On some formulas concerning the Ramanujan's Master Theorem: new possible mathematical developments and mathematical connections with the mass value of candidate "glueball" f_0(1710) meson, Dark Photons and the Black Hole entropies.

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Abstract

In the present research thesis, we have obtained various and interesting new possible mathematical results concerning some equations of the Ramanujan's Master Theorem. Furthermore, we have described new possible mathematical connections with the mass value of candidate "glueball" f_0(1710) meson, Dark Photons and with the Black Hole entropies.

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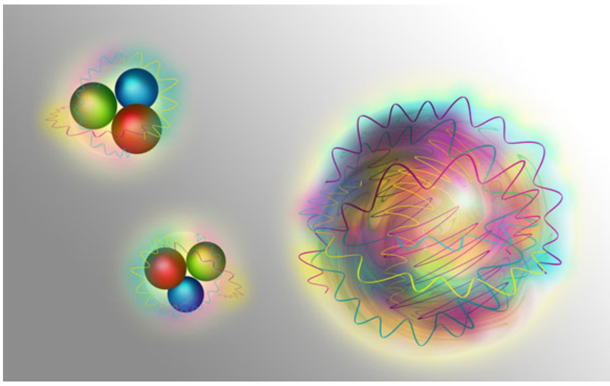
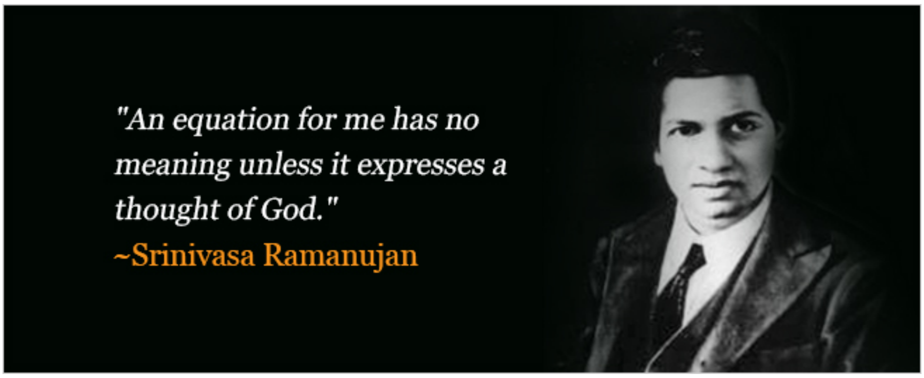


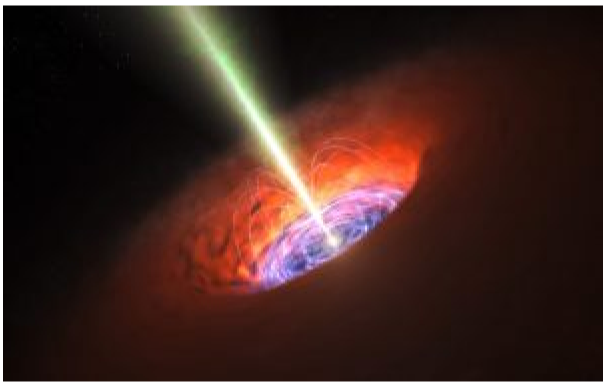
https://scitechdaily.com/glueball-a-particle-purely-made-of-nuclear-force/



http://www.aicte-india.org/content/srinivasa-ramanujan

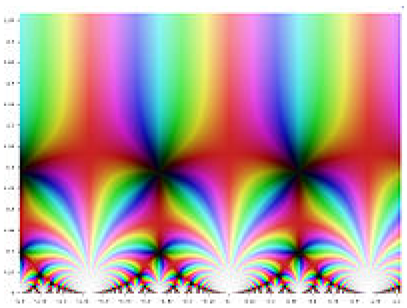
From: https://www.scienceandnonduality.com/article/the-secrets-of-ramanujans-garden

"No one at the time understood what Ramanujan was talking about. "It wasn't until 2002, through the work of Sander Zwegers, that we had a description of the functions that Ramanujan was writing about in 1920," said Emory mathematician Ken Ono. Building on that description, Ono and his colleagues went a step further. They drew on modern mathematical tools that had not been developed before Ramanujan's death to prove that a mock modular form could be computed just as Ramanujan predicted. They found that while the outputs of a mock modular form shoot off into enormous numbers, the corresponding ordinary modular form expands at close to the same rate. So when you add up the two outputs or, in some cases, subtract them from one another, the result is a relatively small number, such as four, in the simplest case.

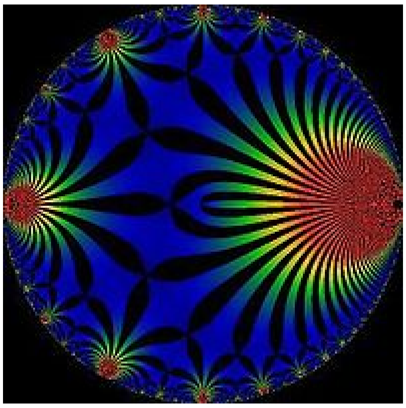


“We proved that Ramanujan was right,” Ono says. “We found the formula explaining one of the visions that he believed came from his goddess… No one was talking about black holes back in the 1920s when Ramanujan first came up with mock modular forms, and yet, his work may unlock secrets about them.”[2].“It’s fascinating to me to explore his writings and imagine how his brain may have worked. It’s like being a mathematical anthropologist,” said Ono.”

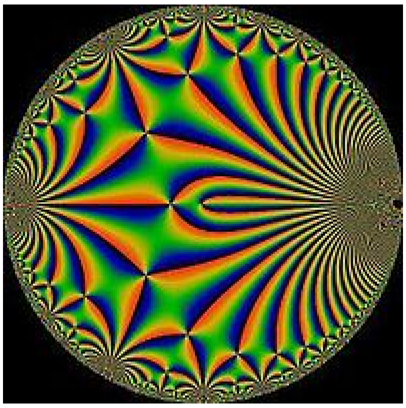
From Wikipedia (j-invariant)



Klein's j-invariant in the complex plane



Real part of the j-invariant as a function of the nome q on the unit disk



Phase of the j-invariant as a function of the nome q on the unit disk

[2] Translation of the Ono’s quote in Italian:
"Abbiamo dimostrato che Ramanujan aveva ragione", dice Ono. "Abbiamo trovato la formula che spiegava una delle visioni che credeva provenissero dalla sua dea ... Nessuno parlava di buchi neri negli anni Venti quando Ramanujan aveva inventato forme modulari finte, eppure il suo lavoro poteva svelare segreti su di loro. ”

From:

Bruce C. Berndt - **Ramanujan's Notebooks Part 1** –

Entry 13(ii). *If $m > -1$ and n is any complex number, then*

$$\int_0^{\pi/2} \cos^m x \cos nx \, dx = \frac{\pi\Gamma(m+1)}{2^{m+1}\Gamma\left(\frac{m+n}{2}+1\right)\Gamma\left(\frac{m-n}{2}+1\right)}.$$

We have, from the right hand side, for m = -3 and n =2+i :

-((Pi gamma (2))) / (((((2^(-2) (((gamma (((-3+2+i)/2 +1))) gamma (((-3-2-i)/2 +1)))))

Input:

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

Open code

- $\Gamma(x)$ is the gamma function
- i is the imaginary unit

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Exact result:

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

Decimal approximation:

- More digits

$-5.018356957316113564019991286538811896424048716296304548\ldots - 10.03671391463222712803998257307762379284809743259260909 6\ldots i$

Open code

Alternate forms:

$$(-2-4i)\cosh\left(\frac{\pi}{2}\right)$$

Open code

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

Continued fraction:

- Linear form

$$(-5-10i)+\cfrac{1}{(-11+22i)+\cfrac{1}{(2+4i)+\cfrac{1}{(-2+4i)+\cfrac{1}{(-2-3i)+\cfrac{1}{(2+i)+\cfrac{1}{(-1-i)+\cfrac{1}{\cdots}}}}}}}$$

(using the Hurwitz expansion)

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Alternative representations:

- More

$$-\frac{\pi\,\Gamma(2)}{\frac{\Gamma\left(\frac{1}{2}(-3+2+i)+1\right)\Gamma\left(\frac{1}{2}(-3-2-i)+1\right)}{2^2}} = -\frac{\pi\,1!}{\frac{1}{4}\left(\frac{1}{2}(-5-i)\right)!\left(\frac{1}{2}(-1+i)\right)!}$$

Open code

$$-\frac{\pi\,\Gamma(2)}{\frac{\Gamma\left(\frac{1}{2}(-3+2+i)+1\right)\Gamma\left(\frac{1}{2}(-3-2-i)+1\right)}{2^2}} = -\frac{\pi}{\frac{G\left(2+\frac{1}{2}(-5-i)\right)G\left(2+\frac{1}{2}(-1+i)\right)}{4\,G\left(1+\frac{1}{2}(-5-i)\right)G\left(1+\frac{1}{2}(-1+i)\right)}}$$

Open code

$$-\frac{\pi\,\Gamma(2)}{\frac{\Gamma\left(\frac{1}{2}(-3+2+i)+1\right)\Gamma\left(\frac{1}{2}(-3-2-i)+1\right)}{2^2}} = -\frac{\pi\,(1)_1}{\frac{1}{4}(1)_{\frac{1}{2}(-5-i)}(1)_{\frac{1}{2}(-1+i)}}$$

Series representations:

$$-\frac{\pi\,\Gamma(2)}{\frac{\Gamma\left(\frac{1}{2}(-3+2+i)+1\right)\Gamma\left(\frac{1}{2}(-3-2-i)+1\right)}{2^2}} = -4\pi\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}(-3-i)^{k_1}(1+i)^{k_2}\,2^{-k_1-k_2}\,c_{k_1}\,c_{k_2}$$

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

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

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

Open code

$$-\frac{\pi\,\Gamma(2)}{\frac{\Gamma\left(\frac{1}{2}(-3+2+i)+1\right)\Gamma\left(\frac{1}{2}(-3-2-i)+1\right)}{2^2}} =$$

$$-\frac{1}{\pi}4\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\left(\left(-\frac{3}{2}-\frac{i}{2}\right)-z_0\right)^{k_1}\left(\left(\frac{1}{2}+\frac{i}{2}\right)-z_0\right)^{k_2}\sum_{j_1=0}^{k_1}\sum_{j_2=0}^{k_2}\Bigg((-1)^{j_1+j_2}\pi^{-j_1-j_2+k_1+k_2}$$
$$\sin\left(\frac{1}{2}\pi(-j_1+k_1)+\pi z_0\right)\sin\left(\frac{1}{2}\pi(-j_2+k_2)+\pi z_0\right)$$
$$\Gamma^{(j_1)}(1-z_0)\Gamma^{(j_2)}(1-z_0)\Bigg)\Big/(j_1!\,j_2!\,(-j_1+k_1)!\,(-j_2+k_2)!)$$

- $\zeta(s)$ is the Riemann zeta function
- γ is the Euler-Mascheroni constant
- $\mathbb{Z}$ is the set of integers
-

- Integral representations:
  $$-\frac{\pi\,\Gamma(2)}{\frac{\Gamma\left(\frac{1}{2}(-3+2+i)+1\right)\Gamma\left(\frac{1}{2}(-3-2-i)+1\right)}{2^2}} = \frac{1}{\pi}\oint_L e^t\,t^{3/2+i/2}\,dt\oint_L e^t\,t^{-1/2-i/2}\,dt$$
-
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  $$-\frac{\pi\,\Gamma(2)}{\frac{\Gamma\left(\frac{1}{2}(-3+2+i)+1\right)\Gamma\left(\frac{1}{2}(-3-2-i)+1\right)}{2^2}} = \frac{1}{\pi}\oint_L e^{-t}\,(-t)^{3/2+i/2}\,dt\oint_L e^{-t}\,(-t)^{-1/2-i/2}\,dt$$
- $$-\frac{\pi\,\Gamma(2)}{\frac{\Gamma\left(\frac{1}{2}(-3+2+i)+1\right)\Gamma\left(\frac{1}{2}(-3-2-i)+1\right)}{2^2}} = -\frac{4\,e^{-\pi}\,(1+e^{\pi})^2\,\pi}{\oint_L e^{-t}\,t^{-1/2+i/2}\,dt\oint_L e^{-t}\,t^{-5/2-i/2}\,dt}$$
- $$-\frac{\pi\,\Gamma(2)}{\frac{\Gamma\left(\frac{1}{2}(-3+2+i)+1\right)\Gamma\left(\frac{1}{2}(-3-2-i)+1\right)}{2^2}} =$$
  $$-\frac{4\pi}{\left(\int_1^\infty e^{-t}\,t^{-5/2-i/2}\,dt+\sum_{k=0}^\infty\frac{(-1)^k}{\left(\left(-\frac{3}{2}-\frac{i}{2}\right)+k\right)k!}\right)\left(\int_1^\infty e^{-t}\,t^{-1/2+i/2}\,dt+\sum_{k=0}^\infty\frac{(-1)^k}{\left(\left(\frac{1}{2}+\frac{i}{2}\right)+k\right)k!}\right)}$$
-

Now:

$-5.018356957316113564019991286538811896424048716296304548\ldots - 10.036713914632227128039982573077623792848097432592609096\ldots\, i$

-5.018356957316113564-10.036713914632227128i

Result:
- More digits

$-5.018356957316113564\ldots - 10.03671391463222713\ldots\, i$

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Polar coordinates:

$r = 11.2213872919178405070$ (radius), $\theta = -116.56505117707798935°$ (angle)
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11.221387291917840507

Note that:

(11.221387291917840507)^(1.328+1.2108+0.538)+27

Input interpretation:
$$11.221387291917840507^{1.328+1.2108+0.538} + 27$$
Open code

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Result:

- Fewer digits
- More digits

1728.309121332598760007176199032200007522397704743948412637...
1728.3091213325987600071761990322000075223977047439484

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

Continued fraction:

- Linear form

$$1728+\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{10+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{2+\cfrac{1}{13+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Open code

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Possible closed forms:

- More

$\frac{1}{20}\left(1009 e^{\pi} + 2668 \pi - 520 \log(\pi) + 290 \log(2 \pi) + 2295 \tan^{-1}(\pi)\right) \approx$
1728.30912133259876000090854

$436 e! + \frac{778}{15} - \frac{7811}{5 e} + \frac{2171 e}{15} \approx 1728.30912133259876000022537$

root of $5 x^5 - 8641 x^4 - 940 x^3 - 5145 x^2 - 220 x - 3312$ near $x = 1728.31$ $\approx$
1728.30912133259876000010136

- $\tan^{-1}(x)$ is the inverse tangent function
- $\log(x)$ is the natural logarithm
- $n!$ is the factorial function

((11.221387291917840507))^1/5

Input interpretation:

$\sqrt[5]{11.221387291917840507}$

Open code

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Result:

- Fewer digits
- More digits

1.621844865889989110757965008233004016756958471780920087296...

