pi\log(x) - 1250\,\pi\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k(1.00615716630608368578694381338775560796082879021661439 0000-x)^k\,x^{-k}\quad\text{for } x<0$$

Open code

$$\frac{1}{72}\left(9\log\left(-\left(-1.0061571663060836857869438133877556079608287902166143900\cdot 000\right)\right)\right)\pi\,10^4 = 2500\,i\,\pi^2\left\lfloor -\frac{1}{2\pi}\left(-\pi+\arg\left(1.006157166306083685786943813387755607960828790216614390000/z_0\right)+\arg(z_0)\right)\right\rfloor + 1250\,\pi\log(z_0) - 1250\,\pi\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(1.006157166306083685786943813387755607960828790216614390000-z_0\right)^k z_0^{-k}$$

Integral representations:

$$\frac{1}{72}\left(9\log\left(-\left(-1.0061571663060836857869438133877556079608287902166143900\cdot 000\right)\right)\right)\pi\,10^4 = 1250\,\pi\int_1^{1.006157166306083685786943813387755607960828790216614390000}\frac{1}{t}\,dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{1}{72}\left(9\log\left(-\left(-1.006157166306083685786943813387755607960828790216614390000\right)\right)\right)\pi\,10^4 = \frac{625}{i}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{5.0901386225223366536389003362428466688609619239262995361\,s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

1/(142*(((sqrt(5)+1)/2))^2))) * (8Pi) * 10^4 ln -(-1.006157166306083685786943813387755607960828790216614390)

Input interpretation:

$$\frac{1}{142\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)^2}(8\,\pi)\times 10^4 \log(-(-1.006157166306083685786943813387755607960828790216614390))$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

4.149765203276484724071530319835938309107282758224328...

This result 4,14976 is in the range of the mass of hypothetical dark matter particles

Series representations:

- More

$$\frac{1}{142\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)^2}\left(10^4 \log\left(-(-1.006157166306083685786943813387755607960828790216614390\text{.}000)\right)\right) 8\pi = -\frac{160000\pi \sum_{k=1}^{\infty} \frac{(-0.006157166306083685786943813387755607960828790216614390000)^k}{k}}{71\left(1+\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k}\right)^2}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{1}{142\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)^2}\left(10^4 \log\left(-(-1.006157166306083685786943813387755607960828790216614390\text{.}000)\right)\right) 8\pi = -\frac{160000\pi \sum_{k=1}^{\infty} \frac{(-0.006157166306083685786943813387755607960828790216614390000)^k}{k}}{71\left(1+\sqrt{4}\sum_{k=0}^{\infty} \frac{\left(-\frac{1}{4}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)^2}$$

Open code

$$\frac{1}{142\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)^2}\left(10^4 \log\left(-(-1.006157166306083685786943813387755607960828790216614390\text{.}0000)\right)\right) 8\pi = \left(160000\pi \log(1.00615716630608368578694381338775560796082879021661439000\text{.}00)\right) \Big/ \left(71\left(1+\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k (5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^2\right)$$

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

Integral representations:

$$\frac{1}{142\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)^2}\left(10^4 \log\left(-\left(-1.00615716630608368578694381338775560796082879021661439000\right)\right)\right)8\pi = \frac{160000\pi}{71\left(1+\sqrt{5}\right)^2}\int_1^{1.00615716630608368578694381338775560796082879021661439000} \frac{1}{t}\,dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{1}{142\left(\frac{1}{2}\left(\sqrt{5}+1\right)\right)^2}\left(10^4 \log\left(-\left(-1.006157166306083685786943813387755607960828790216614390000\right)\right)\right)8\pi = \frac{80000}{71\,i\left(1+\sqrt{5}\right)^2}\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{e^{5.090138622522336653638900336242846668860961923926299 5361\,s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

From the (iii), we have:

-0.08184904736756597311641993867425297148239801896192 2

0.000435734563064045714075785307083428104970561697246 6

-1.876226178785132548298650812767996879751945206 5 × 10^-7

$$-0.081849047367565973116419938674252971482398018961922 + 0.0004357345630640457140757853070834281049705616972466 - 1.8762261787851325482986508127679968797519452065 \times 10^{-7}$$

$$-0.0814135004271198059155989832322508201771154324591960 5$$

The result is:

-0.081413500427119805915598983232250820177115432459196 05

Continued fraction:

- Linear form

$$\cfrac{1}{-12+\cfrac{1}{-3+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-6+\cfrac{1}{-1+\cfrac{1}{-7+\cfrac{1}{-3+\cfrac{1}{-1+\cfrac{1}{-2+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-21+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{-1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}$$

5 ln-(-0.081849047367565973116419938674252971482398018961922+ 0.000435734563064045714075785307083428104970561697 2466 - 1.8762261787851325482986508127679968797519452065 × 10^-7)

Input interpretation:

$5 \log(-(-0.081849047367565973116419938674252971482398018961922 + 0.0004357345630640457140757853070834281049705616972466 - 1.8762261787851325482986508127679968797519452065 \times 10^{-7}))$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

−12.541070834063482807190784297649523845515152785009...

This result -12,541 is very near to the value of black hole entropy (see Tables) with minus sign

137 *5 ln-(-0.081849047367565973116419938674252971482398018961922+ 0.0004357345630640457140757853070834281049705616972466 - 1.8762261787851325482986508127679968797519452065 × 10^-7)

Input interpretation:

$137 \times 5 \log(-(-0.081849047367565973116419938674252971482398018961922 + 0.0004357345630640457140757853070834281049705616972466 - 1.8762261787851325482986508127679968797519452065 \times 10^{-7}))$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits

−1718.12670426669714458513744877798476683557593154 62...

This result -1718,126 is very near to the mass of $f_0(1710)$ candidate glueball with minus sign

(54+8) *5 ln-(-0.0818490473675659731164199386742529714823980189619 22+ 0.0004357345630640457140757853070834281049705616972466 - 1.8762261787851325482986508127679968797519452065 × 10^-7)

Input interpretation:

$$(54+8)\times 5 \log(-(-0.081849047367565973116419938674252971482398018961922 + 0.0004357345630640457140757853070834281049705616972466 - 1.8762261787851325482986508127679968797519452065\times 10^{-7}))$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits

−777.54639171193593404582862645427047842193947267053...

This value -777,546 is very near to the rest mass of Charged rho meson with minus sign

((sqrt(5))+1))/2) - ln-(- 0.081849047367565973116419938674252971482398018961922+ 0.0004357345630640457140757853070834281049705616972466 - 1.8762261787851325482986508127679968797519452065 × 10^-7)

Input interpretation:

$$\frac{1}{2}\left(\sqrt{5}+1\right) - \log(-(-0.081849047367565973116419938674252971482398018961922 + 0.0004357345630640457140757853070834281049705616972466 - 1.8762261787851325482986508127679968797519452065\times 10^{-7}))$$

Open code

- $\log(x)$ is the natural logarithm

Result:
- More digits
4.126248155562591409642743693895542886823339736807 47...

This result 4,12624 is in the range of the mass of hypothetical dark matter particles

Enlarge Data Customize A Plai

1/(-0.081849047367565973116419938674252971482398018961922+
0.00043573456306404571407578530708342810497056169724 66 -
1.8762261787851325482986508127679968797519452065 × 10^-7)

Input interpretation:
$1/(-0.081849047367565973116419938674252971482398018961922 + 0.000435734563064045714075785307083428104970561697246 6 - 1.8762261787851325482986508127679968797519452065 \times 10^{-7})$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits
−12.282975117808447636025036258308814245227379401223629 2807...

Open code

This result -12,2829 is very near to the value of black hole entropy (see Tables) with minus sign

((-(1/(-0.081849047367565973116419938674252971482398018961922+
0.00043573456306404571407578530708342810497056169724 66 -
1.8762261787851325482986508127679968797519452065 × 10^-7)))^1/5

Input interpretation:
$(-1/(-0.081849047367565973116419938674252971482398018961922 + 0.000435734563064045714075785307083428104970561697246 6 - 1.8762261787851325482986508127679968797519452065 \times 10^{-7}))\hat{}(1/5)$

Open code

Result:
- More digits
1.651432071096145506359440598637113616520991723519 72...

Enlarge Data Customize A Plaintext

We take all the three results (i), (ii) and (iii) and mutiply:

Input interpretation:

0.92434086745859745756753595616700523645194956152836224 ×
(−1.0061571663060836857869438133877556079608287902166143) ×
(−0.08141350042711980591559898323225082017711543245919605)

Open code

Result:

- More digits

0.075717175927080104333280313003357627560491481124352895669...

Open code

Repeating decimal:

- More digits

0.075717175927080104333280313003357627560491481124352895669...

Now:

Input interpretation:

1.772453 / (0.92434086745859745756753595616700523645194956152836224 ×
(−1.0061571663060836857869438133877556079608287902166143) ×
(−0.08141350042711980591559898323225082017711543245919605))

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

23.40886302609822439151210039876532117647838546703822548593...

Open code

This result 23,4088 is very near to the value of black hole entropy (see Tables)

Input interpretation:

−(0.945308 / (0.92434086745859745756753595616700523645194956152836224 ×
(−1.0061571663060836857869438133877556079608287902166143) ×
(−0.08141350042711980591559898323225082017711543245919605)))

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

−12.4847234253742470480692693141967929365091371162309922224...

Open code

This result -12,4847 is very near to the value of black hole entropy (see Tables) with minus sign

Input interpretation:

$2.363271/(0.9243408674585974575675359561670052364519495615283 6224\times(-1.0061571663060836857869438133877556079608287902166143)\times(-0.0814135004271198059155989832322508201771154324591 9605))$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

31.211821770478639972937614154784651182320349538787710693 81...

Open code

This result 31,2118 is very near to the value of black hole entropy (see Tables)

Input interpretation:

$1.329340/(0.9243408674585974575675359561670052364519495615283 6224\times(-1.0061571663060836857869438133877556079608287902166143)\times(-0.0814135004271198059155989832322508201771154324591 9605))$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

17.556650571334423881825185516397158092620665787331226648 87...

Open code

This result 17,5566 is very near to the value of black hole entropy (see Tables)

From the sum of all results that we have obtained, we have:

Pi/6 ln ((-4267.24+(6.5960861587*10^20)-(1.0058343895*10^-12)-(5.74968*10^-40)-0.16322979927460603413500684045300119168599466114744 8110))

Input interpretation:

$$\frac{\pi}{6}\log(-4267.24+6.5960861587\times10^{20}-1.0058343895\times10^{-12}-5.74968\times10^{-40}-0.163229799274606034135006840453001191685994661147448110)$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

25.10037147630...

This result 25,10 is very near to the value of black hole entropy (see Tables)

Multiplying all results obtained, we have:

1/((5+sqrt(5))/2))) ln -((-4267.24*(6.5960861587*10^20)*(1.0058343895*10^-12)*(5.74968*10^-40)*0.163229799274606034135006840453001191685994661147448110))

Input interpretation:

$$\frac{1}{\frac{1}{2}(5+\sqrt{5})} \log(-(-4267.24\times 6.5960861587\times 10^{20}\times 1.0058343895\times 10^{-12}\times 5.74968\times 10^{-40}\times 0.163229799274606034135006840453001191685994661147448110))$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-17.549630\ldots$

This result -17,5496 is very near to the value of black hole entropy (see Tables) with minus sign

We have (pag.4 paper):

Mock ϑ-functions (of 5th order)

$$f(q) = 1+\frac{q^2}{1+q}+\frac{q^6}{(1+q)(1+q^2)}+\frac{q^12}{(1+q)(1+q^2)(1+q^3)}+\ldots$$
$$\phi(q) = q+q^4(1+q)+q^9(1+q)(1+q^3)+\ldots$$
$$\psi(q) = 1+q(1+q)+q^3(1+q)(1+q^2)+q^6(1+q)(1+q^2)(1+q^3)+\ldots$$

f(q) = (13.2879+2134.55-(4.93121*10^6))

Input interpretation:

$13.2879+2134.55-4.93121\times 10^6$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

-4.9290621621×10^6

The result is -4.9290621621 * 10^6

Input interpretation:

$\log(-(13.2879 + 2134.55 - 4.93121 \times 10^6))$

Open code

- $\log(x)$ is the natural logarithm

Result:

- Fewer digits
- More digits

15.410659297111338018790981752965646485435086647542514743 53...

This result 15,41 is very near to the value of black hole entropy (see Tables)

φ(q) = (4.33962*10^5)+(4.04437*10^14)

Input interpretation:

$4.33962 \times 10^5 + 4.04437 \times 10^{14}$

Open code

Result:

404437000433962

Scientific notation:

$4.04437000433962 \times 10^{14}$

The result is: $4.04437 * 10^{14}$

Open code

Input:

$\frac{1}{\sqrt{8}} \log(404437000433962)$

Open code

- $\log(x)$ is the natural logarithm

Exact result:

$$\frac{\log(404437000433962)}{2\sqrt{2}}$$

Enlarge Data Customize A Plaintext Interactive

Decimal approximation:

- More digits

11.891244005995531298748728468726359176750385396129295358 82...

Open code

This result 11,8912 is very near to the value of black hole entropy (see Tables)

Property:

$\frac{\log(404437000433962)}{2\sqrt{2}}$ is a transcendental number

Continued fraction:

- Linear form

$$11+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{5+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{58+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{6+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{22+\cfrac{1}{44+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{\log(404437000433962)}{\sqrt{8}} = \frac{\log(404437000433961)}{2\sqrt{2}} - \frac{\sum_{k=1}^{\infty} \frac{\left(-\frac{1}{404437000433961}\right)^k}{k}}{2\sqrt{2}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{\log(404437000433962)}{\sqrt{8}} = \frac{i\pi\left\lfloor\frac{\arg(404437000433962-x)}{2\pi}\right\rfloor}{\sqrt{2}} + \frac{\log(x)}{2\sqrt{2}} - \frac{\sum_{k=1}^{\infty}\frac{(-1)^k(404437000433962-x)^k x^{-k}}{k}}{2\sqrt{2}} \quad \text{for } x<0$$

Open code

$$\frac{\log(404437000433962)}{\sqrt{8}} = \frac{1}{2\sqrt{2}}\left(\log(z_0) + \left\lfloor\frac{\arg(404437000433962-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right) - \sum_{k=1}^{\infty}\frac{(-1)^k(404437000433962-z_0)^k z_0^{-k}}{k}\right)$$

Integral representations:

$$\frac{\log(404437000433962)}{\sqrt{8}} = \frac{1}{2\sqrt{2}}\int_1^{404437000433962}\frac{1}{t}\,dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{\log(404437000433962)}{\sqrt{8}} = -\frac{i}{4\sqrt{2}\,\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{404437000433961^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds$$

for $-1 < \gamma < 0$

144 * 1/(sqrt8) ln(404437000433962)

Input:

$$144 \times \frac{1}{\sqrt{8}} \log(404437000433962)$$

Open code

- $\log(x)$ is the natural logarithm

Exact result:

$$36\sqrt{2}\,\log(404437000433962)$$

Enlarge Data Customize A Plaintext Interactive

Decimal approximation:

- More digits

1712.339136863356507019816899496595721452055497042618531671...

This result 1712,339 is very near to the mass of $f_0(1710)$ candidate glueball

Property:

$36\sqrt{2}\,\log(404437000433962)$ is a transcendental number

Open code

Alternate forms:

$$36\sqrt{2}\,(\log(2) + \log(139) + \log(809) + \log(9883) + \log(181957))$$

Enlarge Data Customize A Plaintext Interactive

$$36\sqrt{2}\,\log(2) + 36\sqrt{2}\,\log(139) + 36\sqrt{2}\,\log(809) + 36\sqrt{2}\,\log(9883) + 36\sqrt{2}\,\log(181957)$$

Continued fraction:

- Linear form

$$1712+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{18+\cfrac{1}{2+\cfrac{1}{11+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{144\log(404437000433962)}{\sqrt{8}} = 36\sqrt{2}\log(404437000433961) - 36\sqrt{2}\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{404437000433961}\right)^k}{k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{144\log(404437000433962)}{\sqrt{8}} = 72\,i\sqrt{2}\,\pi\left\lfloor\frac{\arg(404437000433962-x)}{2\pi}\right\rfloor + 36\sqrt{2}\log(x) - 36\sqrt{2}\sum_{k=1}^{\infty}\frac{(-1)^k\,(404437000433962-x)^k\,x^{-k}}{k} \quad \text{for } x<0$$

Open code

$$\frac{144\log(404437000433962)}{\sqrt{8}} = 36\sqrt{2}\left(\log(z_0) + \left\lfloor\frac{\arg(404437000433962-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right) - \sum_{k=1}^{\infty}\frac{(-1)^k\,(404437000433962-z_0)^k\,z_0^{-k}}{k}\right)$$

Integral representations:

$$\frac{144\log(404437000433962)}{\sqrt{8}} = 36\sqrt{2}\int_1^{404437000433962}\frac{1}{t}\,dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{144 \log(404437000433962)}{\sqrt{8}} = -\frac{18 i \sqrt{2}}{\pi} \int_{-i \infty+\gamma}^{i \infty+\gamma} \frac{404437000433961^{-s} \Gamma(-s)^2 \Gamma(1+s)}{\Gamma(1-s)} \, ds \quad \text{for } -1 < \gamma < 0$$

(64+2) /(sqrt8) ln(404437000433962)

Input:

$$\frac{64+2}{\sqrt{8}} \log(404437000433962)$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\frac{33 \log(404437000433962)}{\sqrt{2}}$$

Decimal approximation:

- More digits

784.8221043957050657174160789359397056655254361445334936826...

Open code

This value 784,82 is very near to the rest mass of Omega meson

Property:

$$\frac{33 \log(404437000433962)}{\sqrt{2}} \text{ is a transcendental number}$$

Continued fraction:

- Linear form

$$784+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{15+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{\log(404437000433962)(64+2)}{\sqrt{8}}=$$

$$\frac{33\log(404437000433961)}{\sqrt{2}}-\frac{33\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{404437000433961}\right)^k}{k}}{\sqrt{2}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{\log(404437000433962)(64+2)}{\sqrt{8}}=33\,i\sqrt{2}\,\pi\left\lfloor\frac{\arg(404437000433962-x)}{2\pi}\right\rfloor+$$

$$\frac{33\log(x)}{\sqrt{2}}-\frac{33\sum_{k=1}^{\infty}\frac{(-1)^k(404437000433962-x)^k x^{-k}}{k}}{\sqrt{2}}\quad\text{for } x<0$$

Open code

$$\frac{\log(404437000433962)(64+2)}{\sqrt{8}}=\frac{1}{\sqrt{2}}$$

$$33\left(\log(z_0)+\left\lfloor\frac{\arg(404437000433962-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(404437000433962-z_0)^k z_0^{-k}}{k}\right)$$

Integral representations:

$$\frac{\log(404437000433962)(64+2)}{\sqrt{8}}=\frac{33}{\sqrt{2}}\int_1^{404437000433962}\frac{1}{t}\,dt$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{\log(404437000433962)(64+2)}{\sqrt{8}} = -\frac{33\,i}{2\sqrt{2}\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{404437000433961^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

And

ψ(q) = (188.923)+(5.76860*10^6)+(3.07735*10^13) =

= 3.0773505768788923 × 10^13

Input interpretation:

$$\frac{1}{\sqrt{2\pi}}\log(3.0773505768788923\times 10^{13})$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

12.3902197815835696...

This result 12,39 is very near to the value of black hole entropy (see Tables)

Input interpretation:

$$\frac{138}{\sqrt{2\pi}}\log(3.0773505768788923\times 10^{13})$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1709.85032985853260...

This result 1709,85 is very near to the mass of $f_0(1710)$ candidate glueball

Continued fraction:

- Linear form

$$1709+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{7+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{56+\cfrac{1}{2+\cfrac{1}{\ldots}}}}}}}}}}}}}}}$$

Input interpretation:

$$\frac{55+8}{\sqrt{2\pi}}\log(3.0773505768788923\times10^{13})$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

780.583846239764883...

This value 780,583 is very near to the rest mass of Omega meson

We have also (pag. 5 paper):

$$\chi(q) = \frac{1}{1-q}+\frac{q}{(1-q^2)(1-q^3)}+\frac{q^2}{(1-q^3)(1-q^4)(1-q^5)}$$
$$+\frac{q^3}{(1-q^4)(1-q^5)(1-q^6)(1-q^7)}+\ldots$$
$$F(q) = \frac{1}{1-q}+\frac{q^4}{(1-q)(1-q^3)}+\frac{q^{12}}{(1-q)(1-q^3)(1-q^5)}+\ldots$$

Thence: χ(q) =

(-0.0818490)+(0.0000329662)+(-6.14714*10^-12)+(4.99008*10^-22)

The result is: -0.0818160338061471399995 00992;

F(q) = (-0.0818490)+(1.08232)+(-2499.28) = -2498.279529

The result is: -2498.279529.

The sum of all five results, is:

(-4.9290621621 * 10^6)+(4.04437 * 10^14)+(3.0773505768788923 * 10^13)+(-0.081816033806147139999500992)+(-2498.279529)

Input interpretation:

$$-4.9290621621\times 10^{6}+4.04437\times 10^{14}+3.0773505768788923\times 10^{13}-0.081816033806147139999500992-2498.279529$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

$$4.35210500837228399554966193852860000499008\times 10^{14}$$

Open code

Input interpretation:

$$\frac{1}{2}\log(4.35210500837228399554966193852860000499008\times 10^{14})$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

16.853425469970600484924629536865716030796991...

This result 16,853 is very near to the value of black hole entropy (see Tables)

Input interpretation:

$$\frac{64+38}{2}\log(4.35210500837228399554966193852860000499008\times 10^{14})$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1719.0493979370012494623122127603030351412931...

This result 1719,049 is very near to the mass of $f_0(1710)$ candidate glueball

Continued fraction:

- Linear form

$$1719+\cfrac{1}{20+\cfrac{1}{4+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{38+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{11+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{75+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}$$

Input interpretation:

$$\frac{54-8}{2}\log(4.352105008372283995549661938528600004990008\times 10^{14})$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

775.257571618647622306532958695822937416661 59...

This value 775,257 is practically equal to the rest mass of Charged rho meson

The product of the five results is:

(-4.9290621621 * 10^6)*(4.04437 * 10^14)*(3.0773505768788923 * 10^13)*(-0.08181603380614713999950099 2)*(-2498.279529)

Input interpretation:

$$(-4.9290621621\times 10^6)(4.04437\times 10^{14})(3.0773505768788923\times 10^{13})\times (-0.0818160338061471399995009 92)\times(-2498.279529)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-1.2539251174384734581002648529712833588881437230635 49\ldots\times 10^{37}$

(55+8)/Pi * ln (-(-1.253925117438473458100264852971283358888143723063549 × 10^37))

Input interpretation:

$$\frac{55+8}{\pi}\log(-(-1.253925117438473458100264852971283358888143723063549\times 10^{37}))$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1713.01056657493400634514241940683193778085705254390955...

This result 1713.01 is very near to the mass of $f_0(1710)$ candidate glueball

(-(-1.253925117438473458100264852971283358888143723063549 × 10^37))^1/12

Input interpretation:

$$\sqrt[12]{-(-1.253925117438473458100264852971283358888143723063549\times 10^{37})}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1234.5896547875960518590887724000691554296376974340245...

This value 1234,589 is practically equal to the rest mass of Delta baryon 1232±2

(-(-1.253925117438473458100264852971283358888143723063549 × 10^37))^1/34

Input interpretation:

$$\sqrt[34]{-(-1.253925117438473458100264852971283358888143723063549\times 10^{37})}$$

Open code

Result:

- More digits

12.3346160489457212096954783004550310113394241087746250...

This result 12,33461 is very near to the value of black hole entropy (see Tables)

1/(sqrt(27)) (1.08643*10^11) / ((-
1.253925117438473458100264852971283358888143723063549 × 10^37))

Input interpretation:

$$\frac{1}{\sqrt{27}}\left(-\frac{1.08643\times 10^{11}}{1.2539251174384734581002648529712833588881437230635\times 10^{37}}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-1.66743... \times 10^{-27}$

Result very near to the mass of proton

1/(sqrt(29)) (1.08643*10^19) / ((-1.2539251174384734581002648529712833588881437230635 × 10^37))

Input interpretation:

$$\frac{1}{\sqrt{29}}\left(-\frac{1.08643\times 10^{19}}{1.2539251174384734581002648529712833588881437230635\times 10^{37}}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-1.60891... \times 10^{-19}$

Result very near to the electric charge of electron

1/(sqrt(48)) ln (((((-0.72999480077443047538362776991420567540346048553554829328)/(-1.2539251174384734581002648529712833588881437230635 × 10^37))))

Input interpretation:

$$\frac{1}{\sqrt{48}}\log\left(\frac{-0.72999480077443047538362776991420567540346048553554829328}{-1.2539251174384734581002648529712833588881437230635\times 10^{37}}\right)$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-12.375018772353262048976473943941711859169688468417563\ldots$

This result -12,35750 is very near to the value of black hole entropy (see Tables) with minus sign

139/(sqrt(48)) ln (((((-0.72999480077443047538362776991420567540346048553554829328)/(-1.2539251174384734581002648529712833588881437230635 × 10^37))))

Input interpretation:

$$\frac{139}{\sqrt{48}} \log\left(\frac{-0.7299948007744304753836277699142056754034604855355482932 8}{-1.2539251174384734581002648529712833588881437230635 49 \times 10^{37}}\right)$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

-1720.127609357103424807729878207897948424586697110041 26...

This result -1720.1276 is very near to the mass of $f_0(1710)$ candidate glueball with minus sign

8 - 139/(sqrt(48)) ln (((((-0.72999480077443047538362776991420567540346048553554829328)/(-1.2539251174384734581002648529712833588881437230635 49 × 10^37))))

Input interpretation:

$$8 - \frac{139}{\sqrt{48}} \log\left(\frac{-0.72999480077443047538362776991420567540346048553554829328}{-1.253925117438473458100264852971283358888143723063549 \times 10^{37}}\right)$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1728.127609357103424807729878207897948424586697110041 26...

This result 1728.1276 is very near to the mass of $f_0(1710)$ candidate glueball

sqrt(37) * (((((169/(sqrt(48)) ln (((((-0.72999480077443047538362776991420567540346048553554829328)/(-1.253925117438473458100264852971283358888143723063549 × 10^37)))))))^16

Input interpretation:

$$\sqrt{37}\left(\frac{169}{\sqrt{48}} \log\left((-0.72999480077443047538362776991420567540346048553554829328)/(-1.253925117438473458100264852971283358888143723063549 \times 10^{37})\right)\right)^{16}$$

Open code

- log(x) is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

8.1474555250402646646723462934432481544841699733603052... × 10^{53}

Comparisons:

≈ the size of the Monster group (≈8.1×10^{53})

sqrt(37)/196884 * (((((169/(sqrt(48)) ln (((((-0.72999480077443047538362776991420567540346048553554829328)/(-1.253925117438473458100264852971283358888143723063549 × 10^37)))))))^16

Input interpretation:

$$\frac{\sqrt{37}}{196884}\left(\frac{169}{\sqrt{48}}\log\left(\left(-0.7299948007744304753836277699142056754034604855355482932\right.\right.\right.$$
$$\left.\left.\left.28\right)/\left(-1.253925117438473458100264852971283358888143723063549\times 10^{37}\right)\right)\right)^{16}$$

Open code

- log(x) is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

4.1382009330571629307980060814709413433718179097134887... × 10^{48}

This result 4,1382 is a multiple of the mass of hypothetical dark matter particles

2/gamma (7/2) * ln (((((-0.72999480077443047538362776991420567540346048553554829328)/(-1.253925117438473458100264852971283358888143723063549 × 10^37)))))))^28

Input interpretation:

$$\frac{2}{\Gamma\left(\frac{7}{2}\right)}\log^{28}\left(\frac{-0.72999480077443047538362776991420567540346048553554829328}{-1.253925117438473458100264852971283358888143723063549\times 10^{37}}\right)$$

Open code

- Γ(x) is the gamma function
- log(x) is the natural logarithm

Result:

- More digits

8.093108635057017220776239185289761354907255581285566... × 10^{53}

Comparisons:
≈ the size of the Monster group ($\approx 8.1\times10^{53}$)

In conclusion, we have also that:

1/34 zeta(2) gamma (2) * ln (((((-0.729994800774430475383627769914205675403460485535548293 28)*(-1.25392511743847345810026485297128335888814372306354 9 × 10^37))))))

Input interpretation:

$$\frac{1}{34}\zeta(2)\left(\Gamma(2)\log\left(-0.72999480077443047538362776991420567540346048553554829328\left(-1.2539251174384734581002648529712833588881437230635 49\times10^{37}\right)\right)\right)$$

Open code

- $\zeta(s)$ is the Riemann zeta function
- $\Gamma(x)$ is the gamma function
- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

4.11752199736943834292796697826889090908182207984549507...

This result 4,11752 is in the range of the mass of hypothetical dark matter particles

Continued fraction:

- Linear form

$$4+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{27+\cfrac{1}{7+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{19+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}}$$

((2 zeta(2) gamma (2))/(1.6220877440446798)^8 (((-0.72999480077443))*((-1.2539251174384734581 × 10^37)))

Input interpretation:

$$\frac{2\,\zeta(2)\,\Gamma(2)}{1.6220877440446798^8}\left(-0.72999480077443\left(-1.2539251174384734581\times 10^{37}\right)\right)$$

Open code

- $\zeta(s)$ is the Riemann zeta function
  - $\Gamma(x)$ is the gamma function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$6.2831165538163\ldots\times 10^{35}$

This result is practically a multiple of a length of a circle

((2 zeta(2) gamma (2))/(1.611349)^8 (((-0.72999480077443))*((-1.2539251174384734581 × 10^37)))

Input interpretation:

$$\frac{2\,\zeta(2)\,\Gamma(2)}{1.611349^8}\left(-0.72999480077443\left(-1.2539251174384734581\times 10^{37}\right)\right)$$

Open code

- $\zeta(s)$ is the Riemann zeta function
  - $\Gamma(x)$ is the gamma function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$6.62602\ldots\times 10^{35}$

This result can be considered a multiple of a Planck's constant

Now, we have:

Mock ϑ-functions (of 5th order)

$$f(q) = 1 + \frac{q}{1+q^2} + \frac{q^4}{(1+q)(1+q^2)} + \frac{q^9}{(1+q)(1+q^2)(1+q^3)} + \ldots$$
$$\phi(q) = 1 + q(1+q) + q^4(1+q)(1+q^3) + q^9(1+q)(1+q^3)(1+q^5) + \ldots$$
$$\psi(q) = q + q^3(1+q) + q^6(1+q)(1+q^2) + q^{10}(1+q)(1+q^2)(1+q^3) + \ldots$$
$$\chi(q) = 1 + \frac{q}{1-q^2} + \frac{q^2}{(1-q^3)(1-q^4)} + \frac{q^3}{(1-q^4)(1-q^5)(1-q^6)} + \ldots$$
$$= 1 + \left\{ \frac{q}{1-q} + \frac{q^3}{(1-q^2)(1-q^3)} + \frac{q^5}{(1-q^3)(1-q^4)(1-q^5)} + \ldots \right\}$$

$$F(q) = 1 + \frac{q^2}{1-q} + \frac{q^8}{(1-q)(1-q^3)} + \ldots$$

χ(q) = 1+(-1.08185)+(0.00575937)+(-1.41949 × 10^-8) = -0.0760906441949

= 1+(-0.0760922)+(2.47992 × 10^-6)+(-3.51705 × 10^-14) =

= 0.92391027991996482 95

F(q) = 1+(-14.2995)+(33034.4) = 33021.1005

Note that:

3Pi sqrt(33021.1005)

Input interpretation:

$3\pi\sqrt{33021.1005}$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1712.64322...