1.6218448658899891107579650082330040167569584717809200

Continued fraction:

- Linear form

$$1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{4 + \cfrac{1}{3 + \cfrac{1}{17 + \cfrac{1}{1 + \cfrac{1}{11 + \cfrac{1}{2 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{2 + \cfrac{1}{1 + \cfrac{1}{2 + \cfrac{1}{38 + \cfrac{1}{1 + \cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}$$

Open code

Possible closed forms:

1.62184486588998911076

- Less

$$\frac{1\,255\,869\,194\,\pi}{2\,432\,679\,917} \approx 1.62184486588998911072719 2$$

$$\pi \left(\text{root of } 5823 x^3 - 44598 x^2 - 40661 x + 32076 \text{ near } x = 0.516249\right) \approx 1.62184486588998911075745 7$$

$$\frac{40\,284\,881}{7\,906\,475\,\pi} \approx 1.6218448658899890699 4$$

$$-\frac{377\,\pi!}{27} - \frac{53}{3} - \frac{230}{27\,\pi} + \frac{3155\,\pi}{81} \approx 1.62184486588998911029158$$

$$\frac{2\left(-242 - 12\,e + 217\,e^2\right)}{36 + 489\,e + 37\,e^2} \approx 1.62184486588998911169 17$$

$$\text{root of } 20954 x^3 - 74450 x^2 + 74600 x - 14549 \text{ near } x = 1.62184 \approx 1.62184486588998911031891$$

$$\frac{1}{\text{root of } 14549 x^3 - 74600 x^2 + 74450 x - 20954 \text{ near } x = 0.616582} \approx 1.62184486588998911031891$$

$$\pi \left(\text{root of } 3074 x^4 + 7441 x^3 - 1490 x^2 - 3171 x + 792 \text{ near } x = 0.516249\right) \approx 1.62184486588998911078493 8$$

$$\text{root of } 3253 x^4 - 2119 x^3 - 3750 x^2 + 2167 x - 7118 \text{ near } x = 1.62184 \approx 1.62184486588998911076113 03$$

$$\text{root of } 381 x^5 - 215 x^4 - 107 x^3 - 229 x^2 - 53 x - 1643 \text{ near } x = 1.62184 \approx 1.62184486588998911075901 4$$

$$\log\left(\frac{1}{58}\left(-289 + 58\sqrt{2} - 202\,e + 407\,e^2 + 90\,\pi - 227\,\pi^2\right)\right) \approx 1.62184486588998911067776$$

We have also that:

(1/ 11.221387291917840507)*7

Input interpretation:

$$\frac{1}{11.221387291917840507} \times 7$$

Open code

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Result:

- More digits

0.62380878744303942822199714215172898576100896799378811743 9...

Open code

0.6238087874430394282219971421517289857610089679937881174 39

Continued fraction:

- Linear form

$$\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{12+\cfrac{1}{2+\cfrac{1}{30+\cfrac{1}{3+\cfrac{1}{5+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{12+\cfrac{1}{11+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{14+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{30+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Open code

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Possible closed forms:

- Less

$\frac{1}{44}(50 e^{\pi} + 49\pi - 947\log(\pi) + 22\log(2\pi) - 190\tan^{-1}(\pi)) \approx$ 0.623808787443039428209351

$\frac{3505261100}{57685863\pi^4} \approx 0.623808787443039430958$

$\frac{73229349\pi^2}{1158599750} \approx 0.623808787443039429695 0$

$-\tan\left(\operatorname{csch}\left(\frac{20313649}{116890935}\right)\right) \approx 0.623808787443039428190 44$

And:

1 / 0.6238087874430394282219971421517289857610089679937881174 39

Input interpretation:

$$\frac{1}{0.623808787443039428221997142151728985761008967993788117439}$$

Open code

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Result:

- More digits

1.60305532741683435814285714285714285714285714285714285714285714 4...

Open code

1.6030553274168343581428571428571428571428571428571428571428571 44

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{12+\cfrac{1}{2+\cfrac{1}{30+\cfrac{1}{3+\cfrac{1}{5+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{12+\cfrac{1}{11+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{14+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{30+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Open code

Possible closed forms:

- Less

$$\frac{57685863\pi^4}{3505261100} \approx 1.60305532741683435 11093$$

$$\frac{1158599750}{73229349\pi^2} \approx 1.60305532741683435 43575$$

$$-\cot\left(\operatorname{csch}\left(\frac{20313649}{116890935}\right)\right) \approx 1.603055327416834358 22394$$

$$\text{root of } 628x^4-5700x^3+9352x^2+843x-6050 \text{ near } x=1.60306 \approx$$
$$1.6030553274168343581 26959$$

$$\frac{3037779724\pi}{5953298243} \approx 1.6030553274168343581 76487$$

$$\frac{1}{\text{root of } 6050x^4-843x^3-9352x^2+5700x-628 \text{ near } x=0.623809} \approx$$
$$1.6030553274168343581 26959$$

π root of $32849 x^3 + 24367 x^2 - 66453 x + 23200$ near $x = 0.510268$ ≈ 1.6030553274168343581496309

π root of $999 x^4 + 5428 x^3 - 1529 x^2 + 216 x - 501$ near $x = 0.510268$ ≈ 1.6030553274168343581339429

$$\frac{105624 \pi^2 - 186443}{169976 \pi} \approx 1.60305532741683435806150$$

$$\frac{177 + 432 \sqrt{\pi} + 371 \pi - 62 \pi^{3/2} - 48 \pi^2}{256 \pi} \approx 1.6030553274168343581447730$$

root of $17301 x^3 + 17333 x^2 - 63216 x - 14475$ near $x = 1.60306$ ≈ 1.6030553274168343581430734

root of $255 x^5 + 201 x^4 - 966 x^3 - 379 x^2 + 306 x + 436$ near $x = 1.60306$ ≈ 1.6030553274168343581326191

$$\frac{1}{\text{root of } 14475 x^3 + 63216 x^2 - 17333 x - 17301 \text{ near } x = 0.623809} \approx$$
1.6030553274168343581430734

π root of $883 x^5 + 541 x^4 - 1065 x^3 - 508 x^2 - 434 x + 428$ near $x = 0.510268$ ≈ 1.6030553274168343581338008

$$\frac{e^{\frac{2}{33} + \frac{49}{33 e} - \frac{5 e}{11} + \frac{5}{33 \pi} + \frac{32 \pi}{33}} \pi^{-2/33 - (9 e)/11} \sin^{2/33}(e \pi)}{(-\cos(e \pi))^{46/33}} \approx 1.60305532741683435803097$$

Now, from:

Entry 13(i). *If $m, n > -1$, then*

$$\int_0^{\pi/2} \sin^m x \cos^n x \, dx = \frac{\Gamma\left(\frac{m+1}{2}\right)\Gamma\left(\frac{n+1}{2}\right)}{2\Gamma\left(\frac{m+n}{2}+1\right)}.$$

we have, from the right hand side, for m = -5 n = -7:

-((((((((gamma ((4/2))* (((gamma ((6/2)))))))) /-(((2 gamma (5)))

Input:

$$-\left(-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}\right)$$

Open code

- $\Gamma(x)$ is the gamma function

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Exact result:

$$\frac{1}{24}$$

Decimal approximation:

- More digits

0.041666666666666666666666666666666666666666666666666666666...

Open code

Alternative representations:

- More

$$\frac{-\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)}{-(2\,\Gamma(5))} = \frac{-2\left(\frac{1}{1}\right)^2}{-\frac{576}{12}}$$

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$$\frac{-\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)}{-(2\,\Gamma(5))} = \frac{-1!\times 2!}{-2\times 4!}$$

Open code

$$\frac{-\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)}{-(2\,\Gamma(5))} = \frac{-e^0\, e^{\log(2)}}{-2\, e^{-\log(12)+\log(288)}}$$

Open code

- $n!$ is the factorial function
- $\log(x)$ is the natural logarithm

Series representations:

$$\frac{-\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)}{-(2\,\Gamma(5))} = \frac{\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(2-z_0)^{k_1}(3-z_0)^{k_2}\,\Gamma^{(k_1)}(z_0)\,\Gamma^{(k_2)}(z_0)}{k_1!\,k_2!}}{2\sum_{k=0}^{\infty}\frac{(5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Open code

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$$\frac{-\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)}{-(2\,\Gamma(5))} = \left(\pi\sum_{k=0}^{\infty}(5-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right) \Big/ \left(2\left(\sum_{k=0}^{\infty}(2-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right) \sum_{k=0}^{\infty}(3-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)$$

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

Integral representations:

- More

$$\frac{-\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)}{-(2\,\Gamma(5))} = \frac{1}{2}\, e^{\int_0^1 (1+x-x^3-x^4)/\log(x)\,dx}$$

Open code

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$$\frac{-\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)}{-(2\,\Gamma(5))} = \int_0^1 \int_0^1 \log\left(\frac{1}{t_1}\right)\log^2\left(\frac{1}{t_2}\right) dt_2\, dt_1$$

Open code

$$\frac{-\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)}{-(2\,\Gamma(5))} = \frac{1}{2}\exp\left(\int_0^1 \frac{1-x^2-x^3+x^5+\log(x^2)+\log(x^3)-\log(x^5)}{\log(x)-x\log(x)}\,dx\right)$$

1 / -((((((((gamma ((4/2)))* (((gamma ((6/2)))))) /-(((2 gamma (5)))

Input:

$$-\frac{1}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}}$$

Open code

- $\Gamma(x)$ is the gamma function

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Exact result:

24

Alternative representations:

- More

$$-\frac{1}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}} = -\frac{1}{-\frac{2\left(\frac{1}{1}\right)^2}{\frac{576}{12}}}$$

Open code

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$$-\frac{1}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}} = -\frac{1}{-\frac{1!\times 2!}{2\times 4!}}$$

Open code

$$-\frac{1}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}} = -\frac{1}{-\frac{e^0\, e^{\log(2)}}{2\, e^{-\log(12)+\log(288)}}}$$

Open code

- $n!$ is the factorial function
- $\log(x)$ is the natural logarithm

Integral representations:

More

$$-\frac{1}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}} = 2\, e^{\int_0^1 \left(-1-x+x^3+x^4\right)/\log(x)\,dx}$$

Open code

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$$-\frac{1}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}} = 2\exp\left(\int_0^1 \frac{1-x^2-x^3+x^5+\log\left(x^2\right)+\log\left(x^3\right)-\log\left(x^5\right)}{(-1+x)\log(x)}\,dx\right)$$

Open code

$$-\frac{1}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}} = \frac{2\int_0^1 \log^4\left(\frac{1}{t}\right)dt}{\left(\int_0^1 \log\left(\frac{1}{t}\right)dt\right)\int_0^1 \log^2\left(\frac{1}{t}\right)dt}$$

This value 24 is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

0.5 / -((((((((gamma ((4/2)))* (((gamma ((6/2))))))) /-(((2 gamma (5)))

Input:

$$-\frac{0.5}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}}$$

Open code

- $\Gamma(x)$ is the gamma function

Units »

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Result:

12

Alternative representations:

- More

$$-\frac{0.5}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}} = -\frac{0.5}{-\frac{2\left(\frac{1}{1}\right)^2}{\frac{576}{12}}}$$

Open code

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$$-\frac{0.5}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}} = -\frac{0.5}{-\frac{1!\times 2!}{2\times 4!}}$$

Open code

$$-\frac{0.5}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}} = -\frac{0.5}{-\frac{e^0\, e^{\log(2)}}{2\, e^{-\log(12)+\log(288)}}}$$

Open code

Series representations:

$$-\frac{0.5}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}} = \frac{\sum_{k=0}^{\infty}\frac{(5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}{\left(\sum_{k=0}^{\infty}\frac{(2-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(3-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Open code

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$$-\frac{0.5}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}} = \left(\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}(2-z_0)^{k_1}(3-z_0)^{k_2}\sum_{j_1=0}^{k_1}\sum_{j_2=0}^{k_2}\left((-1)^{j_1+j_2}\pi^{-j_1-j_2+k_1+k_2}\sin\left(\frac{1}{2}\pi(-j_1+k_1+2z_0)\right)\sin\left(\frac{1}{2}\pi(-j_2+k_2+2z_0)\right)\Gamma^{(j_1)}(1-z_0)\,\Gamma^{(j_2)}(1-z_0)\right)\Big/(j_1!\,j_2!\,(-j_1+k_1)!\,(-j_2+k_2)!)\right)\Big/\left(\pi\sum_{k=0}^{\infty}(5-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)$$

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

Integral representations:

- More

$$-\frac{0.5}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}} = e^{\int_0^1 (-1-x+x^3+x^4)/\log(x)\,dx}$$

Open code

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$$-\frac{0.5}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}} = \exp\left(\int_0^1 \frac{1-x^2-x^3+x^5+\log(x^2)+\log(x^3)-\log(x^5)}{(-1+x)\log(x)}\,dx\right)$$

Open code

$$-\frac{0.5}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}} = \frac{\int_0^1 \log^4\left(\frac{1}{t}\right)dt}{\left(\int_0^1 \log\left(\frac{1}{t}\right)dt\right)\int_0^1 \log^2\left(\frac{1}{t}\right)dt}$$

This result 12 is very near to the value of black hole entropy 12.1904

((((((((0.5 / -((((((((gamma ((4/2)))* (((gamma ((6/2))))))) /-(((2 gamma (5))))))))))))^3

Input:

$$\left(-\frac{0.5}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}}\right)^3$$

Open code

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- $\Gamma(x)$ is the gamma function

Result:

1728

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

1/3 * ((((((((0.5 / -((((((((gamma ((4/2)))* (((gamma ((6/2))))))) /-(((2 gamma (5))))))))))))

Input:

$$\frac{1}{3}\left(-\frac{0.5}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}}\right)$$

Open code

- $\Gamma(x)$ is the gamma function
- Units »

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Result:

4

Alternative representations:

- More

$$-\frac{0.5}{-\frac{\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)3}{2\,\Gamma(5)}} = -\frac{0.166667}{-\frac{\frac{2\left(\frac{1}{1}\right)^2}{576}}{12}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$-\frac{0.5}{-\frac{\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)3}{2\,\Gamma(5)}} = -\frac{0.166667}{-\frac{1!\times 2!}{2\times 4!}}$$

Open code

$$-\frac{0.5}{-\frac{\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)3}{2\,\Gamma(5)}} = -\frac{0.166667}{-\frac{e^{0}\,e^{\log(2)}}{2\,e^{-\log(12)+\log(288)}}}$$

Series representations:

$$-\frac{0.5}{-\frac{\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)3}{2\,\Gamma(5)}} = \frac{0.333333\sum_{k=0}^{\infty}\frac{(5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}{\left(\sum_{k=0}^{\infty}\frac{(2-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(3-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Open code

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$$-\frac{0.5}{-\frac{\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)^3}{2\,\Gamma(5)}} = \left(0.333333 \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}(2-z_0)^{k_1}(3-z_0)^{k_2}\sum_{j_1=0}^{k_1}\sum_{j_2=0}^{k_2}\left((-1)^{j_1+j_2}\pi^{-j_1-j_2+k_1+k_2}\sin\left(\frac{1}{2}\pi(-j_1+k_1+2z_0)\right)\sin\left(\frac{1}{2}\pi(-j_2+k_2+2z_0)\right)\Gamma^{(j_1)}(1-z_0)\,\Gamma^{(j_2)}(1-z_0)\right)\Big/(j_1!\,j_2!\,(-j_1+k_1)!\,(-j_2+k_2)!)\right)\Big/$$

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

- $\mathbb{Z}$ is the set of integers
  - Units »
  - More information

Integral representations:

- More

$$-\frac{0.5}{-\frac{\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)^3}{2\,\Gamma(5)}} = 0.333333\, e^{\int_0^1 (-1-x+x^3+x^4)/\log(x)\,dx}$$

$$-\frac{0.5}{-\frac{\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)^3}{2\,\Gamma(5)}} = 0.333333 \exp\left(\int_0^1 \frac{1-x^2-x^3+x^5+\log(x^2)+\log(x^3)-\log(x^5)}{(-1+x)\log(x)}\,dx\right)$$

$$-\frac{0.5}{-\frac{\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)^3}{2\,\Gamma(5)}} = \frac{0.333333\int_0^1\log^4\left(\frac{1}{t}\right)dt}{\left(\int_0^1\log\left(\frac{1}{t}\right)dt\right)\int_0^1\log^2\left(\frac{1}{t}\right)dt}$$

The result 4 is in the range of the mass of DM particle that is between 4 – 4.2 eV

5/((11.8458+12.1904)/2)) * ((((((((0.5 / -(((((((gamma ((4/2)))* (((gamma ((6/2))))))) /-(((2 gamma (5)))))))))))))

Where 11,8458 and 12,1904 are the values of black hole entropies

Input interpretation:

$$\frac{5}{\frac{11.8458+12.1904}{2}}\left(-\frac{0.5}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}}\right)$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

4.992469691548580890490177315881878167097960576131002404706...

Open code

Alternative representations:

- More

$$-\frac{0.5\times 5}{-\frac{\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)(11.8458+12.1904)}{(2\,\Gamma(5))\,2}} = \frac{2.5}{-\frac{12.0181\left(-2\left(\frac{1}{1}\right)^2\right)}{\frac{576}{12}}}$$

Open code

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$$-\frac{0.5\times 5}{-\frac{\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)(11.8458+12.1904)}{(2\,\Gamma(5))\,2}} = \frac{2.5}{-\frac{12.0181(-1!\times 2!)}{2\times 4!}}$$

Open code

$$-\frac{0.5\times 5}{-\frac{\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)(11.8458+12.1904)}{(2\,\Gamma(5))\,2}} = \frac{2.5}{-\frac{12.0181\left(-e^0\, e^{\log(2)}\right)}{2\, e^{-\log(12)+\log(288)}}}$$

Series representations:

$$-\frac{0.5\times 5}{-\frac{\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)(11.8458+12.1904)}{(2\,\Gamma(5))\,2}} = \frac{0.416039\sum_{k=0}^{\infty}\frac{(5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}{\left(\sum_{k=0}^{\infty}\frac{(2-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(3-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}$$

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

Open code

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$$-\frac{0.5\times 5}{-\frac{\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)(11.8458+12.1904)}{(2\,\Gamma(5))\,2}} =$$

$$\left(0.416039 \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}(2-z_0)^{k_1}(3-z_0)^{k_2}\sum_{j_1=0}^{k_1}\sum_{j_2=0}^{k_2}\left((-1)^{j_1+j_2}\pi^{-j_1-j_2+k_1+k_2}\sin\left(\frac{1}{2}\pi(-j_1+k_1+2z_0)\right)\sin\left(\frac{1}{2}\pi(-j_2+k_2+2z_0)\right)\Gamma^{(j_1)}(1-z_0)\Gamma^{(j_2)}(1-z_0)\right)\Big/(j_1!\,j_2!\,(-j_1+k_1)!\,(-j_2+k_2)!)\right)\Big/$$

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

Integral representations:

- More

$$-\frac{0.5\times 5}{-\frac{\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)(11.8458+12.1904)}{(2\,\Gamma(5))\,2}} = 0.416039\, e^{\int_0^1 (-1-x+x^3+x^4)/\log(x)\,dx}$$

Open code

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$$-\frac{0.5\times 5}{-\frac{\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)(11.8458+12.1904)}{(2\,\Gamma(5))\,2}} =$$

$$0.416039\exp\left(\int_0^1 \frac{1-x^2-x^3+x^5+\log(x^2)+\log(x^3)-\log(x^5)}{(-1+x)\log(x)}\,dx\right)$$

Open code

$$-\frac{0.5\times 5}{-\frac{\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)(11.8458+12.1904)}{(2\,\Gamma(5))\,2}} = \frac{0.416039\int_0^1 \log^4\left(\frac{1}{t}\right)dt}{\left(\int_0^1 \log\left(\frac{1}{t}\right)dt\right)\int_0^1 \log^2\left(\frac{1}{t}\right)dt}$$

This result 4,99246 is very near to the first value of upper bound dark photon energy range ($1.8 * 10^{15} – 4.95 * 10^{16} – 5.4 * 10^{16}$) (Physics Letters B 731 (2014) 265–271 - **Searching a dark photon with HADES**)

2*1.5236 * 1/3 * (((((((((0.5 / -((((((((gamma ((4/2)))* (((gamma ((6/2)))))) /-(((2 gamma (5))))))))))))

Where 1.5236 the following Hausdorff dimension:

$$\log_2\left(\frac{1+\sqrt[3]{73-6\sqrt{87}}+\sqrt[3]{73+6\sqrt{87}}}{3}\right)$$

Input interpretation:

$$2\times 1.5236\times\frac{1}{3}\left(-\frac{0.5}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}}\right)$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

12.1888

Alternative representations:

- More

$$\frac{(2\times 1.5236)\,0.5}{-\frac{3\left(-\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)\right)}{2\,\Gamma(5)}}=-\frac{0.507867}{-\frac{2\left(\frac{1}{1}\right)^2}{\frac{576}{12}}}$$

Open code

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$$\frac{(2\times 1.5236)\,0.5}{-\frac{3\left(-\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)\right)}{2\,\Gamma(5)}}=-\frac{0.507867}{-\frac{1!\times 2!}{2\times 4!}}$$

Open code

$$\frac{(2\times 1.5236)\,0.5}{-\frac{3\left(-\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)\right)}{2\,\Gamma(5)}}=-\frac{0.507867}{-\frac{e^0\,e^{\log(2)}}{2\,e^{-\log(12)+\log(288)}}}$$

Open code

Series representations:

$$\frac{(2\times 1.5236)\,0.5}{-\frac{3\left(-\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)\right)}{2\,\Gamma(5)}}=\frac{1.01573\sum_{k=0}^{\infty}\frac{(5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}{\left(\sum_{k=0}^{\infty}\frac{(2-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(3-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}\quad\text{for }(z_0\notin\mathbb{Z}\text{ or }z_0>0)$$

Open code

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$$\frac{(2\times 1.5236)\,0.5}{-\frac{3\left(-\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)\right)}{2\,\Gamma(5)}} = \left(1.01573\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}(2-z_0)^{k_1}(3-z_0)^{k_2}\sum_{j_1=0}^{k_1}\sum_{j_2=0}^{k_2}\left((-1)^{j_1+j_2}\pi^{-j_1-j_2+k_1+k_2}\sin\left(\frac{1}{2}\pi(-j_1+k_1+2z_0)\right)\sin\left(\frac{1}{2}\pi(-j_2+k_2+2z_0)\right)\Gamma^{(j_1)}(1-z_0)\,\Gamma^{(j_2)}(1-z_0)\right)\Big/\left(j_1!\,j_2!\,(-j_1+k_1)!\,(-j_2+k_2)!\right)\right)\Big/\left(\pi\sum_{k=0}^{\infty}(5-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)$$

Integral representations:

- More

$$\frac{(2\times 1.5236)\,0.5}{-\frac{3\left(-\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)\right)}{2\,\Gamma(5)}} = 1.01573\,e^{\int_0^1\left(-1-x+x^3+x^4\right)/\log(x)\,dx}$$

Open code

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$$\frac{(2\times 1.5236)\,0.5}{-\frac{3\left(-\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)\right)}{2\,\Gamma(5)}} = 1.01573\exp\left(\int_0^1\frac{1-x^2-x^3+x^5+\log(x^2)+\log(x^3)-\log(x^5)}{(-1+x)\log(x)}\,dx\right)$$

Open code

$$\frac{(2\times 1.5236)\,0.5}{-\frac{3\left(-\left(\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)\right)\right)}{2\,\Gamma(5)}} = \frac{1.01573\int_0^1\log^4\left(\frac{1}{t}\right)dt}{\left(\int_0^1\log\left(\frac{1}{t}\right)dt\right)\int_0^1\log^2\left(\frac{1}{t}\right)dt}$$

This result 12,1888 is very near to the value of black hole entropy 12,1904

[(((0.5 /   -(((((((((gamma ((4/2)))* (((gamma ((6/2))))))) /-(((2 gamma (5))))))))))))^3))))]^1/15

Input:

$$\sqrt[15]{\left(-\frac{0.5}{-\frac{\Gamma\left(\frac{4}{2}\right)\Gamma\left(\frac{6}{2}\right)}{2\,\Gamma(5)}}\right)^3}$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- Fewer digits
- More digits

1.643751829517225762308497936230979517383492589945475200411...

1.6437518295172257623084979362309795173834925899454752

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{20+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

Possible closed forms:

- More

$2^{2/5}\sqrt[5]{3} \approx 1.643751829517225762308497936230979517383492589945475200411$

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$$4\sqrt{\frac{3139915}{18593681}} \approx 1.64375182951722583645$$

$$\frac{e^{\frac{3}{4}+\frac{29}{2e}-4e+\frac{9}{4\pi}-\frac{13\pi}{4}}\,\pi^{8e-7}\cos^6(e\pi)}{\sin^{5/2}(e\pi)} \approx 1.64375182951722576653822$$

Now, we have:

Entry 14. *If x is any complex number, then*

$$\prod_{n=1}^{\infty}\left(1+\frac{x^6}{n^6}\right)=\frac{\sinh(2\pi x)-2\sinh(\pi x)\cos(\pi x\sqrt{3})}{4\pi^3 x^3}.$$

From the right hand side, for x = 2+i, we have that:

((((((((sinh((2Pi*(2+i))) - (((2sinh((Pi*(2+i))) * (((cos(Pi*(2+i)*sqrt(3))))))))) / (((4Pi^3 * (2+i)^3)))

Input:

$$\frac{\sinh(2\pi(2+i))-2\sinh(\pi(2+i))\cos\left(\pi(2+i)\sqrt{3}\right)}{4\pi^3(2+i)^3}$$

Open code

- $\sinh(x)$ is the hyperbolic sine function
- i is the imaginary unit

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Exact result:

$$\frac{\left(\frac{1}{250}-\frac{11i}{500}\right)\left(\sinh(4\pi)+2\cos\left((2+i)\sqrt{3}\,\pi\right)\sinh(2\pi)\right)}{\pi^3}$$

Decimal approximation:

- More digits

61.1592628831775945484831841570685763389188526931428820780... − 88.8761450714008586244320926181396980443770278339344422932... i

Open code

61.159262883177594548-88.8761450714008586i

Alternate forms:

- More

$$\frac{\left(\frac{1}{125}-\frac{11i}{250}\right)\sinh(2\pi)\left(\cosh(2\pi)+\cos\left((2+i)\sqrt{3}\,\pi\right)\right)}{\pi^3}$$

Open code

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$$\frac{\left(\frac{1}{250}-\frac{11i}{500}\right)\sinh(4\pi)}{\pi^3}+\frac{\left(\frac{1}{125}-\frac{11i}{250}\right)\cos\left((2+i)\sqrt{3}\,\pi\right)\sinh(2\pi)}{\pi^3}$$

Open code

$$\frac{\left(\frac{1}{500}-\frac{11i}{1000}\right)\left(-e^{-4\pi}+e^{4\pi}+4\cos\left((2+i)\sqrt{3}\,\pi\right)\sinh(2\pi)\right)}{\pi^3}$$

Continued fraction:

- Linear form

$$(61-89i)+\cfrac{1}{(4-3i)+\cfrac{1}{(-9+5i)+\cfrac{1}{(-1+2i)+\cfrac{1}{(1+2i)+\cfrac{1}{(1-i)+\cfrac{1}{(1+2i)+\cfrac{1}{(4+4i)+\cfrac{1}{\dots}}}}}}}}$$

(using the Hurwitz expansion)

Alternative representations:

- More

$$\frac{\sinh(2\pi(2+i)) - 2\left(\sinh(\pi(2+i))\cos\left(\pi(2+i)\sqrt{3}\right)\right)}{4\pi^3(2+i)^3} = \frac{-\cosh\left(i(2+i)\pi\sqrt{3}\right)\left(-e^{-(2+i)\pi}+e^{(2+i)\pi}\right)+\frac{1}{2}\left(-e^{-2(2+i)\pi}+e^{2(2+i)\pi}\right)}{4(2+i)^3\pi^3}$$

Open code

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$$\frac{\sinh(2\pi(2+i)) - 2\left(\sinh(\pi(2+i))\cos\left(\pi(2+i)\sqrt{3}\right)\right)}{4\pi^3(2+i)^3} = \frac{-\cosh\left(-i(2+i)\pi\sqrt{3}\right)\left(-e^{-(2+i)\pi}+e^{(2+i)\pi}\right)+\frac{1}{2}\left(-e^{-2(2+i)\pi}+e^{2(2+i)\pi}\right)}{4(2+i)^3\pi^3}$$

Open code

$$\frac{\sinh(2\pi(2+i)) - 2\left(\sinh(\pi(2+i))\cos\left(\pi(2+i)\sqrt{3}\right)\right)}{4\pi^3(2+i)^3} = \frac{-2i\cosh\left(-i(2+i)\pi\sqrt{3}\right)\cos\left(\frac{\pi}{2}+i(2+i)\pi\right)+i\cos\left(\frac{\pi}{2}+2i(2+i)\pi\right)}{4(2+i)^3\pi^3}$$

Series representations:

- More

$$\frac{\sinh(2\pi(2+i)) - 2\left(\sinh(\pi(2+i))\cos\left(\pi(2+i)\sqrt{3}\right)\right)}{4\pi^3(2+i)^3} = \frac{\left(\frac{1}{250}-\frac{11i}{500}\right)\left(\sum_{k=0}^{\infty}\frac{(4\pi)^{1+2k}}{(1+2k)!}+2\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-3)^{k_1}2^{1+2k_2}(2+i)^{2k_1}\pi^{1+2k_1+2k_2}}{(2k_1)!(1+2k_2)!}\right)}{\pi^3}$$