This result 1712.64322 is very near to the mass of $f_0(1710)$ candidate glueball

Series representations:

- More

$$3\pi\sqrt{33021.1} = 3\pi\sqrt{33020.1}\sum_{k=0}^{\infty} e^{-10.4049k}\binom{\frac{1}{2}}{k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$3\pi\sqrt{33021.1} = 3\pi\sqrt{33020.1}\sum_{k=0}^{\infty}\frac{(-0.0000302846)^k\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$3\pi\sqrt{33021.1} = \frac{3\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}e^{-10.4049\,s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}$$

Continued fraction:

- Linear form

$$1712+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{13+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}$$

f(q) = (1.075226+12.2180-2135.48) = -2122,186775

φ(q) = (188.923)+(1.00250 × 10^9)+(1.63161 × 10^20) =

= 1.63161000001002500188923 × 10^20

ψ(q) = (32844.3)+(1.33208 × 10^10)+(9.39267 × 10^17) =

= 9.392670133208328443 × 10^17

The sum of the three functions is:

(-2122.186775)+(9.392670133208328443 × 10^17)+(1.63161000001002500188923 × 10^20) = 1.64100267014323330911036225 × 10^20

The sum of the six functions is:

(-0.0760906441949 + 0.923910279919964829 5 +33021.1005)+(-2122.186775)+(9.392670133208328443 × 10^17)+(1.63161000001002500188923 × 10^20)

Input interpretation:

$(-0.0760906441949 + 0.9239102799199648295 + 33021.1005) - 2122.186775 + 9.392670133208328443\times 10^{17} + 1.63161000001002500188923\times 10^{20}$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:
$1.64100267014323363932984544635725064 8295 \times 10^{20}$

1.641002670143233639329845446357250648295 × 10^20

We note that this value can be considered a multiple near to the ζ(2)

This is the total sum, also of the precedent results:

(1.641002670143233639329845446357250648295 × 10^20) + (-4.9290621621 * 10^6)+(4.04437 * 10^14)+(3.0773505768788923 * 10^13)+(-0.08181603380614713999950 0992)+(-2498.279529)

Input interpretation:
$1.641002670143233639329845446357250648295 \times 10^{20} - 4.9290621621 \times 10^{6} + 4.04437 \times 10^{14} + 3.0773505768788923 \times 10^{13} - 0.081816033806147139999500992 - 2498.279529$
Open code

Enlarge Data Customize A Plaintext Interactive
Result:
$1.641007022248242011613840996019189176895004 99008 \times 10^{20}$
Open code

Total of Mock ϑ-functions (of 5th order) =

= 1.64100702224824201161384099601918917689500499008 × 10^20

another value that can be considered a multiple near to the ζ(2)

Note that from:

(((1.64100702224824201161384099601918917689500499008 × 10^20)))^(10/gamma(1.63975513^2*1/5))

Input interpretation:
$(1.64100702224824201161384099601918917689500499008 \times 10^{20})^{10/\Gamma\left(1.63975513^2 \times \frac{1}{5}\right)}$
Open code

- $\Gamma(x)$ is the gamma function

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits

$2.60000\ldots \times 10^{122}$

We obtain a result practically equal to the entropy of cosmic event horizon $S_{CEH} = 2.6 * 10^{122}$ k (from: **Dark Energy and the Entropy of the Observable Universe** Charles H. Lineweaver and Chas A. Egan)

From the inverse of the result obtained on pag.126, we obtain the following expression:

-[(1/(-5.74968 * 10^-40))(1.64100702224824201161384099601918917689500499008 × 10^20)]*1/(1.624*15)^4

Input interpretation:

$$-\left(-\frac{1}{\frac{5.74968}{10^{40}}}\times 1.64100702224824201161384099601918917689500499008\times 10^{20}\right)\times\frac{1}{(1.624\times 15)^4}$$

Open code

Result:

- More digits
  8.1050860323194458929813551374360349927299793897165808... × 10^{53}

Open code

Enlarge Data Customize A Plaintext Interactive

Comparisons:

≈ the size of the Monster group (≈ 8.1×10^{53})

Total of Mock ϑ-functions (of 7th order)

-0.08141350042711980591559898323225082017711543245919605

-1.0061571663060836857869438133877556079608287902166143

0.92434086745859745756753595616700523645194956152836224

-0.08141350042711980591559898323225082017711543245919605 - 1.0061571663060836857869438133877556079608287902166143 - 0.92434086745859745756753595616700523645194956152836224

Result:

-2.01191153419180094927007875278701166458989378420417259

Open code

ln -(-2.011911534191800949270078752787011664589893784204172596*1.64100702224824201161384099601918917689500499008 × 10^20)

47.246097233410359177767214822126853043140038647709

Continued fraction:

- Linear form

$$47+\cfrac{1}{4+\cfrac{1}{15+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{2+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{10+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}$$

Possible closed forms:

- More

$$\frac{2621132213\,\pi}{174290157} \approx 47.24609723341035917\,10232$$

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$$\frac{94930+3\sqrt{1284494290}}{4285} \approx 47.2460972334103591\,90352$$

$$\sqrt{\frac{1}{11}(3917+4381\,e+2127\,\pi+2952\log(2))} \approx 47.24609723341035917\,49299$$

From:

Three-Dimensional Gravity Reconsidered

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Princeton, New Jersey 08540

https://arxiv.org/abs/0706.3359v1

The classical BTZ black hole is characterized by its mass M and angular momentum J. In terms of the Virasoro generators,

$$\begin{aligned} M =& \frac{1}{\ell}(L_0 + \overline{L}_0) \\ J =& (L_0 - \overline{L}_0), \end{aligned} \tag{3.2}$$

so $L_0 = (\ell M + J)/2$, $\overline{L}_0 = (\ell M - J)/2$. The classical BTZ black hole obeys $M\ell \geq |J|$, or $L_0, \overline{L}_0 \geq 0$. The BTZ black hole is usually studied in the absence of the gravitational Chern-Simons coupling, that is for $k_L = k_R = k$. Its entropy is $S = \pi(\ell/2G)^{1/2}\left(\sqrt{M\ell - J} + \sqrt{M\ell + J}\right)$. (This entropy was first expressed in terms of two-dimensional conformal field theory in [13].) With $\ell/G = 16k$ as in (2.19), this is equivalent to $S = 4\pi\sqrt{k}\left(\sqrt{L_0} + \sqrt{\overline{L}_0}\right)$. For the holomorphic sector, the entropy is therefore

$$S_L = 4\pi\sqrt{k_L L_0}, \tag{3.3}$$

and similarly for the antiholomorphic sector.

There is no classical BTZ black hole with $L_0 < 0$, and the entropy of such a black hole is zero if $L_0 = 0$. We will take this as a suggestion that quantum states corresponding to black holes exist only if $L_0 > 0$, that is $L_0 \geq 1$. This means that the exact partition function $Z(q)$ should differ from the function $Z_0(q)$ in (3.1) by terms of order q:

$$Z(q) = q^{-k}\prod_{n=2}^{\infty}\frac{1}{1-q^n} + \mathcal{O}(q). \tag{3.4}$$

Admittedly, we are here trying to squeeze more information from the classical result than is justified. But it turns out that a modular-invariant partition function of this form exists and is unique. This result (which is due to Höhn [31]) follows from the fact that the moduli space $\mathcal{M}_1$ of Riemann surfaces of genus 1 is itself a Riemann surface of genus 0, in fact parametrized by the j-function. If E_4 and E_6 are the usual Eisenstein series of weights 4 and 6, then $j = 1728E_4^3/(E_4^3 - E_6^2)$. Its expansion in powers of q is

$$j(q) = q^{-1} + 744 + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \dots. \tag{3.5}$$

Actually, it is more convenient to use the function

$$J(q) = j(q) - 744 = q^{-1} + 196884q + 21493760q^2 + \dots, \tag{3.6}$$

which likewise parametrizes the moduli space.

In our interpretation, the 196883 primaries are operators that (when combined with suitable anti-holomorphic factors) create black holes. It is illuminating to compare the number 196883 to the Bekenstein-Hawking formula. An exact quantum degeneracy of 196883 corresponds to an entropy of $\ln 196883 \simeq 12.19$. By contrast, the Bekenstein-Hawking entropy at $k = 1$ and $L_0 = 1$ is $4\pi \simeq 12.57$. We should not expect perfect agreement, because the Bekenstein-Hawking formula is derived in a semiclassical approximation which is valid for large k.

Agreement improves rapidly if one increases k. For example, at $k = 4$, and again taking $L_0 = 1$, the exact quantum degeneracy of primary states is 81026609426, according to eqn. (3.8). (Two of the states at this level are descendants.) This corresponds to an entropy $\ln 81026609426 \simeq 25.12$, compared to the Bekenstein-Hawking entropy $8\pi \simeq 25.13$. Shortly we will compute the entropy in the large k limit.

Our interpretation is that a primary state $|\Lambda\rangle$ represents a black hole, while a descendant $\prod_{n=1}^{\infty} L_{-n}^{s_n}|\Lambda\rangle$ describes a black hole embellished by boundary excitations. These boundary excitations are the closest we can come in $2+1$ dimensions to the gravitational waves that a black hole can interact with in a larger number of dimensions. If this interpretation is correct, then for an exact count of black hole states, we should count primaries only. However, as the above examples illustrate, in practice this issue has only a very slight effect on the black hole degeneracies. The boundary excitations contribute to the entropy an amount that is independent of k and thus negligible in the regime where we compare to the Bekenstein-Hawking entropy, and also, numerically, negligible even for small k. The separation between the black hole and the boundary excitations is best-motivated for large k.

Finally, for $k^* = 10$, we find

$$\begin{aligned}F_{10} &= K^{10} - 2760K^8 - 20479K^7 + 2554141K^6 + 33421429K^5 - 793639831K^4 \\ &- 14145708496K^3 + 30831695165K^2 + 1166011724825K + 2482063616019 \\ &= q^{-5} + q^{-7/2} + q^{-3} + q^{-5/2} + q^{-2} + 2q^{-3/2} + 3q^{-1} + 3q^{-1/2} + 3 \\ &+ 389274233q^{1/2} + 842231630010q + 341925580784341q^{3/2} + \ldots \\ H_{10} &= -261 + 1652836102144q + 112692628289650688q^2 + 630520566901614002176q^3 + \ldots.\end{aligned}$$

From H_{10} we take the sum of coefficients of q and calculate the ln:

ln ((1652836102144 + 112692628289650688 + 630520566901614002176))

Input:

log(1 652 836 102 144 + 112 692 628 289 650 688 + 630 520 566 901 614 002 176)

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Exact result:

$\log(630633261182739755008)$

Decimal approximation:

- More digits

47.89325616490734310752554062193900949670489094140506994433...

Open code

Property:

$\log(630633261182739755008)$ is a transcendental number

Open code

Alternate forms:

$12\log(2)+\log(153963198530942323)$

Enlarge Data Customize A Plaintext Interactive

$12\log(2)+\log(938117)+\log(164119399319)$

Open code

Continued fraction:

- Linear form

$$47+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{13+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{14+\cfrac{1}{1+\cfrac{1}{11+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{32+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}$$

Alternative representations:

- More

$\log(1652836102144+112692628289650688+630520566901614002176)=\log_e(630633261182739755008)$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\log(1\,652\,836\,102\,144 + 112\,692\,628\,289\,650\,688 + 630\,520\,566\,901\,614\,002\,176) = \log(a)\log_a(630\,633\,261\,182\,739\,755\,008)$$

Open code

$$\log(1\,652\,836\,102\,144 + 112\,692\,628\,289\,650\,688 + 630\,520\,566\,901\,614\,002\,176) = -\mathrm{Li}_1(-630\,633\,261\,182\,739\,755\,007)$$

Open code

- Integral representations:

$$\log(1\,652\,836\,102\,144 + 112\,692\,628\,289\,650\,688 + 630\,520\,566\,901\,614\,002\,176) = \int_1^{630\,633\,261\,182\,739\,755\,008} \frac{1}{t}\,dt$$

- Open code

- Enlarge Data Customize A Plaintext Interactive

$$\log(1\,652\,836\,102\,144 + 112\,692\,628\,289\,650\,688 + 630\,520\,566\,901\,614\,002\,176) = -\frac{i}{2\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{630\,633\,261\,182\,739\,755\,007^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1 < \gamma < 0$$

- Open code

The result is 47.893256 another value of the black hole entropy, very near to the 47.2460972334... previously calculated

From the sum of Mock ϑ-function (of 3th and 5th order), we calculate the ln and obtain:

ln (((6.596086158 *10^20)+(-4267.24)+(1.6410070222482420116138409960191891768950049900 8 × 10^20)))

Input interpretation:

$$\log(6.596086158\times10^{20} - 4267.24 + 1.64100702224824201161384099601918917689500499008\times10^{20})$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

48.160349372177186929504831348655631444976013285133507308 97...

value very near to the precedent values of black hole entropy

Continued fraction:

- Linear form

$$48+\cfrac{1}{6+\cfrac{1}{4+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{16+\cfrac{1}{1+\cfrac{1}{16+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}$$

Note that:

36 * (((ln (((6.596086158 *10^20)+(-4267.24)+(1.64100702224824201161384099601918917689500499008 × 10^20))))))

Input interpretation:

$36 \log(6.596086158\times10^{20} - 4267.24 + 1.64100702224824201161384099601918917689500499008\times10^{20})$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1733.77257740...

This result 1733.7725 is very near to the mass of $f_0(1710)$ candidate glueball

64 * (((ln (((6.596086158 *10^20)+(-4267.24)+(1.64100702224824201161384099601918917689500499008 × 10^20))))))

Input interpretation:

$64 \log(6.596086158\times10^{20} - 4267.24 + 1.64100702224824201161384099601918917689500499008\times10^{20})$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits

3082.26235982...

This value 3082,26 is a good approximation of the rest mass of J/Psi meson 3096.916±0.011

From the S = 4π √k = 4π √14 = 47,0190534 that is black hole entropy for k = 14.