Open code

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$$\frac{\sinh(2\pi(2+i)) - 2\left(\sinh(\pi(2+i))\cos\left(\pi(2+i)\sqrt{3}\right)\right)}{4\pi^3(2+i)^3} = \frac{\left(\frac{1}{250} - \frac{11 i}{500}\right)\left(\sum_{k=0}^{\infty} \frac{(4\pi)^{1+2k}}{(1+2k)!} - 2\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty} \frac{(-1)^{k_2}(2\pi)^{1+2k_1}\left(-\frac{\pi}{2}+(2+i)\sqrt{3}\,\pi\right)^{1+2k_2}}{(1+2k_1)!(1+2k_2)!}\right)}{\pi^3}$$

Open code

$$\frac{\sinh(2\pi(2+i)) - 2\left(\sinh(\pi(2+i))\cos\left(\pi(2+i)\sqrt{3}\right)\right)}{4\pi^3(2+i)^3} = \sum_{k=0}^{\infty} \frac{\left(\frac{2}{125} - \frac{11 i}{125}\right) 4^k \pi^{-2+2k}\left(4^k + \sqrt{\pi}\sum_{j=0}^{\infty} \operatorname{Res}_{s=-j} \frac{\left(\frac{9}{4}+3i\right)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\right)}{(1+2k)!}$$

Integral representations:

- More

$$\frac{\sinh(2\pi(2+i)) - 2\left(\sinh(\pi(2+i))\cos\left(\pi(2+i)\sqrt{3}\right)\right)}{4\pi^3(2+i)^3} = \frac{\left(\frac{2}{125} - \frac{11 i}{125}\right)\left(\int_0^1 \cosh(4\pi t)\,dt + \int_0^1\int_0^1 \cos\left(\frac{1}{2}\left(-1+(4+2i)\sqrt{3}\right)\pi t_2\right)\cosh(2\pi t_1)\,dt_2\,dt_1\right)}{\pi^2}$$

Open code

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$$\frac{\sinh(2\pi(2+i)) - 2\left(\sinh(\pi(2+i))\cos\left(\pi(2+i)\sqrt{3}\right)\right)}{4\pi^3(2+i)^3} = -\frac{1}{\pi^2}\left(\frac{2}{125} - \frac{11 i}{125}\right)\left(-\int_0^1 (\cosh(2\pi t) + \cosh(4\pi t))\,dt + \int_0^1\int_0^1 \cosh(2\pi t_1)\sin\left((2+i)\sqrt{3}\,\pi t_2\right)dt_2\,dt_1\right)$$

Open code

$$\frac{\sinh(2\pi(2+i)) - 2\left(\sinh(\pi(2+i))\cos\left(\pi(2+i)\sqrt{3}\right)\right)}{4\pi^3(2+i)^3} = \int_{-i\infty+\gamma}^{i\infty+\gamma} -\frac{\left(\frac{11}{500} + \frac{i}{250}\right)e^{\pi^2/s+s}\left(e^{(3\pi^2)/s} - \int_{\frac{\pi}{2}}^{(2+i)\sqrt{3}\,\pi} \sin(t)\,dt\right)}{\pi^{5/2}\,s^{3/2}}\,ds \quad \text{for } \gamma > 0$$

61.159262883177594548 - 88.8761450714008586i

Input interpretation:

$61.159262883177594548 + i \times (-88.8761450714008586)$

Open code

- i is the imaginary unit

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Result:

- More digits

61.1592628831775945... −
88.8761450714008586... i

Polar coordinates:

$r = 107.8861650035180169$ (radius), $\theta = -55.4665701628988893°$ (angle)

107.8861650035180169

Continued fraction:

- Linear form

$$107+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{31+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}$$

Open code

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Possible closed forms:

- More

π root of $90x^3 - 3010x^2 - 3174x + 13815$ near $x = 34.3412$ ≈
107.88616500351801633992

root of $3x^5 - 323x^4 - 72x^3 + 111x^2 - 838x + 795$ near $x = 107.886$ ≈
107.8861650035180159314

$$\frac{\sqrt[4]{12197223607493507}}{\pi^4} \approx 107.8861650035180173077$$

16 * 107.8861650035180169

Input interpretation:

$16 \times 107.8861650035180169$

Open code

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Result:

1726.1786400562882704

1726.1786400562882704

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

Continued fraction:

- Linear form

$$1726+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{18+\cfrac{1}{5+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{12+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Possible closed forms:

- More

$$\frac{515\,e!}{2}+\frac{6360}{13}+\frac{5130}{13\,e}-\frac{103\,e}{52}\approx 1726.17864005628827040120\,5$$

$$\frac{656}{3}-\frac{775}{\pi}-\frac{580}{3\sqrt{\pi}}-\frac{1265\sqrt{\pi}}{3}+831\,\pi\approx 1726.17864005628827039999$$

$$\frac{4837566\,\pi^2-22153961}{4719\,\pi}\approx 1726.17864005628827039738$$

(16 * 107.8861650035180169)^1/3

Input interpretation:

$$\sqrt[3]{16\times 107.8861650035180169}$$

Open code

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Result:

- More digits

11.99578240685185307...

11.99578240685185307

This result 11,9957 is very near to the values of black hole entropies 11,8458 and 12,1904

2 * (16 * 107.8861650035180169)^1/3

Input interpretation:

$$2\sqrt[3]{16\times 107.8861650035180169}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

23.99156481370370614...

23.99156481370370614

Continued fraction:

- Linear form

$$23+\cfrac{1}{1+\cfrac{1}{117+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{60+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}$$

Open code

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Possible closed forms:

- More

$$\frac{-1003+17802\pi+155\pi^2}{749\pi}\approx 23.99156481370370615274 9$$

$$\frac{3665735111\pi}{480012312}\approx 23.99156481370370613631 8$$

$$\sqrt{\frac{1}{13}(1820+7715e-4309\pi-2556\log(2))}\approx 23.99156481370370612821 7$$

This value is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

(16 * 107.8861650035180169)^1/15

Input interpretation:

$$\sqrt[15]{16 \times 107.8861650035180169}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.6436362686622374540...

1.6436362686622374540

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{6+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{138+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{37+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}}$$

Possible closed forms:

π root of $304 x^4 + 7672 x^3 + 3630 x^2 - 780 x - 1707$ near $x = 0.523186$ $\approx$ 1.64363626866223745399917

$$\frac{4678830275\,\pi}{8942963294} \approx 1.6436362686622374540008419$$

$$\frac{5}{4}\pi\cosh^{-1}\left(\frac{8843188}{7268317}\right)^2 \approx 1.64363626866223745 23284$$

$$\frac{850+1090\pi-167\pi^2}{4(-43+78\pi+20\pi^2)} \approx 1.64363626866223745 495473$$

$$\log\left(\frac{1}{8}\left(-205-22\sqrt{2}+70e+97e^2+274\pi-151\pi^2\right)\right) \approx 1.64363626866223745 31787$$

$$\text{root of } 149x^5-844x^4+1010x^3-650x^2+203x+1310 \text{ near } x=1.64364 \approx 1.64363626866223745 40 36541$$

$$\pi \text{ root of } 874x^5+249x^4-717x^3+1647x^2+170x-490 \text{ near } x=0.523186 \approx 1.64363626866223745 39991$$

$$\frac{1}{30}\left(-22-41e+19e^2-67\sqrt{1+e}+17\pi+4\pi^2+50\sqrt{1+\pi}-7\sqrt{1+\pi^2}\right) \approx 1.64363626866223745 39837$$

Now, we have:

1.4. Ramanujan next briefly indicates some of the kinds of functions to which his Master Theorem is applicable.

1.5. Examples. (i) This first example is mentioned by Hardy in his book [20, p. 188]. Let m, $n > 0$ with $m < n$. Letting $x = y^{1/n}$, we find that

$$\int_0^\infty \frac{x^{m-1}}{1+x^n}\,dx = \frac{1}{n}\int_0^\infty \frac{y^{m/n-1}}{1+y}\,dy.$$

Expanding $1/(1+y)$ into a geometric series, we see that, in the notation of the Master Theorem, $\varphi(s) = \Gamma(s+1)$. Hardy's hypotheses are easily seen to be satisfied, and so (1.1) gives

$$\int_0^\infty \frac{x^{m-1}}{1+x^n}\,dx = \frac{1}{n}\Gamma\left(\frac{m}{n}\right)\varphi\left(-\frac{m}{n}\right)$$
$$= \frac{1}{n}\Gamma\left(\frac{m}{n}\right)\Gamma\left(1-\frac{m}{n}\right) = \frac{\pi}{n\sin(\pi m/n)},$$

which is a familiar result.

$$\int_0^\infty \frac{x^{m-1}}{1+x^n}\,dx = \frac{\pi}{n\sin(\pi m/n)}$$

From the right hand side, we have that for m = 1 and n = 2:

(((Pi/((2sin(Pi/2)))

Input:

$$\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}$$

Open code

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Exact result:

$$\frac{\pi}{2}$$

Decimal approximation:

- More digits

1.5707963267948966192313216916397514420985846996875529104870...

Property:

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

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{31+\cfrac{1}{1+\cfrac{1}{145+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

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Alternative representations:

- More

$$\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}=\frac{\pi}{2\cos(0)}$$

Open code

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$$\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}=\frac{\pi}{2\cosh(0)}$$

Open code

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

Series representations:

- More

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

Open code

$$\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)} = \sum_{k=0}^{\infty} -\frac{2(-1)^k\, 1195^{-1-2k}\left(5^{1+2k} - 4\times 239^{1+2k}\right)}{1+2k}$$

Open code

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

Open code

- More information

Integral representations:

- More

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

Open code

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

Open code

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

Half-argument formulas:

$$\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)} = \frac{\pi}{2\sqrt{\frac{1}{2}(1-\cos(\pi))}}$$

Open code

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$$\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)} = \frac{(-1)^{-\lfloor \mathrm{Re}(\pi)/(2\pi)\rfloor}\,\pi}{2\sqrt{\frac{1}{2}(1-\cos(\pi))}\left(1-\left(1+(-1)^{\lfloor -\mathrm{Re}(\pi)/(2\pi)\rfloor+\lfloor \mathrm{Re}(\pi)/(2\pi)\rfloor}\right)\theta(-\mathrm{Im}(\pi))\right)}$$

Open code

- $\mathrm{Re}(z)$ is the real part of z
- $\lfloor x\rfloor$ is the floor function
- $\mathrm{Im}(z)$ is the imaginary part of z
- $\theta(x)$ is the Heaviside step function

Multiple-argument formulas:

More

$$\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)} = \frac{\pi}{4\cos\left(\frac{\pi}{4}\right)\sin\left(\frac{\pi}{4}\right)}$$

Open code

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$$\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)} = \frac{\pi}{6\sin\left(\frac{\pi}{6}\right)-8\sin^3\left(\frac{\pi}{6}\right)}$$

Open code

$$\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)} = \frac{\pi}{2\,U_{-\frac{1}{2}}(\cos(\pi))\sin(\pi)}$$

Open code

- $U_n(x)$ is the Chebyshev polynomial of the second kind

And:

1/ (((Pi/((2sin(Pi/2)))

Input:

$$\frac{1}{\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}}$$

Open code

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Exact result:

$\frac{2}{\pi}$

Decimal approximation:

- More digits

0.6366197723675813430755350534900574481378385829618257949906...

Open code

Property:

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

Series representations:

- More

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

Open code

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$$\frac{1}{\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}} = \frac{1}{\sum_{k=0}^{\infty} -\frac{2(-1)^k\, 1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}}$$

Open code

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

Open code

- More information

Integral representations:

- More

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

Open code

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

Open code

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

Now, we have:

10 * ((((((1/ (((Pi/((2sin(Pi/2)))))^4

Input:

$$10\times\frac{1}{\left(\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}\right)^4}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\frac{160}{\pi^4}$$

Decimal approximation:

- More digits

1.642557160749493630264445322738991062692448296582122034906...

Open code

1,64255716…..

Property:

$\frac{160}{\pi^4}$ is a transcendental number

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{16+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{102+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{9+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{10}{\left(\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}\right)^4}=\frac{5}{8\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^4}$$

Open code

$$\frac{10}{\left(\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}\right)^4} = \frac{5}{8\left(\sum_{k=0}^{\infty}\frac{(-1)^k\, 1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^4}$$

Open code

$$\frac{10}{\left(\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}\right)^4} = \frac{160}{\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^4}$$

Open code

- [More information]

Integral representations:

- More

$$\frac{10}{\left(\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}\right)^4} = \frac{10}{\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^4}$$

Open code

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$$\frac{10}{\left(\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}\right)^4} = \frac{10}{\left(\int_0^{1}\frac{1}{\sqrt{1-t^2}}\,dt\right)^4}$$

Open code

$$\frac{10}{\left(\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}\right)^4} = \frac{5}{8\left(\int_0^{1}\sqrt{1-t^2}\,dt\right)^4}$$

Half-argument formulas:

$$\frac{10}{\left(\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}\right)^4} = \frac{160\sqrt{\frac{1}{2}(1-\cos(\pi))}^{\,4}}{\pi^4}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{10}{\left(\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}\right)^4} = \frac{160\,(-1)^{4\lfloor \operatorname{Re}(\pi)/(2\pi)\rfloor}\sqrt{\frac{1}{2}(1-\cos(\pi))}^{\,4}\left(-1+\left(1+(-1)^{\lfloor -\operatorname{Re}(\pi)/(2\pi)\rfloor+\lfloor \operatorname{Re}(\pi)/(2\pi)\rfloor}\right)\theta(-\operatorname{Im}(\pi))\right)^4}{\pi^4}$$

Open code

- $\operatorname{Re}(z)$ is the real part of z
- $\lfloor x\rfloor$ is the floor function
- $\operatorname{Im}(z)$ is the imaginary part of z
- $\theta(x)$ is the Heaviside step function

Multiple-argument formulas:

- More

$$\frac{10}{\left(\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}\right)^4} = \frac{2560\cos^4\left(\frac{\pi}{4}\right)\sin^4\left(\frac{\pi}{4}\right)}{\pi^4}$$

Open code

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$$\frac{10}{\left(\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}\right)^4} = \frac{160\left(-3\sin\left(\frac{\pi}{6}\right)+4\sin^3\left(\frac{\pi}{6}\right)\right)^4}{\pi^4}$$

Open code

$$\frac{10}{\left(\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}\right)^4} = \frac{160\,U_{-\frac{1}{2}}(\cos(\pi))^4\sin^4(\pi)}{\pi^4}$$

Open code

- $U_n(x)$ is the Chebyshev polynomial of the second kind

1.642557160749493630264445322738991062692448296582122034906

Possible closed forms:

- Less

$$\frac{160}{\pi^4} \approx$$

1.64255716074949363026444532273899106269244829658212203490688567

$$\frac{40}{9\zeta(2)^2} \approx$$
$$1.642557160749493630264445322738991062692448296582122034906 88567$$

$$-\sinh\left(\cot\left(\frac{62\,560\,805}{25\,276\,196}\right)\right) \approx 1.6425571607494936301 1343$$

$$\frac{11}{3}\pi\tanh^{-1}\left(\frac{1\,136\,761}{3\,152\,112}\right)^2 \approx 1.64255716074949363 50443$$

$$\frac{5\,021\,637\,401\,\pi}{9\,604\,499\,341} \approx 1.642557160749493630 281349$$

$$\frac{e^{-\frac{10}{3}-\frac{4}{3e}+\frac{2e}{3}+\frac{7}{6\pi}+\frac{61\pi}{6}}\pi^{-(29e)/3}\sin(e\pi)}{(-\cos(e\pi))^{7/6}} \approx 1.6425571607494936 27966$$

$$\text{root of } 30x^5+669x^4+62x^3-1755x^2-391x-126 \text{ near } x = 1.64256 \approx$$
$$1.6425571607494936302 657300$$

$$\frac{-152\,e\,e!-6976-2235\,e+2775\,e^2}{1275\,e} \approx 1.64255716074949363 031843$$

$$\frac{-439-263\,e+293\,e^2}{3\,(-146-197\,e+120\,e^2)} \approx 1.6425571607494936 29722$$

$$\text{root of } 12\,104\,x^3-69\,482\,x^2+68\,459\,x+21\,374 \text{ near } x = 1.64256 \approx$$
$$1.642557160749493630281380$$

$$\pi \; \text{root of } 49\,696\,x^3-26\,668\,x^2+97\,745\,x-50\,918 \text{ near } x = 0.522842 \approx$$
$$1.6425571607494936302 690327$$

$$\pi \; \text{root of } 1527\,x^4+2952\,x^3+6145\,x^2+2896\,x-3730 \text{ near } x = 0.522842 \approx$$
$$1.642557160749493630273574$$

$$\pi \; \text{root of } 776\,x^5+1209\,x^4-26\,x^3-1576\,x^2+870\,x-141 \text{ near } x = 0.522842 \approx$$
$$1.642557160749493630238220$$

$$\frac{1}{\text{root of } 21\,374\,x^3+68\,459\,x^2-69\,482\,x+12\,104 \text{ near } x = 0.608807} \approx$$
$$1.642557160749493630281380$$

$$\text{root of } 445\,x^4-3558\,x^3+3527\,x^2-6081\,x+13\,001 \text{ near } x = 1.64256 \approx$$
$$1.642557160749493630254782$$

We have also that:

(((Pi/((2sin(Pi/2)))))*11 * 10^2

Input:

$$\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)} \times 11 \times 10^2$$

Open code

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$550\,\pi$$

Decimal approximation:

- More digits

1727.875959474386281154453860803726586308443169656308201536...

Open code

Property:

$550\,\pi$ is a transcendental number

Continued fraction:

- Linear form

$$1727+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{16+\cfrac{1}{6+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{37+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}$$

Open code

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Alternative representations:

- More

$$\frac{(11 \times 10^2)\,\pi}{2\sin\left(\frac{\pi}{2}\right)} = \frac{11\,\pi\,10^2}{2\cos(0)}$$

Open code

$$\frac{(11 \times 10^2)\,\pi}{2\sin\left(\frac{\pi}{2}\right)} = \frac{11\,\pi\,10^2}{2\cosh(0)}$$

Open code

$$\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)} = -\frac{11\pi 10^2}{2\cos(\pi)}$$

Series representations:

- More

$$\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)} = 2200\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

Open code

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$$\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)} = \sum_{k=0}^{\infty}\frac{440(-1)^k\left(956\times 5^{-2k}-5\times 239^{-2k}\right)}{239(1+2k)}$$

Open code

$$\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)} = 550\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)$$

Open code

- More information

Integral representations:

- More

$$\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)} = 2200\int_0^1\sqrt{1-t^2}\,dt$$

Open code

$$\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)} = 1100\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt$$

Open code

$$\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)} = 1100\int_0^{\infty}\frac{1}{1+t^2}\,dt$$

1727.875959474386281154453860803726586308443169656308201536

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

((((((((((Pi/((2sin(Pi/2)))))*11 * 10^2)))))))^1/3

Input:

$$\sqrt[3]{\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}\times 11\times 10^2}$$

Open code

Exact result:

$$5^{2/3}\sqrt[3]{22\,\pi}$$

Decimal approximation:

- More digits

11.99971286228305437353177326084250037048206187553150520381...

Open code

Enlarge Data Customize A Plaintext Interactive

Property:

$5^{2/3}\sqrt[3]{22\,\pi}$ is a transcendental number

Series representations:

- More

$$\sqrt[3]{\frac{(11\times 10^2)\,\pi}{2\sin\left(\frac{\pi}{2}\right)}} = 2\times 5^{2/3}\sqrt[3]{11}\sqrt[3]{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\sqrt[3]{\frac{(11\times 10^2)\,\pi}{2\sin\left(\frac{\pi}{2}\right)}} = 2\times 5^{2/3}\sqrt[3]{\sum_{k=0}^{\infty}-\frac{11\,(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}}$$

Open code

$$\sqrt[3]{\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)}} = 5^{2/3}\sqrt[3]{22}\sqrt[3]{\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)}$$

Open code

- More information

Integral representations:

- More

$$\sqrt[3]{\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)}} = 10^{2/3}\sqrt[3]{11}\sqrt[3]{\int_0^{\infty}\frac{1}{1+t^2}\,dt}$$

Open code

$$\sqrt[3]{\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)}} = 2\times 5^{2/3}\sqrt[3]{11}\sqrt[3]{\int_0^{1}\sqrt{1-t^2}\,dt}$$

Open code

$$\sqrt[3]{\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)}} = 10^{2/3}\sqrt[3]{11}\sqrt[3]{\int_0^{1}\frac{1}{\sqrt{1-t^2}}\,dt}$$

This result 11,99971 is very near to the values of black hole entropies 11,8458 and 12,1904

2*((((((((((Pi/((2sin(Pi/2)))))*11 * 10^2)))))))^1/3

Input:

$$2\sqrt[3]{\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}\times 11\times 10^2}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$2\times 5^{2/3}\sqrt[3]{22\pi}$$

Decimal approximation:

- More digits

23.999425724566108747063546521685000740964123751063010407 62...

Open code

Property:

$2\times 5^{2/3}\sqrt[3]{22\pi}$ is a transcendental number

Continued fraction:

- Linear form

$$23+\cfrac{1}{1+\cfrac{1}{1740+\cfrac{1}{3+\cfrac{1}{12+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{18+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}$$

Open code

Series representations:

- More

$$2\sqrt[3]{\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)}} = 4\times 5^{2/3}\sqrt[3]{11}\sqrt[3]{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}$$

Open code

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$$2\sqrt[3]{\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)}} = 4\times 5^{2/3}\sqrt[3]{\sum_{k=0}^{\infty}-\frac{11(-1)^k\, 1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}}$$

Open code

$$2\sqrt[3]{\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)}} = 2\times 5^{2/3}\sqrt[3]{22}\sqrt[3]{\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)}$$

Open code

- More information

Integral representations:

- More

$$2\sqrt[3]{\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)}} = 4\times 5^{2/3}\sqrt[3]{11}\sqrt[3]{\int_0^1 \sqrt{1-t^2}\,dt}$$

Open code

$$2\sqrt[3]{\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)}} = 2\times 10^{2/3}\sqrt[3]{11}\sqrt[3]{\int_0^\infty \frac{1}{1+t^2}\,dt}$$

Open code

$$2\sqrt[3]{\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)}} = 2\times 10^{2/3}\sqrt[3]{11}\sqrt[3]{\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt}$$

This value 23,99942 is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string

We have:

1/(2*1.2108) *((((((((((Pi/((2sin(Pi/2)))))*11 * 10^2)))))))^1/3

where 1,2108 is the following Hausdorff dimension:

$$2\log_2\left(\frac{\sqrt[3]{27-3\sqrt{78}}+\sqrt[3]{27+3\sqrt{78}}}{3}\right),$$

or root of $2^x - 1 = 2^{(2-x)/2}$

Input interpretation:

$$\frac{1}{2\times 1.2108}\sqrt[3]{\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}\times 11\times 10^2}$$

Open code

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Result:

- Fewer digits

- More digits
  4.955282813958975212063005145706351325768938666803561778911...

Series representations:

- More

$$\frac{\sqrt[3]{\frac{\pi\, 11\times 10^2}{2\sin\left(\frac{\pi}{2}\right)}}}{2\times 1.2108} = 2.6854 \sqrt[3]{\frac{\pi}{\sum_{k=0}^{\infty} (-1)^k J_{1+2k}\left(\frac{\pi}{2}\right)}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{\sqrt[3]{\frac{\pi\, 11\times 10^2}{2\sin\left(\frac{\pi}{2}\right)}}}{2\times 1.2108} = 3.38339 \sqrt[3]{\frac{\pi}{\sum_{k=0}^{\infty} \frac{(-1)^k 2^{-1-2k} \pi^{1+2k}}{(1+2k)!}}}$$

Open code

$$\frac{\sqrt[3]{\frac{\pi\, 11\times 10^2}{2\sin\left(\frac{\pi}{2}\right)}}}{2\times 1.2108} = 3.38339 \sqrt[3]{\frac{1}{\sum_{k=0}^{\infty} \frac{(-1)^k \left(\frac{1}{2}+2k\right)\left(\left(\frac{1}{2}\right)_k\right)^3}{(k!)^3}}}$$

Open code

- $J_n(z)$ is the Bessel function of the first kind
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
-

Integral representations:

$$\frac{\sqrt[3]{\frac{\pi\, 11\times 10^2}{2\sin\left(\frac{\pi}{2}\right)}}}{2\times 1.2108} = 4.2628 \sqrt[3]{\frac{1}{\int_0^1 \cos\left(\frac{\pi t}{2}\right) dt}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{\sqrt[3]{\frac{\pi\, 11\times 10^2}{2\sin\left(\frac{\pi}{2}\right)}}}{2\times 1.2108} = 6.76678 \sqrt[3]{\frac{i\pi}{\sqrt{\pi} \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{e^{-\pi^2/(16 s)+s}}{s^{3/2}}\, ds}} \quad \text{for } \gamma > 0$$

Open code

$$\frac{\sqrt[3]{\frac{\pi\, 11\times 10^2}{2\sin\left(\frac{\pi}{2}\right)}}}{2\times 1.2108} = 4.2628\sqrt[3]{\frac{i\,\pi^2}{\sqrt{\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{4^{-1+2s}\,\pi^{1-2s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}\,ds}} \quad \text{for } 0<\gamma<1$$

Open code

- i is the imaginary unit
- $\Gamma(x)$ is the gamma function
-

This value 4,95528 is very near to the first value of upper bound dark photon energy range (1.8 * 10^{15} – 4.95 * 10^{16} – 5.4 * 10^{16}) (Physics Letters B 731 (2014) 265–271 - **Searching a dark photon with HADES**)

1/3 *((((((((((Pi/((2sin(Pi/2)))))*11 * 10^2)))))))^1/3

Input:

$$\frac{1}{3}\sqrt[3]{\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}\times 11\times 10^2}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$\frac{1}{3}\times 5^{2/3}\sqrt[3]{22\,\pi}$$

Decimal approximation:

- More digits

3.999904287427684791177257753614166790160687291843835067937...

Open code

Property:

$$\frac{1}{3}\times 5^{2/3}\sqrt[3]{22\,\pi} \text{ is a transcendental number}$$

Series representations:

- More

$$\frac{1}{3}\sqrt[3]{\frac{\pi\, 11\times 10^2}{2\sin\left(\frac{\pi}{2}\right)}} = \frac{2}{3}\times 5^{2/3}\sqrt[3]{11}\sqrt[3]{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}$$

Open code

$$\frac{1}{3}\sqrt[3]{\frac{\pi\, 11\times 10^2}{2\sin\left(\frac{\pi}{2}\right)}} = \frac{2}{3}\times 5^{2/3}\sqrt[3]{\sum_{k=0}^{\infty} -\frac{11\,(-1)^k\, 1195^{-1-2k}\left(5^{1+2k} - 4\times 239^{1+2k}\right)}{1+2k}}$$

Open code

$$\frac{1}{3}\sqrt[3]{\frac{\pi\, 11\times 10^2}{2\sin\left(\frac{\pi}{2}\right)}} = \frac{1}{3}\times 5^{2/3}\sqrt[3]{22}\sqrt[3]{\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)}$$

Open code

- More information

Integral representations:

- More

$$\frac{1}{3}\sqrt[3]{\frac{\pi\, 11\times 10^2}{2\sin\left(\frac{\pi}{2}\right)}} = \frac{2}{3}\times 5^{2/3}\sqrt[3]{11}\sqrt[3]{\int_0^1 \sqrt{1-t^2}\, dt}$$

Open code

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$$\frac{1}{3}\sqrt[3]{\frac{\pi\, 11\times 10^2}{2\sin\left(\frac{\pi}{2}\right)}} = \frac{1}{3}\times 10^{2/3}\sqrt[3]{11}\sqrt[3]{\int_0^{\infty}\frac{1}{1+t^2}\, dt}$$

Open code

$$\frac{1}{3}\sqrt[3]{\frac{\pi\, 11\times 10^2}{2\sin\left(\frac{\pi}{2}\right)}} = \frac{1}{3}\times 10^{2/3}\sqrt[3]{11}\sqrt[3]{\int_0^1 \frac{1}{\sqrt{1-t^2}}\, dt}$$

This result 3,999904 ≈ 4 is in the range of the mass of DM particle that is between 4 – 4.2 eV

(((((((((((Pi/((2sin(Pi/2)))))*11 * 10^2)))))))^1/15

Input:

$$\sqrt[15]{\frac{\pi}{2\sin\left(\frac{\pi}{2}\right)}\times 11\times 10^2}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$5^{2/15}\sqrt[15]{22\pi}$$

Decimal approximation:

- More digits

$$1.6437439630561409332266060794498211230841389970983689244 38...$$

Open code

Property:

$5^{2/15}\sqrt[15]{22\pi}$ is a transcendental number

Series representations:

- More

$$\sqrt[15]{\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)}} = \sqrt[5]{2}\,5^{2/15}\sqrt[15]{11}\sqrt[15]{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}$$

Open code

$$\sqrt[15]{\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)}} = 5^{2/15}\sqrt[15]{22}\sqrt[15]{\sum_{k=0}^{\infty}-\frac{4(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}}$$

Open code

$$\sqrt[15]{\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)}} = 5^{2/15}\sqrt[15]{22}\sqrt[15]{\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)}$$

Open code

- More information

Integral representations:

- More

$$\sqrt[15]{\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)}} = 10^{2/15}\sqrt[15]{11}\sqrt[15]{\int_0^{\infty}\frac{1}{1+t^2}\,dt}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\sqrt[15]{\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)}} = 10^{2/15}\sqrt[15]{11}\sqrt[15]{\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt}$$

Open code

$$\sqrt[15]{\frac{(11\times 10^2)\pi}{2\sin\left(\frac{\pi}{2}\right)}} = \sqrt[5]{2}\;5^{2/15}\sqrt[15]{11}\sqrt[15]{\int_0^1 \sqrt{1-t^2}\,dt}$$

1.6437439630561409332266060794498211230841389970983689244 38

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{12+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{150+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{8+\cfrac{1}{4+\cfrac{1}{7+\frac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}$$

Open code

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Possible closed forms:

- More

$$\frac{1600407829\,\pi}{3058766810} \approx 1.64374396305614093325 6327$$

$$\frac{2\left(-285-380\,e+132\,e^2\right)}{-608-52\,e+45\,e^2} \approx 1.64374396305614093372483$$

$$\pi\ \text{root of } 50486\,x^3+45270\,x^2-32429\,x-2657 \text{ near } x=0.52322 \approx 1.64374396305614093322 39459$$

Now, we have:

(ii) The second example is Corollary 5, Section 11 of Chapter 4. Let $m, n > 0$ and set $x = y/(1+y)$ to obtain

$$\int_0^1 x^{m-1}(1-x)^{n-1}\,dx = \int_0^\infty y^{m-1}(1+y)^{-m-n}\,dy.$$

From the binomial series,

$$(1+y)^{-r} = \sum_{k=0}^{\infty} \frac{\Gamma(k+r)}{\Gamma(r)k!}(-y)^k, \qquad |y| < 1, \tag{1.5}$$

we find that $\varphi(s) = \Gamma(s+m+n)/\Gamma(m+n)$. By Stirling's formula (I6), the hypotheses of Hardy's theorem are readily verified. Hence, Ramanujan's Master Theorem yields the following well-known representation of the beta-function $B(m, n)$,

$$B(m, n) = \int_0^1 x^{m-1}(1-x)^{n-1}\,dx = \Gamma(m)\varphi(-m) = \frac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}. \tag{1.6}$$

$$B(m, n) = \int_0^1 x^{m-1}(1-x)^{n-1}\,dx = \Gamma(m)\varphi(-m) = \frac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}. \tag{1.6}$$

From the right hand side, for n = 2 and m = 3, we obtain:

((((gamma (3) gamma (2)))) / (((gamma (3+2))))

Input:

$$\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}$$

Open code

- $\Gamma(x)$ is the gamma function

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Exact result:

$$\frac{1}{12}$$

Decimal approximation:

- More digits

0.083333333333333333333333333333333333333333333333333333333...

Open code

Series representations:

$$\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)} = \frac{\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(2-z_0)^{k_1}(3-z_0)^{k_2}\,\Gamma^{(k_1)}(z_0)\,\Gamma^{(k_2)}(z_0)}{k_1!\,k_2!}}{\sum_{k=0}^{\infty}\frac{(5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Open code

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

- $\mathbb{Z}$ is the set of integers
  - More information

Integral representations:

- More

$$\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)} = e^{\int_0^1 (1+x-x^3-x^4)/\log(x)\,dx}$$

Open code

$$\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)} = \int_0^1 \int_0^1 \log\left(\frac{1}{t_1}\right) \log^2\left(\frac{1}{t_2}\right) dt_2\, dt_1$$

Open code

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

Open code

1 / ((((gamma (3) gamma (2)))) / (((gamma (3+2))))

Input:

$$\frac{1}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}}$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

12

This result 12 is very near to the value of black hole entropy 12,1904

Alternative representations:

- More

$$\frac{1}{\frac{\Gamma(3)\Gamma(2)}{\Gamma(3+2)}} = \frac{1}{\frac{\frac{2}{288}}{12}}$$

Open code

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$$\frac{1}{\frac{\Gamma(3)\Gamma(2)}{\Gamma(3+2)}} = \frac{1}{\frac{1!\times 2!}{4!}}$$

Open code

$$\frac{1}{\frac{\Gamma(3)\Gamma(2)}{\Gamma(3+2)}} = \frac{1}{\frac{e^0 e^{\log(2)}}{e^{-\log(12)+\log(288)}}}$$

Integral representations:

- More

$$\frac{1}{\frac{\Gamma(3)\Gamma(2)}{\Gamma(3+2)}} = e^{\int_0^1 (-1-x+x^3+x^4)/\log(x)\,dx}$$

Open code

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

Open code

$$\frac{1}{\frac{\Gamma(3)\Gamma(2)}{\Gamma(3+2)}} = \frac{\int_0^1 \log^4\left(\frac{1}{t}\right)dt}{\left(\int_0^1 \log\left(\frac{1}{t}\right)dt\right)\int_0^1 \log^2\left(\frac{1}{t}\right)dt}$$

2 / ((((gamma (3) gamma (2)))) / (((gamma (3+2))))

Input:

$$\frac{2}{\frac{\Gamma(3)\Gamma(2)}{\Gamma(3+2)}}$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

24

This value is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

Alternative representations:

- More

$$\frac{2}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}} = \frac{2}{\frac{\frac{2}{288}}{12}}$$

Open code

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$$\frac{2}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}} = \frac{2}{\frac{1!\times 2!}{4!}}$$

Open code

$$\frac{2}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}} = \frac{2}{\frac{e^0\, e^{\log(2)}}{e^{-\log(12)+\log(288)}}}$$

Integral representations:

- More

$$\frac{2}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}} = 2\, e^{\int_0^1 (-1-x+x^3+x^4)/\log(x)\,dx}$$

Open code

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

Open code

$$\frac{2}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}} = \frac{2\int_0^1 \log^4\left(\frac{1}{t}\right)dt}{\left(\int_0^1 \log\left(\frac{1}{t}\right)dt\right)\int_0^1 \log^2\left(\frac{1}{t}\right)dt}$$

((((1 / ((((gamma (3) gamma (2)))) / (((gamma (3+2)))))))))^3

Input:

$$\left(\frac{1}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}}\right)^3$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

1728

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

1/(1.2108*2) * ((((1 / ((((gamma (3) gamma (2)))) / (((gamma (3+2))))))))

Input interpretation:

$$\frac{1}{1.2108\times 2}\times\frac{1}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}}$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

4.955401387512388503468780971258671952428146679881070366699...

Open code

This value 4,95540 is very near to the first value of upper bound dark photon energy range (1.8 * 10^{15} – 4.95 * 10^{16} – 5.4 * 10^{16}) (Physics Letters B 731 (2014) 265–271 - **Searching a dark photon with HADES**)

Series representations:

$$\frac{1}{\frac{(\Gamma(3)\,\Gamma(2))(1.2108\times 2)}{\Gamma(3+2)}}=\frac{0.41295\sum_{k=0}^{\infty}\frac{(5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}{\left(\sum_{k=0}^{\infty}\frac{(2-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(3-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}\quad \text{for } (z_0\notin\mathbb{Z} \text{ or } z_0>0)$$

Open code

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$$\frac{1}{\frac{(\Gamma(3)\,\Gamma(2))\,(1.2108\times 2)}{\Gamma(3+2)}} = \left(0.41295 \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty} (2-z_0)^{k_1}\,(3-z_0)^{k_2} \sum_{j_1=0}^{k_1}\sum_{j_2=0}^{k_2} \left((-1)^{j_1+j_2}\,\pi^{-j_1-j_2+k_1+k_2} \sin\left(\frac{1}{2}\,\pi\,(-j_1+k_1+2\,z_0)\right)\sin\left(\frac{1}{2}\,\pi\,(-j_2+k_2+2\,z_0)\right) \Gamma^{(j_1)}(1-z_0)\,\Gamma^{(j_2)}(1-z_0)\right) \Big/ (j_1!\,j_2!\,(-j_1+k_1)!\,(-j_2+k_2)!)\right) \Big/ \left(\pi \sum_{k=0}^{\infty} (5-z_0)^k \sum_{j=0}^{k} \frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\,\pi\,(-j+k+2\,z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)$$

Integral representations:

- More

$$\frac{1}{\frac{(\Gamma(3)\,\Gamma(2))\,(1.2108\times 2)}{\Gamma(3+2)}} = 0.41295\,e^{\int_0^1 (-1-x+x^3+x^4)/\log(x)\,dx}$$

Open code

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$$\frac{1}{\frac{(\Gamma(3)\,\Gamma(2))\,(1.2108\times 2)}{\Gamma(3+2)}} = 0.41295\exp\left(\int_0^1 \frac{1-x^2-x^3+x^5+\log(x^2)+\log(x^3)-\log(x^5)}{(-1+x)\log(x)}\,dx\right)$$

Open code

$$\frac{1}{\frac{(\Gamma(3)\,\Gamma(2))\,(1.2108\times 2)}{\Gamma(3+2)}} = \frac{0.41295\int_0^1 \log^4\left(\frac{1}{t}\right)dt}{\left(\int_0^1 \log\left(\frac{1}{t}\right)dt\right)\int_0^1 \log^2\left(\frac{1}{t}\right)dt}$$

1/3 * ((((1 / ((((gamma (3) gamma (2)))) / (((gamma (3+2))))))))

Input:

$$\frac{1}{3}\times\frac{1}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}}$$

Open code

- $\Gamma(x)$ is the gamma function

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Exact result:

4

This result is in the range of the mass of DM particle that is between 4 – 4.2 eV

Series representations:

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

Open code

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$$\frac{1}{\frac{(\Gamma(3)\,\Gamma(2))\,3}{\Gamma(3+2)}} = \left(\sum_{k_1=0}^{\infty} \sum_{k_2=0}^{\infty} (2-z_0)^{k_1}\,(3-z_0)^{k_2} \sum_{j_1=0}^{k_1} \sum_{j_2=0}^{k_2} \left((-1)^{j_1+j_2}\,\pi^{-j_1-j_2+k_1+k_2}\,\sin\left(\frac{1}{2}\,\pi\,(-j_1+k_1+2\,z_0)\right) \sin\left(\frac{1}{2}\,\pi\,(-j_2+k_2+2\,z_0)\right) \Gamma^{(j_1)}(1-z_0)\,\Gamma^{(j_2)}(1-z_0)\right) \Big/ (j_1!\,j_2!\,(-j_1+k_1)!\,(-j_2+k_2)!)\right) \Big/ \left(3\,\pi \sum_{k=0}^{\infty} (5-z_0)^k \sum_{j=0}^{k} \frac{(-1)^j\,\pi^{-j+k}\,\sin\left(\frac{1}{2}\,\pi\,(-j+k+2\,z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)$$

Integral representations:

- More

$$\frac{1}{\frac{(\Gamma(3)\,\Gamma(2))\,3}{\Gamma(3+2)}} = \frac{1}{3}\,e^{\int_0^1 (-1-x+x^3+x^4)/\log(x)\,dx}$$

Open code

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

Open code

$$\frac{1}{\frac{(\Gamma(3)\,\Gamma(2))\,3}{\Gamma(3+2)}} = \frac{\int_0^1 \log^4\left(\frac{1}{t}\right)dt}{3\left(\int_0^1 \log\left(\frac{1}{t}\right)dt\right)\int_0^1 \log^2\left(\frac{1}{t}\right)dt}$$

((((((((((((1 / ((((gamma (3) gamma (2)))) / (((gamma (3+2))))))))^3))))))))))^1/15

Input:

$$\sqrt[15]{\left(\frac{1}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}}\right)^3}$$

Open code

- $\Gamma(x)$ is the gamma function

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Exact result:

$$2^{2/5}\sqrt[5]{3}$$

Decimal approximation:

- More digits

1.64375182951722576230849793623097951738349258994547520041l...

1.64375182951722576230849793623097951738349258994547520041l

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{20+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}}}$$

Open code

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Possible closed forms:

- More

$$2^{2/5}\sqrt[5]{3} \approx$$

1.64375182951722576230849793623097951738349258994547520041102976

$$4\sqrt{\frac{3139915}{18593681}} \approx 1.6437518295172258364 5$$

$$\frac{e^{\frac{3}{4}+\frac{29}{2e}-4e+\frac{9}{4\pi}-\frac{13\pi}{4}}\,\pi^{8e-7}\cos^6(e\pi)}{\sin^{5/2}(e\pi)} \approx 1.64375182951722576 53822$$

(((((((((((((1 / ((((gamma (3) gamma (2)))) / (((gamma (3+2))))))))^3))))))))))^1/2 * Pi + (1.08094*6)

Where 1,08094 is a result of Ramanujan mock theta function (see our previous paper)

Input interpretation:

$$\sqrt{\left(\frac{1}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}}\right)^3}\ \pi + 1.08094 \times 6$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

137.0792...

This result is very near to the inverse of fine-structure constant 137,035

Series representations:

$$\sqrt{\left(\frac{1}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}}\right)^3}\ \pi + 1.08094 \times 6 = 6.48564 + \pi \sqrt{\frac{\left(\sum_{k=0}^{\infty} \frac{(5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^3}{\left(\sum_{k=0}^{\infty} \frac{(2-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^3 \left(\sum_{k=0}^{\infty} \frac{(3-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^3}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Open code

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$$\sqrt{\left(\frac{1}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}}\right)^3}\ \pi + 1.08094 \times 6 =$$

$$6.48564 + \pi \sqrt{\left(\left(\left(\sum_{k=0}^{\infty} (2-z_0)^k \sum_{j=0}^{k} \frac{(-1)^j\,\pi^{-j+k} \sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)^3 \left(\sum_{k=0}^{\infty} (3-z_0)^k \sum_{j=0}^{k} \frac{(-1)^j\,\pi^{-j+k} \sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)^3\right) \Big/ \left(\pi^3 \left(\sum_{k=0}^{\infty} (5-z_0)^k \sum_{j=0}^{k} \frac{(-1)^j\,\pi^{-j+k} \sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)^3\right)\right)}$$

Integral representations:

- More

$$\sqrt{\left(\frac{1}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}}\right)^3}\ \pi + 1.08094 \times 6 = 6.48564 + \sqrt{e^{-\int_0^1 \left(3\left(-1-x+x^3+x^4\right)\right)/\log(x)\,dx}}\ \pi$$

Open code

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$$\sqrt{\left(\frac{1}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}}\right)^3}\ \pi + 1.08094 \times 6 =$$

$$6.48564 + \sqrt{\exp\left(\int_0^1 \frac{3\left(1 - x^2 - x^3 + x^5 + \log(x^2) + \log(x^3) - \log(x^5)\right)}{(-1+x)\log(x)}\,dx\right)\pi}$$

Open code

$$\sqrt{\left(\frac{1}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}}\right)^3}\ \pi + 1.08094 \times 6 = 6.48564 + \pi \sqrt{\frac{\left(\int_0^1 \log^4\left(\frac{1}{t}\right)dt\right)^3}{\left(\int_0^1 \log\left(\frac{1}{t}\right)dt\right)^3 \left(\int_0^1 \log^2\left(\frac{1}{t}\right)dt\right)^3}}$$

(((((((((((((1 / ((((gamma (3) gamma (2)))) / (((gamma (3+2))))))))^3))))))))))^1/2 * (6.582*1/2)+0.081816+0.0814135+0.07609

Where 6,582 is reduced Planck constant and 0.081816, 0.0814135 and 0.07609 are results of Ramanujan mock theta functions

Input interpretation:

$$\sqrt{\left(\frac{1}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}}\right)^3}\left(6.582 \times \frac{1}{2}\right) + 0.081816 + 0.0814135 + 0.07609$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

137.044...