As a last and fundamental deepening, let's multiply and add algebraically various solutions of the 21 Mock theta functions. We'll have:

[(1.63161*10^20)(9.39267*10^17)(6.5960861587*10^20)(4.04437000433962*10^14)(3.0773505768788923*10^13)(0.923910279+0.924340867458)]/(0.081816+0.07609+0.0814135+1.006157+1.08185+1.08753+1.0809+4.85773)

Input interpretation:

$$(1.63161\times 10^{20}\times 9.39267\times 10^{17}\times 6.5960861587\times 10^{20}\times 4.04437000433962\times 10^{14}\times 3.0773505768788923\times 10^{13}\,(0.923910279+0.924340867458))/(0.081816+0.07609+0.0814135+1.006157+1.08185+1.08753+1.0809+4.85773)$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits

$2.4860339674506047571235568994210729337306033506999466\ldots\times 10^{86}$

Open code

Value very near to the entropy of Relic Gravitons ≈2.3 * 10^{86}

[(1.63161*10^20)(9.392*10^17)(6.59608*10^20)(4.04437*10^14)(3.07735*10^13)(4.929*10^6)(33021.10)(2498.27)(2122.18)/(0.081816+0.07609+0.0814135+1.006157+1.08185+1.08753+1.0809+4.85773)^2

Input interpretation:

$$1.63161\times 10^{20}\times 9.392\times 10^{17}\times 6.59608\times 10^{20}\times 4.04437\times 10^{14}\times 3.07735\times 10^{13}\times 4.929\times 10^{6}\times 33\,021.10\times 2498.27\times 2122.18/(0.081816+0.07609+0.0814135+1.006157+1.08185+1.08753+1.0809+4.85773)^2$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits

$1.2408321207041088963380961774320869895869655907042159\ldots\times 10^{103}$

Open code

This important and beautifully result is very near to the entropy of SMBHs (supermassive Black Hole) ≈ 1.2 * 10^{103}

((2.48603396745060475712355689942107293373060335069994 66 × 10^86)*(sqrt(2Pi))

Input interpretation:

$2.4860339674506047571235568994210729337306033506999466 \times 10^{86} \sqrt{2\pi}$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$6.2315630345047702650888005180122216175976846206065610... \times 10^{86}$

This result is very near to the entropy of Dark Matter ≈6 * 10^{86}

[(1.63161*10^20)(9.392*10^17)(6.59608*10^20)(4.04437*10^14)(3.07735*10^13)(4.929*10^6)(33021.10)(2498.27)(2122.18)(4267.24)](1.00583*10^-12)/(1.006157+0.9239+0.07609+0.08181)

Input interpretation:

$$\left(1.63161 \times 10^{20} \times 9.392 \times 10^{17} \times 6.59608 \times 10^{20} \times 4.04437 \times 10^{14} \times 3.07735 \times 10^{13} \times 4.929 \times 10^{6} \times 33021.10 \times 2498.27 \times 2122.18 \times 4267.24\right) \times \frac{1.00583 \times 10^{-12}}{1.006157 + 0.9239 + 0.07609 + 0.08181}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$2.2315682741425171676039766571641207790444544820858809... \times 10^{96}$

This value is very near to the entropy of stellar BHs (2.5-15 solar mass) ≈ 2.2 * 10^{96}

[(1.63161*10^20)(9.392*10^17)(6.59608*10^20)(4.04437*10^14)(3.07735*10^13)(4.929*10^6)(33021.10)(2498.27)(2122.18)(4267.24)(1/(1.0058343895*10^-12))*(1.08663428)^48]

Input interpretation:

$$1.63161 \times 10^{20} \times 9.392 \times 10^{17} \times 6.59608 \times 10^{20} \times 4.04437 \times 10^{14} \times 3.07735 \times 10^{13} \times 4.929 \times 10^{6} \times 33021.10 \times 2498.27 \times 2122.18 \times 4267.24 \left(\frac{1}{1.0058343895 \times 10^{-12}} \times 1.08663428^{48}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$2.4847570983272032366407660380481283715700342763729692... \times 10^{122}$

This result can be considered a good approximation to the value of entropy of Cosmic Event Horizon 2.6±0.3 * 10^{122}

[(1.63161*10^20)(9.392*10^17)(6.59608*10^20)(4.04437*10^14)(3.07735*10^13)(1.08663428)^34]

Input interpretation:

$$1.63161\times10^{20}\times9.392\times10^{17}\times6.59608\times10^{20}\times4.04437\times10^{14}\times3.07735\times10^{13}\times1.08663428^{34}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$$2.12091754048167407283270778139527609728519375046979 11... \times 10^{88}$$

Open code

This result is very near to the entropy of Photons 2.03±0.15 * 10^{88}

[(1.63161*10^20)(9.392*10^17)(6.59608*10^20)(4.04437*10^14)(3.07735*10^13)(1.08663428)^33]

Input interpretation:

$$1.63161\times10^{20}\times9.392\times10^{17}\times6.59608\times10^{20}\times4.04437\times10^{14}\times3.07735\times10^{13}\times1.08663428^{33}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$$1.95182277930866866525939875686167023672876742897324 31... \times 10^{88}$$

Open code

This result is very near to the entropy of Relic Neutrinos 1.93±0.15 * 10^{88}

sqrt((ln ((1.63161*10^20)(9.392*10^17)(6.59608*10^20)(4.04437*10^14)(3.07735*10^13)(4.929*10^6)(33021.10)(2498.27)(2122.18)(4267.24))))

Input interpretation:

$$\sqrt{\log(1.63161\times10^{20}\times9.392\times10^{17}\times6.59608\times10^{20}\times4.04437\times10^{14}\times3.07735\times10^{13}\times4.929\times10^{6}\times33021.10\times2498.27\times2122.18\times4267.24)}$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

15.81810...

This result 15.81810 is very near to the value of black hole entropy (see Tables)

Continued fraction:

- Linear form

$$15+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{99+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{23+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{11+\cfrac{1}{1+\cfrac{1}{10+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Possible closed forms:

- More

$$\frac{1}{53}\left(120\, e^{\pi}+83\,\pi-1648\log(\pi)+106\log(2\,\pi)-402\tan^{-1}(\pi)\right)\approx$$

15.818099369021165226496866

Enlarge Data Customize A Plaintext Interactive

$\text{root of } 51x^4-559x^3-4139x^2+3800x-4939 \text{ near } x=15.8181 \approx$

15.818099369021165234347

$$\sec\left(\csc\left(\frac{1452871841}{482220326}\right)\right)\approx 15.818099369021165224468 6$$

From the simple multiplication of the previously terms, we obtain:

((1.63161*10^20)(9.39267*10^17)(6.596086*10^20)(4.04437*10^14)(3.07735*10^13)(4.929062*10^6)(33021.10)(2498.27)(2122.18)(4267.24))))

Input interpretation:

$1.63161\times10^{20}\times9.39267\times10^{17}\times6.596086\times10^{20}\times4.04437\times10^{14}\times 3.07735\times10^{13}\times4.929062\times10^{6}\times33021.10\times2498.27\times2122.18\times4267.24$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

4.6328×10^{108}

(2Pi) * (((1.63161*10^20)(9.39267*10^17)(6.596086*10^20)(4.04437*10^14)(3.07735*10^13)(4.929062*10^6)(33021.10)(2498.27)(2122.18)(4267.24)))*10^13

Input interpretation:

$$(2\pi)\left(1.63161\times 10^{20}\times 9.39267\times 10^{17}\times 6.596086\times 10^{20}\times 4.04437\times 10^{14}\times 3.07735\times 10^{13}\times 4.929062\times 10^{6}\times 33021.10\times 2498.27\times 2122.18\times 4267.24\right)\times 10^{13}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$2.91088\ldots\times 10^{122}$

the maximum possible value of Cosmic Event Horizon

Multiplying all 21 values obtained, we have the following final expressions:

((-1.0058343895*10^-12)*(-5.74968*10^-40)*(-1.08663428)*(-0.081816)*(-0.07609064)*(0.92391)*(-0.0814135)*(-1.00615716)*(0.9243408)))

Input interpretation:

$$-1.0058343895\times 10^{-12}\left(-5.74968\times 10^{-40}\right)\times(-1.08663428)\times(-0.081816)\times(-0.07609064)\times 0.92391\times(-0.0814135)\times(-1.00615716)\times 0.9243408$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$-2.7368252918327916655091995391494943566521964877723\ldots\times 10^{-55}$

Open code

(((-2.7368252918327916655091 × 10^-55)*(-4.92906*10^6)*(4.04437*10^14)*(3.07735*10^13)*(-2498.279)*(33021.10)*(-2122.186)*(1.63161*10^20)*(9.39267*10^17)*(-4267.24)*(6.596086*10^20)))

Input interpretation:

$$-2.7368252918327916655091 9\times 10^{-55}\left(-4.92906\times 10^{6}\right)\times 4.04437\times 10^{14}\times 3.07735\times 10^{13}\times(-2498.279)\times 33021.10\times(-2122.186)\times 1.63161\times 10^{20}\times 9.39267\times 10^{17}\times(-4267.24)\times 6.596086\times 10^{20}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits
$-1.267925315513541562416051980712673446144837786881388... \times 10^{54}$
Open code

The final result is -1,26792531 * 10^{54}

1/8 (ln-(-1.267925315513541562416051980712673446144837786881388 × 10^54))

Input interpretation:
$\frac{1}{8} \log(-(-1.267925315513541562416051980712673446144837786881388 \times 10^{54}))$
Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits
15.57212212206519888602347130210562654111004789471932 21...

This result 15.5721 is very near to the value of black hole entropy (see Tables)

Continued fraction:
- Linear form

$$15+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{29+\cfrac{1}{5+\cfrac{1}{45+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{22+\cfrac{1}{30+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Note that (1.267810604950157029630091881427512166709644875154061 7 × 10^54) /(1/0.6449) where 0,6449 is 1-ζ(2) = 1 – 1.6449, give us:

Input interpretation:

$$\frac{1.2678106049501570296300918814275121667096448751540617 \times 10^{54}}{\frac{1}{0.6449}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$8.1761105913235626840844625433260259631104997998685439... \times 10^{53}$

$\approx$ the size of the Monster group ($\approx 8.1 \times 10^{53}$)

((-1.2679253155135415624160519807126734461448377868813888 × 10^54))^2

Input interpretation:

$(-1.2679253155135415624160519807126734461448377868813888 \times 10^{54})^2$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

$1.6076346057201139198476546737317006196605176132241981 \times 10^{108}$

(1.6076346057201139198476546737317006196605176132241981×10^108)/(33021.10*1.08663428^16)

Input interpretation:

$$\frac{1.6076346057201139198476546737317006196605176132241981 \times 10^{108}}{33\,021.10 \times 1.08663428^{16}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$1.2884316496159661343073291050577187770453894858832274... \times 10^{103}$

Open code

(1.6076346057201139198476546737317006196605176132241981×10^108)/(6.59608*10^20*1.086634^28)

Input interpretation:

$$\frac{1.6076346057201139198476546737317006196605176132241981 \times 10^{108}}{6.59608 \times 10^{20} \times 1.086634^{28}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$2.3799581536691101825973019439047070402315311531908581... \times 10^{86}$

Open code

(1.6076346057201139198476546737317006196605176132241 98×10^108)/(6.59608 *10^20*1.086634^28)*2.61803398)

Input interpretation:

$$\frac{1.6076346057201139198476546737317006196605176132241 98\times 10^{108}}{6.59608\times 10^{20}\times 1.086634^{28}}\times 2.61803398$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits
  $6.2308113172837921344037411454625769132713756264822520\ldots\times 10^{86}$

(((1.6076346057201139198476546737317006196605176132241 98×10^108)*(4.04437*10^14)*1/(2.61803398-0.081816)))

Input interpretation:

$$(1.6076346057201139198476546737317006196605176132241 98\times 10^{108})\times 4.04437\times 10^{14}\times \frac{1}{2.61803398-0.081816}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits
  $2.5636081841578369119574884225054969585604813113877339\ldots\times 10^{122}$

Open code

From the previously analyzed

Mock ϑ-functions (of 5th order)

$$\begin{aligned} f(q) &= 1+\frac{q}{1+q^2}+\frac{q^4}{(1+q)(1+q^2)}+\frac{q^9}{(1+q)(1+q^2)(1+q^3)}+\ldots \\ \phi(q) &= 1+q(1+q)+q^4(1+q)(1+q^3)+q^9(1+q)(1+q^3)(1+q^5)+\ldots \\ \psi(q) &= q+q^3(1+q)+q^6(1+q)(1+q^2)+q^{10}(1+q)(1+q^2)(1+q^3)+\ldots \\ \chi(q) &= 1+\frac{q}{1-q^2}+\frac{q^2}{(1-q^3)(1-q^4)}+\frac{q^3}{(1-q^4)(1-q^5)(1-q^6)}+\ldots \\ &= 1+\left\{\frac{q}{1-q}+\frac{q^3}{(1-q^2)(1-q^3)}+\frac{q^5}{(1-q^3)(1-q^4)(1-q^5)}+\ldots\right\} \end{aligned}$$

$$F(q)=1+\frac{q^2}{1-q}+\frac{q^8}{(1-q)(1-q^3)}+\ldots$$

we have obtained that

ψ(q) = (32844.3)+(1.33208 × 10^10)+(9.39267 × 10^17) =

= 9.392670133208328443 × 10^17

From:

Magnetic Monopoles and Dark Matter

V. V. Burdyuzha

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Dirac's theory does not predict the magnetic monopole mass, but it is often assumed that the monopole mass can be

$$m_g = (g/e)^2 m_e = 4692.25 m_e \approx 2.56 m_p \approx 2.4 \text{ GeV}/c^2. \quad (6)$$

from our electric world. The minimum mass of the magnetic charge in Schwinger's symmetric world must probably be

$$m_g = (g/e)^2 m_e = 18769 m_e \approx 10.24 m_p \approx 9.6 \text{ GeV}/c^2. \quad (10)$$

Here, as in Dirac's case, the classical magnetic monopole radius is equal to the classical electron radius. Before the annihilation of Schwinger magnetic charges with a minimum mass of 9.6 GeV/c^2, they could also form an atomic system—monopolium (g^+g^-). In this theory [62]. As has been mentioned, the relation between the masses m_g and m_e in the case where the classical radii r_g and r_e are equal is $m_g = m_e(g^2/e^2)$ and then $m_g = 2.4$ GeV/c^2. However, nature could choose a different definition of the masses. As was shown by Caruso [61], the relation between the charges in the Born–Infeld electromagnetic theory is different, $m_g = m_e(g^2/e^2)^{3/4}$, and then $m_g = 0.29$ GeV/c^2. This point

In this work we have three fundamental values:

$m_g = 2.4$ GeV/c^2 ; $m_g = 9.6$ GeV/c^2 ; $m_g = 0.29$ GeV/c^2 .

We observe that utilizing the following 5th order Ramanujan's Mock Theta function

$\psi(q) = 9.392670133208328443 \times 10^{17}$, we have obtained some new interesting mathematical connections.

Conclusion

We observe how the results of the proposed equations (based on Ramanujan's mathematics) are either transcendental numbers or numbers that can be represented as infinite continued fractions. Both sets are an uncountable infinity. This, physically, could mean that the supersymmetric vacuum and the Hilbert space contained in it are also uncountable infinities. These numbers, therefore, could be identified in the infinite information, of which only a part (the one re-elaborated at each cycle of the universe, given the increasingly evident cyclical nature of the multiverse) passes into the Hilbert fractal space, coming to constitute the infinite frequencies that collapse in well-defined physical properties of strings / particles and physical-mathematical constants.

Appendix A

From:

Monstrous Moonshine and the Entropy of the Smallest Black Hole
Last Update: 14th September 2008

k	Bekenstein-Hawking	Witten	Difference (%)
1	12.566	12.190	3.0%
2	17.772	17.576	1.1%
3	21.766	21.676	0.4%
4	25.133	25.118	0.06%

TABLE 1

From:

Published by Institute of Physics Publishing for SISSA
Received: September 7, 2007 -Accepted: October 28, 2007 - Published: November 9, 2007 **"Three-dimensional AdS gravity and extremal CFTs at c = 8m"**
Spyros D. Avramis, Alex Kehagias and Constantina Mattheopoulou

m	L_0	d	S	S_{BH}
3	1	196883	12.1904	12.5664
	2	21296876	16.8741	17.7715
	3	842609326	20.5520	21.7656
4	2/3	139503	11.8458	11.8477
	5/3	69193488	18.0524	18.7328
	8/3	6928824200	22.6589	23.6954
5	1/3	20619	9.9340	9.3664
	4/3	86645620	18.2773	18.7328
	7/3	24157197490	23.9078	24.7812

m	L_0	d	S	S_{BH}
6	1	42987519	17.5764	17.7715
	2	40448921875	24.4233	25.1327
	3	8463511703277	29.7668	30.7812
7	2/3	7402775	15.8174	15.6730
	5/3	33934039437	24.2477	24.7812
	8/3	16953652012291	30.4615	31.3460
8	1/3	278511	12.5372	11.8477
	4/3	13996384631	23.3621	23.6954
	7/3	19400406113385	30.5963	31.3460

Table 1: Degeneracies, microscopic entropies and semiclassical entropies for the first few values of m and L_0.

TABLE 2

From:

Dark Energy and the Entropy of the Observable Universe

Charles H. Lineweaver and Chas A. Egan

A LARGER ESTIMATE OF THE ENTROPY OF THE UNIVERSE

CHAS A. EGAN
Research School of Astronomy and Astrophysics, Australian National University, Canberra, Australia 1
CHARLES H. LINEWEAVER
Planetary Science Institute, Research School of Astronomy and Astrophysics and Research School of Earth Sciences, Australian National University,
Canberra, Australia

Received 2009, September 22; accepted 2010, January 11.