This result is very near to the inverse of fine-structure constant 137,035

Series representations:

$$\frac{1}{2}\sqrt{\left(\frac{1}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}}\right)^3}\ 6.582 + 0.081816 + 0.0814135 + 0.07609 =$$

$$3.291\left(0.0727194 + \sqrt{\frac{\left(\sum_{k=0}^{\infty} \frac{(5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^3}{\left(\sum_{k=0}^{\infty} \frac{(2-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^3 \left(\sum_{k=0}^{\infty} \frac{(3-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^3}}\right)$$

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

Open code

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$$\frac{1}{2}\sqrt{\left(\frac{1}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}}\right)^3}\; 6.582 + 0.081816 + 0.0814135 + 0.07609 = 3.291 \left(0.0727194 + \sqrt{\left(\left(\left(\sum_{k=0}^{\infty}(2-z_0)^k \sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)^3 \left(\sum_{k=0}^{\infty}(3-z_0)^k \sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)^3\right) \Big/ \left(\pi^3\left(\sum_{k=0}^{\infty}(5-z_0)^k \sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)^3\right)\right)}\right)$$

Integral representations:

- More

$$\frac{1}{2}\sqrt{\left(\frac{1}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}}\right)^3}\; 6.582 + 0.081816 + 0.0814135 + 0.07609 = 0.23932 + 3.291\sqrt{e^{\int_0^1 \left(3\left(-1-x+x^3+x^4\right)\right)/\log(x)\,dx}}$$

Open code

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$$\frac{1}{2}\sqrt{\left(\frac{1}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}}\right)^3}\; 6.582 + 0.081816 + 0.0814135 + 0.07609 = 0.23932 + 3.291\sqrt{\exp\left(\int_0^1 \frac{3\left(1-x^2-x^3+x^5+\log(x^2)+\log(x^3)-\log(x^5)\right)}{(-1+x)\log(x)}\,dx\right)}$$

Open code

$$\frac{1}{2}\sqrt{\left(\frac{1}{\frac{\Gamma(3)\,\Gamma(2)}{\Gamma(3+2)}}\right)^3}\; 6.582 + 0.081816 + 0.0814135 + 0.07609 = 3.291\left(0.0727194 + \sqrt{\frac{\left(\int_0^1 \log^4\left(\frac{1}{t}\right)dt\right)^3}{\left(\int_0^1 \log\left(\frac{1}{t}\right)dt\right)^3\left(\int_0^1 \log^2\left(\frac{1}{t}\right)dt\right)^3}}\right)$$

Now, we have:

(iii) Let $p > 0$ and $0 < n < 1$. Letting $x = \sqrt{y}$, we find that

$$\int_0^\infty x^{n-1} \cos(px)\, dx = \frac{1}{2} \int_0^\infty y^{n/2-1} \cos(p\sqrt{y})\, dy.$$

Expanding $\cos(p\sqrt{y})$ into a Maclaurin series, we find that, in Hardy's notation, $\psi(s) = p^{2s}/\Gamma(2s+1)$. By Stirling's formula, we deduce that, in the notation (1.3), $A = \pi + \varepsilon$, for any $\varepsilon > 0$. Hence, with no justification, we proceed, as did Ramanujan, to conclude that

$$\int_0^\infty x^{n-1} \cos(px)\, dx = \frac{1}{2}\Gamma(\tfrac{1}{2}n)\varphi(-\tfrac{1}{2}n)$$

$$= \frac{\Gamma(\frac{1}{2}n)\Gamma(1-\frac{1}{2}n)}{2p^n\Gamma(1-n)} = \frac{\Gamma(n)\cos(\frac{1}{2}\pi n)}{p^n}. \qquad (1.7)$$

Now, in fact, Ramanujan's evaluation is, indeed, correct (Gradshteyn and Ryzhik [1, p. 421]).

Ramanujan next shows that

$$\int_0^\infty x^{n-1} \sin(px)\, dx = \frac{\Gamma(n)\sin(\frac{1}{2}n)}{p^n}, \qquad |n| < 1, \qquad (1.8)$$

For n =0,5 and p = 2, we obtain:

((((gamma (1/2) * sin (1/4)))) / ((2^0.5))

Input:

$$\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}$$

Open code

- $\Gamma(x)$ is the gamma function

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Exact result:

$$\sqrt{\frac{\pi}{2}}\sin\left(\frac{1}{4}\right)$$

Decimal approximation:

- More digits

0.310074879761521580149012938402359510635686766785876465636...

Open code

Continued fraction:

- Linear form

$$\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{21+\cfrac{1}{1+\cfrac{1}{103+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{11+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

Series representations:

- More

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

Open code

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

Open code

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

Integral representations:

$$\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}} = \frac{\sqrt{\frac{\pi}{2}}}{4}\int_0^1\cos\left(\frac{t}{4}\right)dt$$

Open code

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$$\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}} = -\frac{i}{16\sqrt{2}}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{-1/(64 s)+s}}{s^{3/2}}\,ds \quad \text{for } \gamma > 0$$

Open code

$$\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}} = -\frac{i}{2\sqrt{2}}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{8^{-1+2s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}\,ds \quad \text{for } 0 < \gamma < 1$$

1/ ((((((gamma (1/2) * sin (1/4)))) / ((2^0.5))))) * ½

Input:

$$\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}} \times \frac{1}{2}$$

Open code

- $\Gamma(x)$ is the gamma function

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Exact result:

$$\frac{\csc\left(\frac{1}{4}\right)}{\sqrt{2\pi}}$$

- $\csc(x)$ is the cosecant function

Decimal approximation:

- More digits

1.612513726957016723162919058085147832209569448868335821777...

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{10+\cfrac{1}{1+\cfrac{1}{207+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{1}{\frac{2\left(\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)\right)}{\sqrt{2}}} = -i\sqrt{\frac{2}{\pi}}\sum_{k=1}^{\infty} q^{-1+2k} \text{ for } q = e^{i/4}$$

Open code

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$$\frac{1}{\frac{2\left(\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)\right)}{\sqrt{2}}} = -2\sqrt{\frac{2}{\pi}}\sum_{k=-\infty}^{\infty}\frac{(-1)^k}{-1+16k^2\pi^2}$$

Open code

$$\frac{1}{\frac{2\left(\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)\right)}{\sqrt{2}}} = 2\sqrt{\frac{2}{\pi}} + \frac{\sum_{k=1}^{\infty}\frac{(-1)^k}{\frac{1}{16}-k^2\pi^2}}{2\sqrt{2\pi}}$$

Open code

- More information

Integral representation:

$$\frac{1}{\frac{2\left(\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)\right)}{\sqrt{2}}} = \frac{1}{\sqrt{2}\,\pi^{3/2}}\int_0^{\infty}\frac{\sqrt[4\pi]{t}}{t+t^2}\,dt$$

exp((((1/((((((gamma(1/2)*sin(1/4))))/ ((2^0.5))))))))) + (0.923910279+0.924340867)

where 0.923910279 and 0.924340867 are two results of the Ramanujan's mock theta functions (see our previous papers)

Input interpretation:

$$\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right) + (0.923910279 + 0.924340867)$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

27.00251588...

Series representations:

$$\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)=$$
$$1.84825+\exp\left(\frac{1}{\sqrt{2}\left(\sum_{k=0}^{\infty}\frac{(-1)^k 4^{-1-2k}}{(1+2k)!}\right)\sum_{k=0}^{\infty}\frac{2^{-k}\Gamma^{(k)}(1)}{k!}}\right)$$

Open code

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$$\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)=$$
$$1.84825+\exp\left(\frac{1}{2\sqrt{2}\left(\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(\frac{1}{4}\right)\right)\sum_{k=0}^{\infty}\frac{2^{-k}\Gamma^{(k)}(1)}{k!}}\right)$$

Open code

$$\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)=$$
$$1.84825+\exp\left(\frac{\sqrt{2}}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k 4^{-1-2k}}{(1+2k)!}\right)\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}-z_0\right)^k\Gamma^{(k)}(z_0)}{k!}}\right) \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Open code

$$\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)=1.84825+$$
$$\exp\left(\frac{1}{\sqrt{2}\left(\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(\frac{1}{4}\right)\right)\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}-z_0\right)^k\Gamma^{(k)}(z_0)}{k!}}\right) \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Integral representations:

- More

$$\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right) + (0.92391 + 0.924341) = 1.84825 + \exp\left(\frac{4\sqrt{2}}{\Gamma\left(\frac{1}{2}\right)\int_0^1 \cos\left(\frac{t}{4}\right)dt}\right)$$

Open code

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$$\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right) + (0.92391 + 0.924341) = 1.84825 + \exp\left(-\frac{i\csc\left(\frac{1}{4}\right)}{\sqrt{2}\,\pi}\oint_L \frac{e^t}{\sqrt{t}}\,dt\right)$$

$$\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right) + (0.92391 + 0.924341) = 1.84825 + \exp\left(\frac{i\csc\left(\frac{1}{4}\right)}{\sqrt{2}\,\pi}\oint_L \frac{e^{-t}}{\sqrt{-t}}\,dt\right)$$

-

((((((((((8^2 * ((((((((exp ((((1/ ((((((gamma (1/2) * sin (1/4)))) / ((2^0.5)))))))) + (0.923910279+0.924340867)))))))))))))))))

Input interpretation:

$$8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right) + (0.923910279 + 0.924340867)\right)$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

1728.161016...

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

Series representations:

$$8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)\right)=$$

$$64\left(1.84825+\exp\left(\frac{1}{\sqrt{2}\left(\sum_{k=0}^{\infty}\frac{(-1)^k 4^{-1-2k}}{(1+2k)!}\right)\sum_{k=0}^{\infty}\frac{2^{-k}\,\Gamma^{(k)}(1)}{k!}}\right)\right)$$

Open code

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$$8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)\right)=$$

$$64\left(1.84825+\exp\left(\frac{1}{2\sqrt{2}\left(\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(\frac{1}{4}\right)\right)\sum_{k=0}^{\infty}\frac{2^{-k}\,\Gamma^{(k)}(1)}{k!}}\right)\right)$$

Open code

$$8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)\right)=$$

$$64\left(1.84825+\exp\left(\frac{\sqrt{2}}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k 4^{-1-2k}}{(1+2k)!}\right)\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}-z_0\right)^k\Gamma^{(k)}(z_0)}{k!}}\right)\right) \quad \text{for } (z_0\notin\mathbb{Z} \text{ or } z_0>0)$$

Open code

$$8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)\right)=$$

$$64\left(1.84825+\exp\left(\frac{1}{\sqrt{2}\left(\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(\frac{1}{4}\right)\right)\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}-z_0\right)^k\Gamma^{(k)}(z_0)}{k!}}\right)\right)$$

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

Integral representations:

- More

$$8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)\right) = 118.288 + 64\exp\left(\frac{4\sqrt{2}}{\Gamma\left(\frac{1}{2}\right)\int_0^1 \cos\left(\frac{t}{4}\right)dt}\right)$$

Open code

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$$8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)\right) = 118.288 + 64\exp\left(-\frac{i\csc\left(\frac{1}{4}\right)}{\sqrt{2}\,\pi}\oint_L \frac{e^t}{\sqrt{t}}\,dt\right)$$

$$8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)\right) = 118.288 + 64\exp\left(\frac{i\csc\left(\frac{1}{4}\right)}{\sqrt{2}\,\pi}\oint_L \frac{e^{-t}}{\sqrt{-t}}\,dt\right)$$

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((((((((((8^2 * ((((((((exp ((((1/ ((((((gamma (1/2) * sin (1/4)))) / ((2^0.5)))))))))) + (0.923910279+0.924340867))))))))))))))))))^1/3

Input interpretation:

$$\sqrt[3]{8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.923910279+0.924340867)\right)}$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

12.000372711...

This result is very near to the value of black hole entropy 12,1904

And:

2*((((((((((8^2 * ((((((((exp ((((1/ ((((((gamma (1/2) * sin (1/4)))) / ((2^0.5)))))))))) + (0.923910279+0.924340867))))))))))))))))))^1/3

Input interpretation:

$$2\sqrt[3]{8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.923910279+0.924340867)\right)}$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

24.000745421...

This value is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

Series representations:

$$2\sqrt[3]{8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)\right)} = 8\sqrt[3]{1.84825+\exp\left(\frac{1}{\sqrt{2}\left(\sum_{k=0}^{\infty}\frac{(-1)^k 4^{-1-2k}}{(1+2k)!}\right)\sum_{k=0}^{\infty}\frac{2^{-k}\Gamma^{(k)}(1)}{k!}}\right)}$$

Open code

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$$2\sqrt[3]{8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)\right)} = 8\sqrt[3]{1.84825+\exp\left(\frac{1}{2\sqrt{2}\left(\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(\frac{1}{4}\right)\right)\sum_{k=0}^{\infty}\frac{2^{-k}\Gamma^{(k)}(1)}{k!}}\right)}$$

Open code

$$2\sqrt[3]{8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)\right)} = 8\sqrt[3]{1.84825+\exp\left(\frac{1}{\sqrt{2}\left(\sum_{k=0}^{\infty}(-1)^k J_{1+2k}\left(\frac{1}{4}\right)\right)\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}-z_0\right)^k\Gamma^{(k)}(z_0)}{k!}}\right)}$$

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

Open code

$$2\sqrt[3]{8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)\right)} = 8\sqrt[3]{1.84825+\exp\left(\frac{\sqrt{2}}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k 4^{-1-2k}}{(1+2k)!}\right)\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}-z_0\right)^k \Gamma^{(k)}(z_0)}{k!}}\right)} \text{ for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Integral representations:

- More

$$2\sqrt[3]{8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)\right)} = 8\sqrt[3]{1.84825+\exp\left(\frac{4\sqrt{2}}{\Gamma\left(\frac{1}{2}\right)\int_0^1\cos\left(\frac{t}{4}\right)dt}\right)}$$

Open code

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$$2\sqrt[3]{8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)\right)} = 8\sqrt[3]{1.84825+\exp\left(-\frac{i\csc\left(\frac{1}{4}\right)}{\sqrt{2}\,\pi}\oint_L\frac{e^t}{\sqrt{t}}\,dt\right)}$$

$$2\sqrt[3]{8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.92391+0.924341)\right)} = 8\sqrt[3]{1.84825+\exp\left(\frac{i\csc\left(\frac{1}{4}\right)}{\sqrt{2}\,\pi}\oint_L\frac{e^{-t}}{\sqrt{-t}}\,dt\right)}$$

((((((((((8^2 * ((((((((exp ((((1/ ((((((gamma (1/2) * sin (1/4)))) / ((2^0.5)))))))) + (0.923910279+0.924340867)))))))))))))))))^1/15

Input interpretation:

$$\sqrt[15]{8^2\left(\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\sin\left(\frac{1}{4}\right)}{\sqrt{2}}}\right)+(0.923910279+0.924340867)\right)}$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

1.6437620401...