TABLE 1. The entropy of the universe including the Gibbons-Hawking entropy of the cosmic event horizon as well as the entropy of the dominant components contained within the cosmic event horizon. See Egan & Lineweaver (2009) for details.

Component	Entropy S [k]
Cosmic Event Horizon	$2.6 \pm 0.3 \times 10^{122}$
SMBHs	$1.2^{+1.1}_{-0.7} \times 10^{103}$
$*$Stellar BHs ($42 - 140\ M_{\odot}$)	$1.2 \times 10^{98^{+0.8}_{-1.6}}$
Stellar BHs ($2.5 - 15\ M_{\odot}$)	$2.2 \times 10^{96^{+0.6}_{-1.2}}$
Photons	$2.03 \pm 0.15 \times 10^{88}$
Relic Neutrinos	$1.93 \pm 0.15 \times 10^{88}$
Dark Matter	$6 \times 10^{86\pm1}$
Relic Gravitons	$2.3 \times 10^{86^{+0.2}_{-3.1}}$
ISM & IGM	$2.7 \pm 2.1 \times 10^{80}$
Stars	$3.5 \pm 1.7 \times 10^{78}$
Total	$\mathbf{2.6 \pm 0.3 \times 10^{122}}$

TABLE 3

TABLE 2
ENTROPY OF THE EVENT HORIZON AND THE MATTER WITHIN IT (SCHEME 2 ENTROPY BUDGET)

Component	Entropy S [k]
Cosmic Event Horizon	$2.6 \pm 0.3 \times 10^{122}$
SMBHs	$1.2^{+1.1}_{-0.7} \times 10^{103}$
Stellar BHs ($2.5-15\ M_{\odot}$)	$2.2 \times 10^{96^{+0.6}_{-1.2}}$
Photons	$2.03 \pm 0.15 \times 10^{88}$
Relic Neutrinos	$1.93 \pm 0.15 \times 10^{88}$
WIMP Dark Matter	$6 \times 10^{86 \pm 1}$
Relic Gravitons	$2.3 \times 10^{86^{+0.2}_{-3.1}}$
ISM and IGM	$2.7 \pm 2.1 \times 10^{80}$
Stars	$3.5 \pm 1.7 \times 10^{78}$
Total	$\mathbf{2.6 \pm 0.3 \times 10^{122}}$
Tentative Components:	
Massive Halo BHs ($10^5\ M_{\odot}$)	10^{104}
Stellar BHs ($42-140\ M_{\odot}$)	$1.2 \times 10^{98^{+0.8}_{-1.6}}$

TABLE 4

From: "SQUARE SERIES GENERATING FUNCTION TRANSFORMATIONS" MAXIE D. SCHMIDT - https://arxiv.org/abs/1609.02803v2

Corollary 4.7 (Special Values of Ramanujan's φ-Function). *For any $k \in \mathbb{R}^+$, the variant of the Ramanujan φ-function, $\varphi\left(e^{-k\pi}\right) \equiv \vartheta_3\left(e^{-k\pi}\right)$, has the integral representation*

$$\varphi\left(e^{-k\pi}\right) = 1 + \int_0^\infty \frac{e^{-t^2/2}}{\sqrt{2\pi}} \left[\frac{4e^{k\pi}\left(e^{2k\pi} - \cos\left(\sqrt{2\pi k}t\right)\right)}{e^{4k\pi} - 2e^{2k\pi}\cos\left(\sqrt{2\pi k}t\right) + 1}\right] dt. \qquad (33)$$

Moreover, the special values of this function corresponding to the particular cases of $k \in \{1, 2, 3, 5\}$ in (33) have the respective integral representations

$$\frac{\pi^{1/4}}{\Gamma\left(\frac{3}{4}\right)} = 1 + \int_0^\infty \frac{e^{-t^2/2}}{\sqrt{2\pi}} \left[\frac{4e^{\pi}\left(e^{2\pi} - \cos\left(\sqrt{2\pi}t\right)\right)}{e^{4\pi} - 2e^{2\pi}\cos\left(\sqrt{2\pi}t\right) + 1}\right] dt \qquad (34)$$

$$\frac{\pi^{1/4}}{\Gamma\left(\frac{3}{4}\right)} \cdot \frac{\sqrt{\sqrt{2}+2}}{2} = 1 + \int_0^\infty \frac{e^{-t^2/2}}{\sqrt{2\pi}} \left[\frac{4e^{2\pi}\left(e^{4\pi} - \cos\left(2\sqrt{\pi}t\right)\right)}{e^{8\pi} - 2e^{4\pi}\cos\left(2\sqrt{\pi}t\right) + 1}\right] dt$$

$$\frac{\pi^{1/4}}{\Gamma\left(\frac{3}{4}\right)} \cdot \frac{\sqrt{\sqrt{3}+1}}{2^{1/4}3^{3/8}} = 1 + \int_0^\infty \frac{e^{-t^2/2}}{\sqrt{2\pi}} \left[\frac{4e^{3\pi}\left(e^{6\pi} - \cos\left(\sqrt{6\pi}t\right)\right)}{e^{12\pi} - 2e^{6\pi}\cos\left(\sqrt{6\pi}t\right) + 1}\right] dt$$

$$\frac{\pi^{1/4}}{\Gamma\left(\frac{3}{4}\right)} \cdot \frac{\sqrt{5+2\sqrt{5}}}{5^{3/4}} = 1 + \int_0^\infty \frac{e^{-t^2/2}}{\sqrt{2\pi}} \left[\frac{4e^{5\pi}\left(e^{10\pi} - \cos\left(\sqrt{10\pi}t\right)\right)}{e^{20\pi} - 2e^{10\pi}\cos\left(\sqrt{10\pi}t\right) + 1}\right] dt.$$

From the first of (34):

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

we have:

$$\Gamma\left(\frac{3}{4}\right) = \frac{\pi\sqrt{2}}{\Gamma\left(\frac{1}{4}\right)} = \frac{4{,}44288293815}{3{,}625609908} = 1{,}2254167025$$

$$\frac{\pi^{1/4}}{\Gamma\left(\frac{3}{4}\right)} = \frac{1{,}3313353638}{1{,}2254167025} = 1{,}08643481\ldots$$

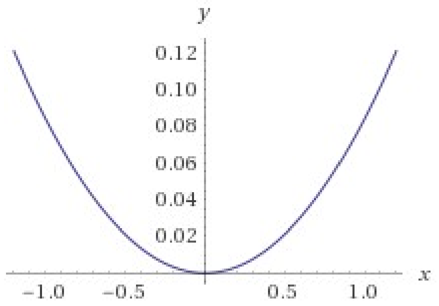
For the integral, we have calculate as follows:

integrate [(2.71828^0.89)/(sqrt6.283185307)][4e^3.14159265 * (e^6.283185307 - cos((sqrt6.283185307)1.33416))]/[e^12.56637 - 2e^6.283185307 (cos(sqrt6.283185307)1.33416))+1]x

Indefinite integral:

$$\int \frac{2.71828^{0.89}\left(4\,e^{3.14159265}\left(e^{6.283185307} - \cos\left(\sqrt{6.283185307}\;1.33416\right)\right)\right)x}{\sqrt{6.283185307}\left(e^{12.56637} - \left(2\,e^{6.283185307}\right)\left(\cos\left(\sqrt{6.283185307}\right)1.33416\right) + 1\right)}\,dx = 0.0837798\,x^2 + \text{constant}$$

Plot of the integral:



(x from −1.2 to 1.2)

Alternate form assuming x is real:

$0.0837798\,x^2 + 0 + \text{constant}$

Thence: 1 + 0.0837798 = 1.0837798

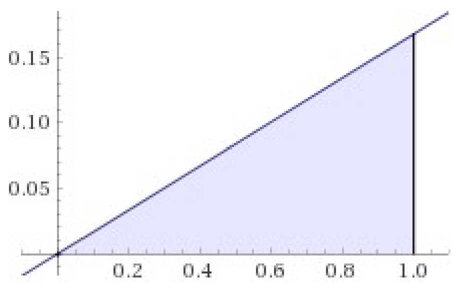
and:

integrate [(2.71828^0.89)/(sqrt6.283185307)][4e^3.14159265 * (e^6.283185307 - cos((sqrt6.283185307)1.33416))]/[e^12.56637 - 2e^6.283185307 (cos(sqrt6.283185307)1.33416))+1] x, [0, 1]

Definite integral:

$$\int_0^1 \frac{2.71828^{0.89}\left(4\,e^{3.14159265}\left(e^{6.283185307} - \cos\left(\sqrt{6.283185307}\ 1.33416\right)\right)\right)x}{\sqrt{6.283185307}\left(e^{12.56637} - \left(2\,e^{6.283185307}\right)\left(\cos\left(\sqrt{6.283185307}\right)1.33416\right) + 1\right)}\,dx = 0.0837798$$

Visual representation of the integral:



Open code

Riemann sums:

left sum	$0.0837798 - \frac{0.0837798}{n} = 0.0837798 - \frac{0.0837798}{n} + O\left(\left(\frac{1}{n}\right)^2\right)$

(assuming subintervals of equal length)

Indefinite integral:

$$\int \frac{2.71828^{0.89}\left(4\,e^{3.14159265}\left(e^{6.283185307}-\cos\left(\sqrt{6.283185307}\;1.33416\right)\right)\right)x}{\sqrt{6.283185307}\left(e^{12.56637}-\left(2\,e^{6.283185307}\right)\left(\cos\left(\sqrt{6.283185307}\right)1.33416\right)+1\right)}\,dx = 0.0837798\,x^2 + \text{constant}$$

Thence: 1 + 0.0837798 = 1.0837798

With regard the integral, from 0 to 0,58438 for t = 2, where (2.71828^2)/(sqrt6.283185307) = 2,94780 for t=2, we have:

integrate (2.94780)[4e^3.14159265 * (e^6.283185307 - cos((sqrt6.283185307)2))]/[e^12.56637 - 2e^6.283185307 (cos(sqrt6.283185307)2))+1] x, [0,0.58438]

$$\int_0^{0.58438} \frac{2.94780\left(4\,e^{3.14159265}\left(e^{6.283185307}-\cos\left(\sqrt{6.283185307}\;2\right)\right)\right)x}{e^{12.56637}-\left(2\,e^{6.283185307}\right)\left(\cos\left(\sqrt{6.283185307}\right)2\right)+1}\,dx =$$

0.0864364

Thence, 1 + 0,0864364 = 1,0864364; 1,08643481 ≅ 1,0864364.

In conclusion, the value of this, defined by us, "New Ramanujan's Constant" is 1.08643.

In this and others our papers, we have used 1,08643 as a new "Ramanujan's constant" and we can see as this constant is fundamental for some results that we have obtained in various equations analyzed and developed.

Remember that, 1729 = 12^3 + 1 = 1728 + 1, is also the fundamental number that is in the range of the mass of the candidate "glueball" $f_0(1710)$:

f_0(1710) MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1723^{+6}_{-5}	**OUR AVERAGE**	Error includes scale factor of 1.6. See the ideogram below.		
1720±10 ±10		[9] BALTRUSAIT...87	MRK3	$J/\psi \to \gamma K^+ K^-$
1742±15		[8] WILLIAMS 84	MPSF	200 $\pi^- N \to 2K^0_S X$

1726 ± 7	74	[13] CHEKANOV	04	ZEUS	$ep \to K^0_S K^0_S X$
$1732+15$		[14] ANISOVICH	03	RVUE	

$1726 \perp 7$	74	[13] CHEKANOV	04	ZEUS	$ep \to K^0_S K^0_S X$
$1732+15$		[14] ANISOVICH	03	RVUE	

1744 ± 15	[22] ALDE	92D	GAM2	38 $\pi^- p \to \eta\eta n$
$1730^{+\ 2}_{-10}$	[27] LONGACRE	86	RVUE	22 $\pi^- p \to n 2K^0_S$

Very important is the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164{,}2696$

$$\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3 = 1164{,}269601267364$$

For the value 1181,81 we have that:

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots$$

List of Baryons

Various result are very near or also equal to the rest masses of following baryons:

$J^P = \frac{1}{2}^+$ baryons

Particle name	Symbol	Quark content	Rest mass (MeV/c^2)	I	J^P	Q (e)	S	C	B'	Mean lifetime (s)	Commonly decays to
proton[8]	p / p^+ / N^+	uud	938.272 046(21)[a]	½	½+	+1	0	0	0	Stable[b]	Unobserved
neutron[9]	n / n^0 / N^0	udd	939.565 379(21)[a]	½	½+	0	0	0	0	$(8.800 \pm 0.009) \times 10^{+2}$[c]	$p^+ + e^- + \bar{\nu}_e$
Lambda[10]	Λ^0	uds	1 115.683 ± 0.006	0	½+	0	−1	0	0	$(2.632 \pm 0.020) \times 10^{-10}$	$p^+ + \pi^-$ or $n^0 + \pi^0$
charmed Lambda[11]	Λ_c^+	udc	2 286.46 ± 0.14	0	½+	+1	0	+1	0	$(2.00 \pm 0.06) \times 10^{-13}$	See Λ_c^+ decay modes (http://pdg.lbl.gov/2013/listings/rpp2013-list-lambdac-plus.pdf)
bottom Lambda[12]	Λ_b^0	udb	5 619.4 ± 0.6	0	½+	0	0	0	−1	$(1.429 \pm 0.024) \times 10^{-12}$	See Λ_b^0 decay modes (http://pdg.lbl.gov/2013/listings/rpp2013-list-lambdab-zero.pdf)
Sigma[13]	Σ^+	uus	1 189.37 ± 0.07	1	½+	+1	−1	0	0	$(8.018 \pm 0.026) \times 10^{-11}$	$p^+ + \pi^0$ or $n^0 + \pi^+$
Sigma[14]	Σ^0	uds	1 192.642 ± 0.024	1	½+	0	−1	0	0	$(7.4 \pm 0.7) \times 10^{-20}$	$\Lambda^0 + \gamma$
Sigma[15]	Σ^-	dds	1 197.449 ± 0.030	1	½+	−1	−1	0	0	$(1.479 \pm 0.011) \times 10^{-10}$	$n^0 + \pi^-$
charmed Sigma[16]	Σ_c^{++}	uuc	2 453.98 ± 0.16	1	½+	+2	0	+1	0	$(2.91 \pm 0.32) \times 10^{-22}$[d]	$\Lambda_c^+ + \pi^+$
charmed Sigma[16]	Σ_c^+	udc	2 452.9 ± 0.4	1	½+	+1	0	+1	0	$>1.43 \times 10^{-22}$[d]	$\Lambda_c^+ + \pi^0$
charmed Sigma[16]	Σ_c^0	ddc	2 453.74 ± 0.16	1	½+	0	0	+1	0	$(3.05 \pm 0.37) \times 10^{-22}$[d]	$\Lambda_c^+ + \pi^-$
bottom Sigma[17]	Σ_b^+	uub	$5\,811.3\,^{+0.9}_{-0.8} \pm 1.7$	1	½+	+1	0	0	−1	$6.8\,^{+2.7}_{-3.5} \times 10^{-23}$[d]	$\Lambda_b^0 + \pi^+$
bottom Sigma†	Σ_b^0	udb	Unknown	1	½+	0	0	0	−1	Unknown	Unknown
bottom Sigma[17]	Σ_b^-	ddb	$5\,815.5\,^{+0.6}_{-0.5} \pm 1.7$	1	½+	−1	0	0	−1	$1.34\,^{+0.87}_{-1.15} \times 10^{-22}$[d]	$\Lambda_b^0 + \pi^-$
Xi[18]	Ξ^0	uss	1 314.86 ± 0.20	½	½+	0	−2	0	0	$(2.90 \pm 0.09) \times 10^{-10}$	$\Lambda^0 + \pi^0$
Xi[19]	Ξ^-	dss	1 321.71 ± 0.07	½	½+	−1	−2	0	0	$(1.639 \pm 0.015) \times 10^{-10}$	$\Lambda^0 + \pi^-$
charmed Xi[20]	Ξ_c^+	usc	$2\,467.8\,^{+0.4}_{-0.6}$	½	½+	+1	−1	+1	0	$(4.42 \pm 0.26) \times 10^{-13}$	See Ξ_c^+ decay modes (http://pdg.lbl.gov/2013/listings/rpp2013-list-xic-plus.pdf)
charmed Xi[21]	Ξ_c^0	dsc	$2\,470.88\,^{+0.34}_{-0.80}$	½	½+	0	−1	+1	0	$1.12\,^{+0.13}_{-0.10} \times 10^{-13}$	See Ξ_c^0 decay modes (http://pdg.lbl.gov/2013/listings/rpp2013-list-xic-zero.pdf)
charmed Xi prime[22]	Ξ'^+_c	usc	2 575.6 ± 3.1	½	½+	+1	−1	+1	0	Unknown	$\Xi_c^+ + \gamma$ (seen)
charmed Xi prime[23]	Ξ'^0_c	dsc	2 577.9 ± 2.9	½	½+	0	−1	+1	0	Unknown	$\Xi_c^0 + \gamma$ (seen)
double charmed Xi[24]	Ξ_{cc}^{++}	ucc	3 621.40 ± 0.78	½	½+	+2	0	+2	0	Unknown	$\Lambda_c^+ + K^- + \pi^+ + \pi^+$ (seen)
double charmed Xi[e]	Ξ_{cc}^+	dcc	Unknown	½	½+	+1	0	+2	0	Unknown	Unknown
bottom Xi[25] (or Cascade B)	Ξ_b^0	usb	5 787.8 ± 5.0 ± 1.3	½	½+	0	−1	0	−1	Unknown	See Ξ_b decay modes (http://pdg.lbl.gov/2013/listings/rpp2013-list-xib-zero-xib-minus.pdf)
bottom Xi[25] (or Cascade B)	Ξ_b^-	dsb	5 791.1 ± 2.2	½	½+	−1	−1	0	−1	$(1.56\,^{+0.27}_{-0.25} \pm 0.02) \times 10^{-12}$	See Ξ_b decay modes (http://pdg.lbl.gov/2013/listings/rpp2013-list-xib-zero-xib-minus.pdf)
bottom Xi prime†	Ξ'^0_b	usb	Unknown	½	½+	0	−1	0	−1	Unknown	Unknown
bottom Xi prime†	Ξ'^-_b	dsb	Unknown	½	½+	−1	−1	0	−1	Unknown	Unknown
double	Ξ_{bb}^0	ubb	Unknown	½	½+	0	0	0	−2	Unknown	Unknown

bottom Xi†											
double bottom Xi†	Ξ_{bb}^{-}	dbb	Unknown	½	½+	−1	0	0	−2	Unknown	Unknown
charmed bottom Xi†	Ξ_{cb}^{+}	ucb	Unknown	½	½+	+1	0	+1	−1	Unknown	Unknown
charmed bottom Xi†	Ξ_{cb}^{0}	dcb	Unknown	½	½+	0	0	+1	−1	Unknown	Unknown
charmed bottom Xi prime†	Ξ'^{+}_{cb}	ucb	Unknown	½	½+	+1	0	+1	−1	Unknown	Unknown
charmed bottom Xi prime†	Ξ'^{0}_{cb}	dcb	Unknown	½	½+	0	0	+1	−1	Unknown	Unknown
charmed Omega[26]	Ω_{c}^{0}	ssc	2 695.2 ± 1.7	0	½+	0	−2	+1	0	$(6.9 \pm 1.2) \times 10^{-14}$	See Ω_{c}^{0} decay modes (http://pdg.lbl.gov/2013/listings/rpp2013-list-omegac-zero.pdf)
bottom Omega[27]	Ω_{b}^{-}	ssb	6071 ± 40	0	½+	−1	−2	0	−1	$(1.13 ^{+0.55}_{-0.42} \pm 0.02) \times 10^{-12}$	Ω^{-} + J/ψ (seen)
double charmed Omega†	Ω_{cc}^{+}	scc	Unknown	0	½+	+1	−1	+2	0	Unknown	Unknown
charmed bottom Omega†	Ω_{cb}^{0}	scb	Unknown	0	½+	0	−1	+1	−1	Unknown	Unknown
charmed bottom Omega prime†	Ω'^{0}_{cb}	scb	Unknown	0	½+	0	−1	+1	−1	Unknown	Unknown
double bottom Omega†	Ω_{bb}^{-}	sbb	Unknown	0	½+	−1	−1	0	−2	Unknown	Unknown
double charmed bottom Omega†	Ω_{ccb}^{+}	ccb	Unknown	0	½+	+1	0	+2	−1	Unknown	Unknown
charmed double bottom Omega†	Ω_{cbb}^{0}	cbb	Unknown	0	½+	0	0	+1	−2	Unknown	Unknown

$J^P = \frac{3}{2}^+$ baryons

Particle name	Symbol	Quark content	Rest mass (MeV/c^2)	I	J^P	Q (e)	S	C	B'	Mean lifetime (s)	Commonly decays to
Delta[29]	Δ^{++}(1232)	uuu	1232 ± 2	3⁄2	3⁄2+	+2	0	0	0	$(5.63 \pm 0.14) \times 10^{-24}$[h]	$p^+ + \pi^+$
Delta[29]	Δ^{+}(1232)	uud	1232 ± 2	3⁄2	3⁄2+	+1	0	0	0	$(5.63 \pm 0.14) \times 10^{-24}$[h]	$\pi^+ + n^0$ or $\pi^0 + p^+$
Delta[29]	Δ^{0}(1232)	udd	1232 ± 2	3⁄2	3⁄2+	0	0	0	0	$(5.63 \pm 0.14) \times 10^{-24}$[h]	$\pi^0 + n^0$ or $\pi^- + p^+$
Delta[29]	Δ^{-}(1232)	ddd	1232 ± 2	3⁄2	3⁄2+	−1	0	0	0	$(5.63 \pm 0.14) \times 10^{-24}$[h]	$\pi^- + n^0$
Sigma[30]	Σ^{*+}(1385)	uus	1 382.8 ± 0.4	1	3⁄2+	+1	−1	0	0	$(1.839 \pm 0.0041) \times 10^{-23}$[h]	$\Lambda^0 + \pi^+$ or $\Sigma^+ + \pi^0$ or $\Sigma^0 + \pi^+$
Sigma[30]	Σ^{*0}(1385)	uds	1 383.7 ± 1.0	1	3⁄2+	0	−1	0	0	$(1.83 \pm 0.25) \times 10^{-23}$[h]	$\Lambda^0 + \pi^0$ or $\Sigma^+ + \pi^-$ or $\Sigma^0 + \pi^0$
Sigma[30]	Σ^{*-}(1385)	dds	1 387.2 ± 0.5	1	3⁄2+	−1	−1	0	0	$(1.671 \pm 0.089) \times 10^{-23}$[h]	$\Lambda^0 + \pi^-$ or $\Sigma^0 + \pi^-$ or $\Sigma^- + \pi^0$
charmed Sigma[31]	Σ_c^{*++}(2520)	uuc	2 517.9 ± 0.6	1	3⁄2+	+2	0	+1	0	$(4.42 \pm 0.44) \times 10^{-23}$[h]	$\Lambda_c^+ + \pi^+$
charmed Sigma[31]	Σ_c^{*+}(2520)	udc	2 517.5 ± 2.3	1	3⁄2+	+1	0	+1	0	$>3.87 \times 10^{-23}$[h]	$\Lambda_c^+ + \pi^0$
charmed Sigma[31]	Σ_c^{*0}(2520)	ddc	2 518.8 ± 0.6	1	3⁄2+	0	0	+1	0	$(4.54 \pm 0.47) \times 10^{-23}$[h]	$\Lambda_c^+ + \pi^-$
bottom Sigma[32]	Σ_b^{*+}	uub	$5\,832.1 \pm 0.7 ^{+1.7}_{-1.8}$	1	3⁄2+	+1	0	0	−1	$(5.7 \pm 1.8) \times 10^{-23}$[h]	$\Lambda_b^0 + \pi^+$
bottom Sigma[e]	Σ_b^{*0}	udb	Unknown	1	3⁄2+	0	0	0	−1	Unknown	Unknown
bottom Sigma[32]	Σ_b^{*-}	ddb	$5\,835.1 \pm 0.6 ^{+1.7}_{-1.8}$	1	3⁄2+	−1	0	0	−1	$8.8 ^{+3.7}_{-3.6} \times 10^{-23}$[h]	$\Lambda_b^0 + \pi^-$
Xi[33]	Ξ^{*0}(1530)	uss	1 531.80 ± 0.32	1⁄2	3⁄2+	0	−2	0	0	$(7.23 \pm 0.40) \times 10^{-23}$[h]	$\Xi^0 + \pi^0$ or $\Xi^- + \pi^+$
Xi[33]	Ξ^{*-}(1530)	dss	1 535.0 ± 0.6	1⁄2	3⁄2+	−1	−2	0	0	$6.6 ^{+1.3}_{-1.1} \times 10^{-23}$[h]	$\Xi^0 + \pi^-$ or $\Xi^- + \pi^0$
charmed Xi[34]	Ξ_c^{*+}(2645)	usc	$2\,645.9 ^{+0.5}_{-0.6}$	1⁄2	3⁄2+	+1	−1	+1	0	$>2.1 \times 10^{-22}$[h]	$\Xi_c^+ + \pi^0$ (seen)
charmed Xi[34]	Ξ_c^{*0}(2645)	dsc	2 645.9 ± 0.5	1⁄2	3⁄2+	0	−1	+1	0	$>1.2 \times 10^{-22}$[h]	$\Xi_c^+ + \pi^-$ (seen)
double charmed Xi†	Ξ_{cc}^{*++}	ucc	Unknown	1⁄2	3⁄2+	+2	0	+2	0	Unknown	Unknown
double charmed Xi†	Ξ_{cc}^{*+}	dcc	Unknown	1⁄2	3⁄2+	+1	0	+2	0	Unknown	Unknown
bottom Xi[35]	Ξ_b^{*0}	usb	5 945.5 ± 0.8 ± 2.2	1⁄2	3⁄2+	0	−1	0	−1	$(3.1 \pm 2.5) \times 10^{-22}$[h]	$\Xi_b^- + \pi^+$ (seen)
bottom Xi†	Ξ_b^{*-}	dsb	Unknown	1⁄2	3⁄2+	−1	−1	0	−1	Unknown	Unknown
double bottom Xi†	Ξ_{bb}^{*0}	ubb	Unknown	1⁄2	3⁄2+	0	0	0	−2	Unknown	Unknown
double bottom Xi†	Ξ_{bb}^{*-}	dbb	Unknown	1⁄2	3⁄2+	−1	0	0	−2	Unknown	Unknown
charmed bottom Xi†	Ξ_{cb}^{*+}	ucb	Unknown	1⁄2	3⁄2+	+1	0	+1	−1	Unknown	Unknown
charmed bottom Xi†	Ξ_{cb}^{*0}	dcb	Unknown	1⁄2	3⁄2+	0	0	+1	−1	Unknown	Unknown
Omega[36]	Ω^-	sss	1 672.45 ± 0.29	0	3⁄2+	−1	−3	0	0	$(8.21 \pm 0.11) \times 10^{-11}$[h]	$\Lambda^0 + K^-$ or $\Xi^0 + \pi^-$ or $\Xi^- + \pi^0$
charmed Omega[37]	Ω_c^{*0}(2770)	ssc	2 765.9 ± 2.0	0	3⁄2+	0	−2	+1	0	Unknown	$\Omega_c^0 + \gamma$
bottom Omega†	Ω_b^{*-}	ssb	Unknown	0	3⁄2+	−1>	−2	0	−1	Unknown	Unknown
double charmed Omega†	Ω_{cc}^{*+}	scc	Unknown	0	3⁄2+	+1	−1	+2	0	Unknown	Unknown
charmed bottom Omega†	Ω_{cb}^{*0}	scb	Unknown	0	3⁄2+	0	−1	+1	−1	Unknown	Unknown
double bottom Omega†	Ω_{bb}^{*-}	sbb	Unknown	0	3⁄2+	−1	−1	0	−2	Unknown	Unknown
triple charmed Omega†	Ω_{ccc}^{++}	ccc	Unknown	0	3⁄2+	+2	0	+3	0	Unknown	Unknown
double charmed bottom Omega†	Ω_{ccb}^{*+}	ccb	Unknown	0	3⁄2+	+1	0	+2	−1	Unknown	Unknown
charmed double bottom Omega†	Ω_{cbb}^{*0}	cbb	Unknown	0	3⁄2+	0	0	+1	−2	Unknown	Unknown
triple bottom Omega†	Ω_{bbb}^{-}	bbb	Unknown	0	3⁄2+	−1	0	0	−3	Unknown	Unknown

List of Mesons

Pseudoscalar mesons

Particle name	Particle symbol	Antiparticle symbol	Quark content	Rest mass (MeV/c^2)	I^G	J^{PC}	S	C	B'	Mean lifetime (s)	Commonly decays to (>5% of decays)
Pion[23]	π^+	π^-	$u\bar{d}$	139.570 18 ± 0.000 35	1^-	0^-	0	0	0	$(2.6033 \pm 0.0005) \times 10^{-8}$	$\mu^+ + \nu_\mu$
Pion[24]	π^0	Self	$\frac{u\bar{u}-d\bar{d}}{\sqrt{2}}$ [a]	134.9766 ± 0.0006	1^-	0^{-+}	0	0	0	$(8.4 \pm 0.6) \times 10^{-17}$	$\gamma + \gamma$
Eta meson[25]	η	Self	$\frac{u\bar{u}+d\bar{d}-2s\bar{s}}{\sqrt{6}}$ [a]	547.853 ± 0.024	0^+	0^{-+}	0	0	0	$(5.0 \pm 0.3) \times 10^{-19}$[b]	$\gamma + \gamma$ or $\pi^0 + \pi^0 + \pi^0$ or $\pi^+ + \pi^0 + \pi^-$
Eta prime meson[26]	$\eta'(958)$	Self	$\frac{u\bar{u}+d\bar{d}+s\bar{s}}{\sqrt{3}}$ [a]	957.66 ± 0.24	0^+	0^{-+}	0	0	0	$(3.2 \pm 0.2) \times 10^{-21}$[b]	$\pi^+ + \pi^- + \eta$ or $(\rho^0 + \gamma)$ / $(\pi^+ + \pi^- + \gamma)$ or $\pi^0 + \pi^0 + \eta$
Charmed eta meson[27]	$\eta_c(1S)$	Self	$c\bar{c}$	2 980.3 ± 1.2	0^+	0^{-+}	0	0	0	$(2.5 \pm 0.3) \times 10^{-23}$[b]	See η_c decay modes (http://pdg.lbl.gov/2008/listings/m026.pdf)
Bottom eta meson[28]	$\eta_b(1S)$	Self	$b\bar{b}$	9300 ± 40	0^+	0^{-+}	0	0	0	Unknown	See η_b decay modes (http://pdg.lbl.gov/2008/listings/m171.pdf)
Kaon[29]	K^+	K^-	$u\bar{s}$	493.677 ± 0.016	½	0^-	1	0	0	$(1.2380 \pm 0.0021) \times 10^{-8}$	$\mu^+ + \nu_\mu$ or $\pi^+ + \pi^0$ or $\pi^0 + e^+ + \nu_e$ or $\pi^+ + \pi^0$
Kaon[30]	K^0	$\bar{K}^0$	$d\bar{s}$	497.614 ± 0.024	½	0^-	1	0	0	[c]	[c]
K-Short[31]	K^0_S	Self	$\frac{d\bar{s}-s\bar{d}}{\sqrt{2}}$ [e]	497.614 ± 0.024[d]	½	0^-	(*)	0	0	$(8.953 \pm 0.005) \times 10^{-11}$	$\pi^+ + \pi^-$ or $\pi^0 + \pi^0$
K-Long[32]	K^0_L	Self	$\frac{d\bar{s}+s\bar{d}}{\sqrt{2}}$ [e]	497.614 ± 0.024[d]	½	0^-	(*)	0	0	$(5.116 \pm 0.020) \times 10^{-8}$	$\pi^\pm + e^\mp + \nu_e$ or $\pi^\pm + \mu^\mp + \nu_\mu$ or $\pi^0 + \pi^0 + \pi^0$ or $\pi^+ + \pi^0 + \pi^-$
D meson[33]	D^+	D^-	$c\bar{d}$	1 869.62 ± 0.20	½	0^-	0	+1	0	$(1.040 \pm 0.007) \times 10^{-12}$	See D^+ decay modes (http://pdg.lbl.gov/2008/listings/s031.pdf)
D meson[34]	D^0	$\bar{D}^0$	$c\bar{u}$	1 864.84 ± 0.17	½	0^-	0	+1	0	$(4.101 \pm 0.015) \times 10^{-13}$	See D^0 decay modes (http://pdg.lbl.gov/2008/listings/s032.pdf)
strange D meson[35]	D^+_s	D^-_s	$c\bar{s}$	1 968.49 ± 0.34	0	0	+1	+1	0	$(5.00 \pm 0.07) \times 10^{-13}$	See $D^\pm_s$ decay modes (http://pdg.lbl.gov/2008/listings/s034.pdf)
B meson[36]	B^+	B^-	$u\bar{b}$	5 279.15 ± 0.31	½	0^-	0	0	+1	$(1.638 \pm 0.011) \times 10^{-12}$	See B^+ decay modes (http://pdg.lbl.gov/2008/listings/s041.pdf)
B meson[37]	B^0	$\bar{B}^0$	$d\bar{b}$	5 279.53 ± 33	½	0^-	0	0	+1	$(1.530 \pm 0.009) \times 10^{-12}$	See B^0 decay modes (http://pdg.lbl.gov/2008/listings/s042.pdf)
Strange B meson[38]	B^0_s	$\bar{B}^0_s$	$s\bar{b}$	5 366.3 ± 0.6	0	0^-	−1	0	+1	$1.470^{+0.026}_{-0.027} \times 10^{-12}$	See B^0_s decay modes (http://pdg.lbl.gov/2008/listings/s086.pdf)
Charmed B meson[39]	B^+_c	B^-_c	$c\bar{b}$	6276 ± 4	0	0^-	0	+1	+1	$(4.6 \pm 0.7) \times 10^{-13}$	See $B^\pm_c$ decay modes (http://pdg.lbl.gov/2008/listings/s091.pdf)

Vector mesons

Particle name	Particle symbol	Antiparticle symbol	Quark content	Rest mass (MeV/c^2)	I^G	J^{PC}	S	C	B'	Mean lifetime (s)	Commonly decays to (>5% of decays)
Charged rho meson[40]	$\rho^+(770)$	$\rho^-(770)$	$u\bar{d}$	775.4 ± 0.4	1^+	1^-	0	0	0	~4.5×10^{-24}[f][g]	$\pi^\pm + \pi^0$
Neutral rho meson[40]	$\rho^0(770)$	Self	$\frac{u\bar{u}-d\bar{d}}{\sqrt{2}}$	775.49 ± 0.34	1^+	1^{--}	0	0	0	~4.5×10^{-24}[f][g]	$\pi^+ + \pi^-$
Omega meson[41]	$\omega(782)$	Self	$\frac{u\bar{u}+d\bar{d}}{\sqrt{2}}$	782.65 ± 0.12	0	1	0	0	0	$(7.75 \pm 0.07) \times 10^{-23}$[f]	$\pi^+ + \pi^0 + \pi^-$ or $\pi^0 + \gamma$
Phi meson[42]	$\phi(1020)$	Self	$s\bar{s}$	1 019.445 ± 0.020	0^-	1^{--}	0	0	0	$(1.55 \pm 0.01) \times 10^{-22}$[f]	$K^+ + K^-$ or $K^0_S + K^0_L$ or $(\rho + \pi) / (\pi^+ + \pi^0 + \pi^-)$
J/Psi[43]	J/ψ	Self	$c\bar{c}$	3 096.916 ± 0.011	0^-	1^{--}	0	0	0	$(7.1 \pm 0.2) \times 10^{-21}$[f]	See J/ψ(1S) decay modes (http://pdg.lbl.gov/2008/listings/m070.pdf)
Upsilon meson[44]	$\Upsilon(1S)$	Self	$b\bar{b}$	9 460.30 ± 0.26	0^-	1^{--}	0	0	0	$(1.22 \pm 0.03) \times 10^{-20}$[f]	See Υ(1S) decay modes (http://pdg.lbl.gov/2008/listings/m049.pdf)
Kaon[45]	K^{*+}	K^{*-}	$u\bar{s}$	891.66 ± 0.026	½	1^-	1	0	0	~7.35×10^{-20}[f][g]	See K*(892) decay modes (http://pdg.lbl.gov/2008/listings/m018.pdf)
Kaon[45]	K^{*0}	$\overline{K}^{*0}$	$d\bar{s}$	896.00 ± 0.025	½	1^-	1	0	0	$(7.346 \pm 0.002) \times 10^{-20}$[f]	See K*(892) decay modes (http://pdg.lbl.gov/2008/listings/m018.pdf)
D meson[46]	$D^{*+}(2010)$	$D^{*-}(2010)$	$c\bar{d}$	2 010.27 ± 0.17	½	1^-	0	+1	0	$(6.9 \pm 1.9) \times 10^{-21}$[f]	$D^0 + \pi^+$ or $D^+ + \pi^0$
D meson[47]	$D^{*0}(2007)$	$\overline{D}^{*0}(2007)$	$c\bar{u}$	2 006.97 ± 0.19	½	1^-	0	+1	0	$>3.1 \times 10^{-22}$[f]	$D^0 + \pi^0$ or $D^0 + \gamma$
strange D meson[48]	D^{*+}_s	D^{*-}_s	$c\bar{s}$	2 112.3 ± 0.5	0	1^-	−1	+1	0	$>3.4 \times 10^{-22}$[f]	$D^{*+} + \gamma$ or $D^{*+} + \pi^0$
B meson[49]	B^{*+}	B^{*-}	$u\bar{b}$	5 325.1 ± 0.5	½	1^-	0	0	+1	Unknown	$B^+ + \gamma$
B meson[49]	B^{*0}	$\overline{B}^{*0}$	$d\bar{b}$	5 325.1 ± 0.5	½	1^-	0	0	+1	Unknown	$B^0 + \gamma$
Strange B meson[50]	B^{*0}_s	$\overline{B}^{*0}_s$	$s\bar{b}$	5 412.8 ± 1.3	0	1^-	−1	0	+1	Unknown	$B^0_s + \gamma$
Charmed B meson†	B^{*+}_c	B^{*-}_c	$c\bar{b}$	Unknown	0	1^-	0	+1	+1	Unknown	Unknown

Various result are very near or also equal to the rest masses of following mesons:

Particle name	Particle symbol	Antiparticle symbol	Quark content	Rest mass (MeV/c^2)	I^G	J^{PC}	S	C	B'	Mean lifetime (s)	Commonly decays to (>5% of decays)
Charged rho meson[40]	$\rho^+(770)$	$\rho^-(770)$	$u\bar{d}$	775.4 ± 0.4	1^+	1^-	0	0	0	~4.5×10^{-24}[f][g]	$\pi^\pm + \pi^0$
Neutral rho meson[40]	$\rho^0(770)$	Self	$\frac{u\bar{u}-d\bar{d}}{\sqrt{2}}$	775.49 ± 0.34	1^+	1^{--}	0	0	0	~4.5×10^{-24}[f][g]	$\pi^+ + \pi^-$
Omega meson[41]	$\omega(782)$	Self	$\frac{u\bar{u}+d\bar{d}}{\sqrt{2}}$	782.65 ± 0.12	0^-	1^{--}	0	0	0	$(7.75 \pm 0.07) \times 10^{-23}$[f]	$\pi^+ + \pi^0 + \pi^-$ or $\pi^0 + \gamma$

From:

Phenomenological consequences of superuid dark matter with baryon-phonon coupling
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(Dated: November 17, 2017)

Using (22) this translates to an upper bound on the mass of the DM particle:

$$m \lesssim 4.2 \left(\frac{\sigma/m}{\mathrm{cm}^2/\mathrm{g}}\right)^{1/4} \mathrm{eV}\,. \qquad (24)$$

Smaller and less massive galaxies result in a somewhat weaker bound.

The bound (24) on the DM particle mass is the main result of this Section. It shows that for values of σ/m satisfying the merging-cluster bound $\sim 1\,\mathrm{cm}^2/\mathrm{g}$ [85–88], m must be somewhat below 4 eV. The dependence on the cross section is rather weak, however, scaling as the 1/4 power. It should be mentioned that the upper bound (24) would be somewhat tighter had we assumed a $\rho \propto r^{-2}$ transition density profile outside the superfluid core, instead of $\rho \propto r^{-3}$.

From J. Polchinski "String Theory Vol II":

Useful facts for grand unification

The exceptional group E_8 is connected to the groups appearing in grand unification through a series of subgroups. This will play a role in the com-

Table 11.3. *Dimensions and Coxeter numbers for simple Lie algebras.*

	$SU(n)$	$SO(n)$, $n \geq 4$	$Sp(k)$	E_6	E_7	E_8	F_4	G_2
dim(g)	$n^2 - 1$	$n(n-1)/2$	$2k^2 + k$	78	133	248	52	14
$h(g)$	n	$n - 2$	$k + 1$	12	18	30	9	4

pactification of the heterotic string, and so we record without derivation the necessary results.

The first subgroup is

$$E_8 \to SU(3) \times E_6 \ . \tag{11.4.23}$$

We have not described E_6 explicitly, but the reader can reproduce this and the decomposition (11.4.24) from the known properties of spinor representations, as well as the further decomposition of the E_6 representations in table 11.4 (exercise 11.5). In simple compactifications of the $E_8 \times E_8$ string, the fermions of the Standard Model can all be thought of as arising from the **248**-dimensional adjoint representation of one of the E_8s. It is therefore interesting to trace the fate of this representation under the successive symmetry breakings. Under $E_8 \to SU(3) \times E_6$,

$$\mathbf{248} \to (\mathbf{8}, \mathbf{1}) + (\mathbf{1}, \mathbf{78}) + (\mathbf{3}, \mathbf{27}) + (\bar{\mathbf{3}}, \overline{\mathbf{27}}) \ . \tag{11.4.24}$$

That is, the adjoint of E_8 contains the adjoints of the subgroups, with half the remaining 162 generators transforming as a triplet of $SU(3)$ and a complex **27**-dimensional representation of E_6 and half as the conjugate of this. Further subgroups are shown in table 11.4. The first three subgroups correspond to successive breaking of E_6 down to the Standard Model group through smaller grand unified groups; the fourth is an alternate breaking pattern.

It is a familiar fact from grand unification that precisely one $SU(3) \times SU(2) \times U(1)$ generation of quarks and leptons is contained in the **10** plus $\bar{\mathbf{5}}$ of $SU(5)$. Tracing back further, we see that a generation fits into the single representation **16** of $SO(10)$, together with an additional state $\mathbf{1}_{-5}$. This extra state is neutral under $SU(5)$, and so under $SU(3) \times SU(2) \times U(1)$, and can be regarded as a right-handed neutrino. Going back to E_6, the **27** contains the 15 states of a single generation plus 12 additional states. Relative to $SU(5)$ unification, $SO(10)$ and E_6 are more unified in the sense that a generation is contained within a single representation, but less economical in that the representation contains additional unseen states as well. In fact, the latter may not be such a

Table 11.4. *Subgroups and representations of grand unified groups.*

E_6	$\rightarrow$	$SO(10) \times U(1)$
$\mathbf{78}$	$\rightarrow$	$\mathbf{45}_0 + \mathbf{16}_{-3} + \overline{\mathbf{16}}_3 + \mathbf{1}_0$
$\mathbf{27}$	$\rightarrow$	$\mathbf{1}_4 + \mathbf{10}_{-2} + \mathbf{16}_1$
$SO(10)$	$\rightarrow$	$SU(5) \times U(1)$
$\mathbf{45}$	$\rightarrow$	$\mathbf{24}_0 + \mathbf{10}_4 + \overline{\mathbf{10}}_{-4} + \mathbf{1}_0$
$\mathbf{16}$	$\rightarrow$	$\mathbf{10}_{-1} + \bar{\mathbf{5}}_3 + \mathbf{1}_{-5}$
$\mathbf{10}$	$\rightarrow$	$\mathbf{5}_2 + \bar{\mathbf{5}}_{-2}$
$SU(5)$	$\rightarrow$	$SU(3) \times SU(2) \times U(1)$
$\mathbf{10}$	$\rightarrow$	$(\mathbf{3}, \mathbf{2})_1 + (\bar{\mathbf{3}}, \mathbf{1})_{-4} + (\mathbf{1}, \mathbf{1})_6$
$\bar{\mathbf{5}}$	$\rightarrow$	$(\bar{\mathbf{3}}, \mathbf{1})_2 + (\mathbf{1}, \mathbf{2})_{-3}$
E_6	$\rightarrow$	$SU(3) \times SU(3) \times SU(3)$
$\mathbf{78}$	$\rightarrow$	$(\mathbf{8}, \mathbf{1}, \mathbf{1}) + (\mathbf{1}, \mathbf{8}, \mathbf{1}) + (\mathbf{1}, \mathbf{1}, \mathbf{8}) + (\mathbf{3}, \mathbf{3}, \mathbf{3}) + (\bar{\mathbf{3}}, \bar{\mathbf{3}}, \bar{\mathbf{3}})$
$\mathbf{27}$	$\rightarrow$	$(\mathbf{3}, \bar{\mathbf{3}}, \mathbf{1}) + (\mathbf{1}, \mathbf{3}, \bar{\mathbf{3}}) + (\bar{\mathbf{3}}, \mathbf{1}, \mathbf{3})$

difficulty. To see why, consider the decomposition of the **27** of E_6 under $SU(3) \times SU(2) \times U(1) \subset SU(5) \subset SO(10) \subset E_6$:

$$\begin{aligned} \mathbf{27} \rightarrow\ & (\mathbf{3}, \mathbf{2})_1 + (\bar{\mathbf{3}}, \mathbf{1})_{-4} + (\mathbf{1}, \mathbf{1})_6 + (\bar{\mathbf{3}}, \mathbf{1})_2 + (\mathbf{1}, \mathbf{2})_{-3} \\ & + [\mathbf{1}_0] \\ & + [(\bar{\mathbf{3}}, \mathbf{1})_2 + (\mathbf{3}, \mathbf{1})_{-2}] + [(\mathbf{1}, \mathbf{2})_{-3} + (\mathbf{1}, \mathbf{2})_3] + [\mathbf{1}_0] \,. \end{aligned} \tag{11.4.25}$$

The first line lists one generation, the second the extra state appearing in the **16** of $SO(10)$, and the third the additional states in the **27** of E_6. The subset within each pair of square brackets is a real representation of $SU(3) \times SU(2) \times U(1)$. The significance of this is that for a real representation r, the CPT conjugate also is in the representation r, and so the combined gauge plus $SO(2)$ helicity representation for the particles plus their antiparticles is $(r, +\frac{1}{2}) + (r, -\frac{1}{2})$. This is the same as for a *massive* spin-$\frac{1}{2}$ particle in representation r, so it is consistent with the gauge and spacetime symmetries for these particles to be massive. In the most general invariant action, all particles in [ ] brackets will have large (of order the unification scale) masses. It is notable that for any of the $\mathbf{10} + \bar{\mathbf{5}}$ of $SU(5)$, the **16** of $SO(10)$, or the **27** of E_6, the natural $SU(3) \times SU(2) \times U(1)$ spectrum is precisely a standard generation of quarks and leptons.

In this paper we have considered the number 16, fundamental in string theory (see above reference) and 0,5 i.e. 1/2, also important in Number Theory. Indeed:

We take n = 16 in the already previously analyzed formula, and developing, we obtain:

$$-\left(\frac{\exp\left(\pi\sqrt{\frac{16}{6}-\frac{1}{144}}\right)}{2\sqrt{16-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{16-\frac{1}{24}}}\right)$$

the value -21.79216 (that is the coefficient).

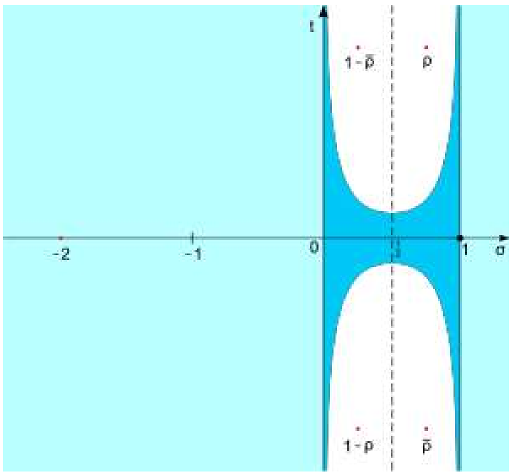
Thence q = coefficient * $-e^{-t}$; for t = 1/2 = 0.5, q = ($-e^{-0.5}$) -21.79216 for each q.

For example: $q^5 = ((-e^{-0.5})* -21.79216)^5$ and so on.

With regard 1/2 = 0.5 we remember that:

"The Riemann hypothesis, asserts that any non-trivial zero s has Re(s) = 1/2. In the theory of the Riemann zeta function, the set $\{s \in \mathbb{C} : \mathrm{Re}(s) = 1/2\}$ is called the **critical line**."

"Apart from the trivial zeros, the Riemann zeta function has no zeros to the right of $\sigma = 1$ and to the left of $\sigma = 0$ (neither can the zeros lie too close to those lines). Furthermore, the non-trivial zeros are symmetric about the real axis and the line $\sigma = 1/2$ and, according to the Riemann hypothesis, they all lie on the line $\sigma = 1/2$."



Ramanujan original last letter

(*Ramanujan's last letter to Hardy, featuring examples of mock modular forms. Credit: Ken Ono)*

If we consider a ϑ-function in the transformed Eulerian form e.g.

(A) $$1+\frac{q}{(1-q)^2}+\frac{q^4}{(1-q)^2(1-q^2)^2}+\frac{q^9}{(1-q)^2(1-q^2)^2(1-q^3)^2}$$

(B) $$1+\frac{q}{1-q}+\frac{q^4}{(1-q)(1-q^2)}+\frac{q^9}{(1-q)(1-q^2)(1-q^3)}$$

and ~~consider~~ determine the nature of the singularities at ~~the~~ the points $q=1$, $q^2=1$, $q^3=1$, $q^4=1$, $q^5=1$, ... we know how beautifully the asymptotic ~~nature~~ form of the function can be expressed in a very neat and closed ~~form~~ exponential form. For instance when $q=e^{-t}$ and $t \to 0$

$$(A) = \sqrt{\frac{t}{2\pi}}\, e^{\frac{\pi^2}{6t}-\frac{t}{24}} {}^{*} + o(1)^{\dagger}$$

$$(B) = \frac{e^{\frac{\pi^2}{15t}-\frac{t}{60}}}{\sqrt{\frac{5-\sqrt{5}}{2}}} {}^{*} + o(1)^{\dagger}$$

and similar results at other singularities. * It is not necessary that there should be only one term like this. There may be many terms but the number of terms must be finite. † Also $o(1)$ may turn out to be $O(1)$. That is all. For instance when $q \to 1$ the function

$$\frac{1}{\{(1-q)(1-q^2)(1-q^3)\cdots\}^{120}}$$

is equivalent to the sum of five terms like (*) together with $O(1)$ instead of $o(1)$.

If we take a number of functions like (A) and (B) it is only in a limited number of cases the terms close as above; but in the majority of cases they never close as above. For instance when $q=e^{-t}$ and $t \to 0$

(C) $$1+\frac{q}{(1-q)^2}+\frac{q^3}{(1-q)^2(1-q^2)^2}+\frac{q^6}{(1-q)^2(1-q^2)^2(1-q^3)^2}$$

$$=\sqrt{\left(\frac{t}{2\sqrt{5}}\right)}\, e^{\frac{\pi^2}{6t}{}^{*}+a_1 t+a_2 t^2+\cdots+O(a_k t^k)}$$

where $a_1=\frac{1}{8\sqrt{5}}$, and so on.

(2)

The function (C) is a simple example of a function behaving in an unclosed form at the singularities.

* The coefft. $\frac{1}{t}$ in the index of e happens to be $\frac{\pi^2}{5}$ in this particular case. It may be some other transcendental numbers in other cases.

† The coeffts. of $t, t^2, \ldots$ happen to be $\frac{1}{8\sqrt{5}}\cdots$ in this case. In other cases they may turn out to be some other algebraic numbers.

Now a very interesting question arises. Is the converse of the statements concerning the forms (A) and (B) true? That is to say Suppose there is a function in the Eulerian form and suppose that all or an infinity of points $q = e^{\frac{2i\pi m}{n}}$ are exponential singularities and also suppose that at these points the asymptotic form of the function closes as neatly as in the cases of (A) and (B). The question is:— is the function taken the sum of two functions one of which is an ordinary ϑ function and the other a (trivial) function which is $O(1)$ at all the points $e^{\frac{2i\pi m}{n}}$? The answer is it is not necessarily so. When it is not so I call the function Mock ϑ-function. I have not proved rigorously that it is not necessarily so. But I have constructed a number of examples in which it is inconceivable to construct a ϑ function to cut out the singularities

 (3)

of the original function. Also I have shown if it is necessarily so then it leads to the following assertion; — viz. it is possible to construct two power series in x namely $\sum_0^\infty a_n x^n$ and $\sum b_n x^n$ both of which have essential singularities on the unit circle, ~~while $\sum_0^\infty a_n x^n$ exists inside the circle and is regular there and $\sum_0^\infty b_n x^n$~~ ~~one~~ are convergent when $|x|<1$, and tend to finite limits at every point ~~x=~~$e^{2i\pi r/s}$ and that ~~pro~~ at the same time the limit of $\sum_0^\infty a_n x^n$ at the point ~~x=~~$e^{2i\pi r/s}$ is equal to the limit of $\sum_0^\infty b_n x^n$ at the point $x = e^{-2i\pi r/s}$.

This assertion seems to be untrue. Any how we shall go to the examples and see how far our assertions are true.

I have proved that if

$$f(q) = 1 + \frac{q}{(1+q)^2} + \frac{q^4}{(1+q)^2(1+q^2)^2} + \cdots$$

then $f(q) + (1-q)(1-q^3)(1-q^5)\cdots(1 - 2q + 2q^4 - 2q^9 + \cdots)$

~~at all the~~ $= O(1)$

at all the points $q=-1$, $q^3=-1$, $q^5=-1$, $q^7=-1$, ...;

and at the same time

$$f(q) - (1-q)(1-q^3)(1-q^5)\cdots(1 - 2q + 2q^4 - \cdots) = O(1)$$

at all the points $q^2=-1$, $q^4=-1$, $q^6=-1$, ...

Also obviously $f(q) = O(1)$ at all the points $q=1$, $q^3=1$, $q^5=1$, ...

(46) (4)

And so $f(q)$ is a Mock ϑ function.

When $q = -e^{-t}$ and $t \to 0$

$$f(q) + \sqrt{\tfrac{\pi}{t}}\, e^{\frac{\pi^2}{24t} - \frac{t}{24}} \to 4.$$

The coeff^t of q^n in $f(q)$ is

$$(-1)^{n-1} \frac{e^{\pi\sqrt{\frac{n}{6} - \frac{1}{144}}}}{2\sqrt{n - \frac{1}{24}}} + O\left(\frac{e^{\frac{\pi}{2}\sqrt{\frac{n}{6} - \frac{1}{144}}}}{\sqrt{n - \frac{1}{24}}}\right)$$

It is inconceivable that a single ϑ function could be found to cut out the singularities of $f(q)$.

Mock ϑ-functions

$$\phi(q) = 1 + \frac{q}{1+q^2} + \frac{q^4}{(1+q^2)(1+q^4)} + \dots$$

$$\psi(q) = \frac{q}{1-q} + \frac{q^4}{(1-q)(1-q^3)} + \frac{q^9}{(1-q)(1-q^3)(1-q^5)} + \dots$$

~~there are~~

$$\chi(q) = 1 + \frac{q}{1-q+q^2} + \frac{q^4}{(1-q+q^2)(1-q^2+q^4)} + \dots$$

These are ~~as closely to~~ related to $f(q)$ as shown below.

$$2\phi(-q) - f(q) = f(q) + 4\psi(-q) = \frac{1 - 2q + 2q^4 - 2q^9 + \dots}{(1+q)(1+q^2)(1+q^3)\dots}$$

These are of the 3rd order

Mock ϑ-functions (of 5th order)

$$f(q) = 1 + \frac{q}{1+q} + \frac{q^4}{(1+q)(1+q^2)} + \frac{q^9}{(1+q)(1+q^2)(1+q^3)} + \dots$$

$$\phi(q) = 1 + q(1+q) + q^4(1+q)(1+q^3) + q^9(1+q)(1+q^3)(1+q^5) + \dots$$

$$\psi(q) = q + q^3(1+q) + q^6(1+q)(1+q^2) + q^{10}(1+q)(1+q^2)(1+q^3) + \dots$$

$$\chi(q) = 1 + \frac{q}{1-q^2} + \frac{q^2}{(1-q^3)(1-q^4)} + \frac{q^3}{(1-q^4)(1-q^5)(1-q^6)} + \dots$$

$$= 1 + \left\{ \frac{q}{1-q} + \frac{q^3}{(1-q^2)(1-q^3)} + \frac{q^5}{(1-q^3)(1-q^4)(1-q^5)} + \dots \right\}$$

$$4\chi(q) - f(q) = \frac{(1 - 2q^3 + 2q^{12} - \dots)^2}{(1-q)(1-q^2)(1-q^3)\dots}$$

(5)

$$F(q) = 1 + \frac{q^2}{1-q} + \frac{q^8}{(1-q)(1-q^3)} + \cdots$$

$$\phi(-q) + \chi(q) = 2F(q).$$

$$f(q) + 2F(q^2) - 2 = \phi(-q^2) + \psi(-q)$$
$$= 2\phi(-q^2) - f(q) = \frac{1 - 2q + 2q^4 - 2q^9 + \cdots}{(1-q)(1-q^4)(1-q^6)(1-q^9)\cdots}$$

$$\psi(q) - F(q^4) + 1 = q \cdot \frac{1 + q^2 + q^6 + q^{12} + \cdots}{(1-q^8)(1-q^{16})(1-q^{24})\cdots}$$

Mock θ-functions (of 5th order)

$$f(q) = 1 + \frac{q^2}{1+q} + \frac{q^6}{(1+q)(1+q^2)} + \frac{q^{12}}{(1+q)(1+q^2)(1+q^3)} + \cdots$$

$$\phi(q) = q + q^4(1+q) + q^9(1+q)(1+q^2) + \cdots$$

$$\psi(q) = 1 + q(1+q) + q^3(1+q)(1+q^2) + q^6(1+q)(1+q^2)(1+q^3) + \cdots$$

$$\chi(q) = \frac{1}{1-q} + \frac{q}{(1-q^2)(1-q^3)} + \frac{q^2}{(1-q^3)(1-q^4)(1-q^5)} + \frac{q^3}{(1-q^4)(1-q^5)(1-q^6)(1-q^7)} + \cdots$$

$$F(q) = \frac{1}{1-q} + \frac{q^4}{(1-q)(1-q^3)} + \frac{q^{12}}{(1-q)(1-q^3)(1-q^5)} + \cdots$$

have got similar relations as above.

Mock θ-functions (of 7th order)

(i) $1 + \frac{q}{1-q^2} + \frac{q^4}{(1-q^3)(1-q^4)} + \frac{q^9}{(1-q^4)(1-q^5)(1-q^6)} + \cdots$

(ii) $\frac{q}{1-q} + \frac{q^4}{(1-q^2)(1-q^3)} + \frac{q^9}{(1-q^3)(1-q^4)(1-q^5)} + \cdots$

(iii) $\frac{1}{1-q} + \frac{q^2}{(1-q^2)(1-q^3)} + \frac{q^6}{(1-q^3)(1-q^4)(1-q^5)} + \cdots$

These are not related to each other.

Ever yours sincerely
S. Ramanujan

Appendix B

We have also:

From:

Input interpretation:

$$-1.0058343895\times 10^{-12}-5.74968\times 10^{-40}-1.08663428-0.081816-0.07609064+0.92391-0.0814135-1.00615716+0.9243408$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

$$-0.4838607800010058343895000000000000000000574968$$

1/e*[[[-(0.48386078)*-(-4.92906*10^6)-(4.04437*10^14)+(3.07735*10^13)+(-2498.279)+(33021.10)+(-2122.186)+(1.63161*10^20)-(9.39267*10^17)-(-4267.24)-(6.596086*10^20)))]]^5

Input interpretation:

$$\frac{1}{e}\left(-\left(-4.92906\times 10^{6}\right)\times(-0.48386078)-4.04437\times 10^{14}+3.07735\times 10^{13}-2498.279+33021.10-2122.186+1.63161\times 10^{20}-9.39267\times 10^{17}--4267.24-6.596086\times 10^{20}\right)^{5}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$$-1.11990\ldots\times 10^{103}$$

(16^2-12) * sqrt-(-1.11990 × 10^103)

Input interpretation:

$$\left(16^{2}-12\right)\sqrt{-\left(-\left(1.11990\times 10^{103}\right)\right)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$$8.16544\ldots\times 10^{53}$$

[[[-(0.48386078)*-(-4.92906*10^6)-(4.04437*10^14)+(3.07735*10^13)+(-2498.279)+(33021.10)+(-2122.186)+(1.63161*10^20)-(9.39267*10^17)-(-4267.24)-(6.596086*10^20)))]]^4 * 4267.24

Input interpretation:

$$\left(-\left(-4.92906\times10^{6}\right)\times(-0.48386078)-4.04437\times10^{14}+3.07735\times10^{13}-2498.279+33\,021.10-2122.186+1.63161\times10^{20}-9.39267\times10^{17}--4267.24-6.596086\times10^{20}\right)^{4}\times4267.24$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$2.611714079455111909417858134889278471522793118774931 9... \times 10^{86}$

In conclusion:

(0.08)^2*[[[((-(0.48386078)*-(-4.92906*10^6)-(4.04437*10^14)+(3.07735*10^13)+(-2498.279)+(33021.10)+(-2122.186)+(1.63161*10^20)-(9.39267*10^17)-(-4267.24)-(6.596086*10^20)))]]^4 * 4267.24)))

Input interpretation:

$$0.08^{2}\left(\left(-\left(-4.92906\times10^{6}\right)\times(-0.48386078)-4.04437\times10^{14}+3.07735\times10^{13}-2498.279+33\,021.10-2122.186+1.63161\times10^{20}-9.39267\times10^{17}--4267.24-6.596086\times10^{20}\right)^{4}\times4267.24\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$1.671497010851271622027429206329138221774587596015956 4... \times 10^{84}$

References

Wikipedia

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https://www.imsc.res.in/~rao/ramanujan/newnow/lastletter.pdf