1.6437620401219394577181408642324200276468653984190346

Continued fraction:

- Linear form

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

Open code

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Possible closed forms:

- More

$\tan\left(\csc\left(\frac{536\,095\,217}{82\,152\,633}\right)\right)\approx 1.6437620401219394578991 1$

root of $13\,049\,x^3+886\,x^2+7030\,x-71\,905$ near $x=1.64376$ $\approx$ 1.643762040121939457729824

$\frac{3}{8}\pi\tan^2\left(\frac{25\,026\,668}{28\,823\,017}\right)\approx 1.643762040121939457588 29$

Now, we have:

$$\int_0^\infty x^{n-1}\cos(px)\,dx = \tfrac{1}{2}\Gamma(\tfrac{1}{2}n)\varphi(-\tfrac{1}{2}n)$$

$$= \frac{\Gamma(\frac{1}{2}n)\Gamma(1-\frac{1}{2}n)}{2p^n\Gamma(1-n)} = \frac{\Gamma(n)\cos(\frac{1}{2}\pi n)}{p^n}. \qquad (1.7)$$

From the right hand side, we obtain, for n = 0,5 and p = 2:

((((gamma (1/2) * cos (Pi/4)))) / ((2^0.5))

Input:

$$\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}$$

Open code

- $\Gamma(x)$ is the gamma function

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Exact result:

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

Decimal approximation:

- More digits

0.8862269254527580136490837416705725913987747280611935641069...

Open code

Property:

$\frac{\sqrt{\pi}}{2}$ is a transcendental number

Continued fraction:

- Linear form

$$\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{57+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{37+\cfrac{1}{3+\cfrac{1}{41+\cfrac{1}{1+\cfrac{1}{10+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

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Alternative representations:

- More

$$\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}} = \frac{\cosh\left(\frac{i\pi}{4}\right)e^{-\log G(1/2)+\log G(3/2)}}{\sqrt{2}}$$

Open code

$$\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}} = \frac{\cosh\left(-\frac{i\pi}{4}\right)e^{-\log G(1/2)+\log G(3/2)}}{\sqrt{2}}$$

Open code

$$\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}} = \frac{e^{-\log G(1/2)+\log G(3/2)}\left(e^{-(i\pi)/4}+e^{(i\pi)/4}\right)}{2\sqrt{2}}$$

Series representations:

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

Open code

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$$\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}} = \frac{\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{\left(-\frac{1}{16}\right)^{k_1}\pi^{2k_1}\left(\frac{1}{2}-z_0\right)^{k_2}\Gamma^{(k_2)}(z_0)}{(2k_1)!\,k_2!}}{\sqrt{2}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Open code

$$\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}} = \sqrt{2}\left(J_0\left(\frac{\pi}{4}\right)+2\sum_{k=1}^{\infty}(-1)^k J_{2k}\left(\frac{\pi}{4}\right)\right)\sum_{k=0}^{\infty}\frac{2^{-k}\,\Gamma^{(k)}(1)}{k!}$$

Open code

$$\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}} = \frac{\left(J_0\left(\frac{\pi}{4}\right)+2\sum_{k=1}^{\infty}(-1)^k J_{2k}\left(\frac{\pi}{4}\right)\right)\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}-z_0\right)^k\Gamma^{(k)}(z_0)}{k!}}{\sqrt{2}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Open code

- $n!$ is the factorial function
- $\mathbb{Z}$ is the set of integers
- $J_n(z)$ is the Bessel function of the first kind

Integral representations:

- More

$$\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}} = -\frac{i\left(\sqrt{2}\,\pi\int_{\frac{\pi}{2}}^{\frac{\pi}{4}}\sin(t)\,dt\right)}{\oint_L \frac{e^t}{\sqrt{t}}\,dt}$$

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$$\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}} = \frac{\sqrt{\pi}}{\sqrt{2}\oint_L \frac{e^t}{\sqrt{t}}\,dt}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-\pi^2/(64\,s)+s}}{\sqrt{s}}\,ds \quad \text{for } \gamma > 0$$

$$\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}} = -\frac{1}{4}\oint_L \frac{e^{-t}}{\sqrt{t}}\,dt$$

(((1 / ((((((gamma (1/2) * cos (Pi/4)))) / ((2^0.5)))))))^4

Input:

$$\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)^4$$

Open code

- $\Gamma(x)$ is the gamma function

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Exact result:

$$\frac{16}{\pi^2}$$

Decimal approximation:

- More digits

1.621138938277404343102071411355642222469740394755944781529...

Open code

Property:

$\frac{16}{\pi^2}$ is a transcendental number

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}}$$

Alternative representations:

- More

$$\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)^4 = \left(\frac{1}{\frac{\cosh\left(\frac{i\pi}{4}\right)e^{-\log G(1/2)+\log G(3/2)}}{\sqrt{2}}}\right)^4$$

Open code

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

Open code

$$\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)^4 = \left(\frac{1}{\frac{\cosh\left(-\frac{i\pi}{4}\right)e^{-\log G(1/2)+\log G(3/2)}}{\sqrt{2}}}\right)^4$$

Open code

•

Series representations:

- More

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

Open code

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$$\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)^4 = \frac{1}{\left(\sum_{k=0}^{\infty} \frac{(-1)^k\, 1195^{-1-2k}\left(5^{1+2k} - 4 \times 239^{1+2k}\right)}{1+2k}\right)^2}$$

Open code

$$\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)^4 = \frac{16}{\left(\sum_{k=0}^{\infty} \left(-\frac{1}{4}\right)^k \left(\frac{1}{1+2k} + \frac{2}{1+4k} + \frac{1}{3+4k}\right)\right)^2}$$

Open code

- More information

Integral representations:

- More

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

Open code

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

Open code

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

The result is:
1.621138938277404343102071411355642222469740394755944781529

(24^2-18) * exp (((1 / ((((((gamma (1/2) * cos (Pi/4)))) / ((2^0.5)))))))

Input:

$$(24^2 - 18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)$$

Open code

- $\Gamma(x)$ is the gamma function

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Exact result:

$$558\, e^{2/\sqrt{\pi}}$$

Decimal approximation:

- More digits

1724.578806449425072210201497898693507853506235463672492146...

Open code

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

Property:

$558\, e^{2/\sqrt{\pi}}$ is a transcendental number

Continued fraction:

- Linear form

$$1724+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{19+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{6+\cfrac{1}{13+\cfrac{1}{34+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{24+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}$$

Series representations:

$$(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)=558\exp\left(\frac{1}{\sqrt{2}\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{16}\right)^k\pi^{2k}}{(2k)!}\right)\sum_{k=0}^{\infty}\frac{2^{-k}\,\Gamma^{(k)}(1)}{k!}}\right)$$

Open code

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$$(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)=558\exp\left(\frac{\sqrt{2}}{\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{16}\right)^k\pi^{2k}}{(2k)!}\right)\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}-z_0\right)^k\,\Gamma^{(k)}(z_0)}{k!}}\right)$$

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

Open code

$$(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)=$$

$$558\exp\left(\frac{1}{\sqrt{2}\left(J_0\left(\frac{\pi}{4}\right)+2\sum_{k=1}^{\infty}(-1)^k J_{2k}\left(\frac{\pi}{4}\right)\right)\sum_{k=0}^{\infty}\frac{2^{-k}\,\Gamma^{(k)}(1)}{k!}}\right)$$

Open code

$$(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)=$$

$$558\exp\left(\frac{\sqrt{2}}{\left(J_0\left(\frac{\pi}{4}\right)+2\sum_{k=1}^{\infty}(-1)^k J_{2k}\left(\frac{\pi}{4}\right)\right)\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}-z_0\right)^k\Gamma^{(k)}(z_0)}{k!}}\right) \text{ for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Integral representations:

- More

$$(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)=558\exp\left(-\frac{i}{\pi}\oint_L\frac{e^t}{\sqrt{t}}\,dt\right)$$

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$$(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)=558\exp\left(\frac{2\sqrt{2}}{4i\pi-i\left(4-2\sqrt{2}\right)\pi}\oint_L\frac{e^t}{\sqrt{t}}\,dt\right)$$

$$(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)=558\exp\left(-\frac{i\oint_L\frac{e^{-t}}{\sqrt{-t}}\,dt}{\sqrt{2}\,\pi\int_{\frac{\pi}{2}}^{\frac{\pi}{4}}\sin(t)\,dt}\right)$$

2*(((((24^2-18) * exp (((1 / ((((((gamma (1/2) * cos (Pi/4)))) / ((2^0.5))))))))))^1/3

Input:

$$2\sqrt[3]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}$$

Open code

- $\Gamma(x)$ is the gamma function

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Exact result:

$$2\times 3^{2/3}\sqrt[3]{62}\,e^{2/\left(3\sqrt{\pi}\right)}$$

Decimal approximation:

- More digits

23.98415067656303346722195002635402674849651252198068164927...

Open code

This value is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

Property:

$2\times 3^{2/3}\sqrt[3]{62}\, e^{2/(3\sqrt{\pi})}$ is a transcendental number

Continued fraction:

- Linear form

$$23+\cfrac{1}{1+\cfrac{1}{62+\cfrac{1}{10+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{13+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

$$2\sqrt[3]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)} = 2\times 3^{2/3}\sqrt[3]{62}\sqrt[3]{\exp\left(\frac{1}{\sqrt{2}\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{16}\right)^k \pi^{2k}}{(2k)!}\right)\sum_{k=0}^{\infty}\frac{2^{-k}\,\Gamma^{(k)}(1)}{k!}}\right)}$$

Open code

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$$2\sqrt[3]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)} =$$

$$2\times 3^{2/3}\sqrt[3]{62}\sqrt[3]{\exp\left(\frac{\sqrt{2}}{\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{16}\right)^k \pi^{2k}}{(2k)!}\right)\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}-z_0\right)^k \Gamma^{(k)}(z_0)}{k!}}\right)} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Open code

$$2\sqrt[3]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)} =$$

$$2\times 3^{2/3}\sqrt[3]{62}\sqrt[3]{\exp\left(\frac{1}{\sqrt{2}\left(J_0\left(\frac{\pi}{4}\right)+2\sum_{k=1}^{\infty}(-1)^k J_{2k}\left(\frac{\pi}{4}\right)\right)\sum_{k=0}^{\infty}\frac{2^{-k}\Gamma^{(k)}(1)}{k!}}\right)}$$

Open code

$$2\sqrt[3]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)} = 2\times 3^{2/3}\sqrt[3]{62}$$

$$\sqrt[3]{\exp\left(\frac{\sqrt{2}}{\left(J_0\left(\frac{\pi}{4}\right)+2\sum_{k=1}^{\infty}(-1)^k J_{2k}\left(\frac{\pi}{4}\right)\right)\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}-z_0\right)^k \Gamma^{(k)}(z_0)}{k!}}\right)} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Integral representations:

- More

$$2\sqrt[3]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)} = 2\times 3^{2/3}\sqrt[3]{62}\sqrt[3]{\exp\left(-\frac{i}{\pi}\oint_L \frac{e^t}{\sqrt{t}}\,dt\right)}$$

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$$2\sqrt[3]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)} = 2\times 3^{2/3}\sqrt[3]{62}\sqrt[3]{\exp\left(\frac{2\sqrt{2}}{4i\pi - i\left(4-2\sqrt{2}\right)\pi}\oint_L \frac{e^t}{\sqrt{t}}\,dt\right)}$$

$$2\sqrt[3]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)} = 2\times 3^{2/3}\sqrt[3]{62}\sqrt[3]{\exp\left(-\frac{i\oint_L \frac{e^{-t}}{\sqrt{-t}}\,dt}{\sqrt{2}\,\pi\int_{\frac{\pi}{2}}^{\frac{\pi}{4}}\sin(t)\,dt}\right)}$$

1/(2*1.2108) *(((((24^2-18) * exp (((1 / ((((((gamma (1/2) * cos (Pi/4)))) / ((2^0.5))))))))))^1/3

Where 1,2108 is a Hausdorff dimension

Input interpretation:

$$\frac{1}{2\times 1.2108}\sqrt[3]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

4.95213...

This value 4,95213 is very near to the first value of upper bound dark photon energy range ($1.8 * 10^{15} - 4.95 * 10^{16} - 5.4 * 10^{16}$) (Physics Letters B 731 (2014) 265–271 - **Searching a dark photon with HADES**)

Series representations:

$$\frac{\sqrt[3]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}}{2\times 1.2108} = 3.39971\sqrt[3]{\exp\left(\frac{1}{\sqrt{2}\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{16}\right)^k\pi^{2k}}{(2k)!}\right)\sum_{k=0}^{\infty}\frac{2^{-k}\,\Gamma^{(k)}(1)}{k!}}\right)}$$

Open code

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$$\frac{\sqrt[3]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}}{2\times 1.2108} = 3.39971\sqrt[3]{\exp\left(\frac{\sqrt{2}}{\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{16}\right)^k \pi^{2k}}{(2k)!}\right)\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}-z_0\right)^k \Gamma^{(k)}(z_0)}{k!}}\right)}$$

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

Open code

$$\frac{\sqrt[3]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}}{2\times 1.2108} = 3.39971\sqrt[3]{\exp\left(\frac{1}{\sqrt{2}\left(J_0\left(\frac{\pi}{4}\right)+2\sum_{k=1}^{\infty}(-1)^k J_{2k}\left(\frac{\pi}{4}\right)\right)\sum_{k=0}^{\infty}\frac{2^{-k}\Gamma^{(k)}(1)}{k!}}\right)}$$

Open code

$$\frac{\sqrt[3]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}}{2\times 1.2108} = 3.39971\sqrt[3]{\exp\left(\frac{\sqrt{2}}{\left(J_0\left(\frac{\pi}{4}\right)+2\sum_{k=1}^{\infty}(-1)^k J_{2k}\left(\frac{\pi}{4}\right)\right)\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}-z_0\right)^k \Gamma^{(k)}(z_0)}{k!}}\right)}$$

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

Integral representations:

- More

$$\frac{\sqrt[3]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}}{2\times 1.2108} = 3.39971\sqrt[3]{\exp\left(-\frac{i}{\pi}\oint_L \frac{e^t}{\sqrt{t}}\,dt\right)}$$

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$$\frac{\sqrt[3]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}}{2\times 1.2108} = 3.39971\sqrt[3]{\exp\left(\frac{2\sqrt{2}}{4 i\pi - i(4-2\sqrt{2})\pi}\oint_L \frac{e^t}{\sqrt{t}}\,dt\right)}$$

$$\frac{\sqrt[3]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}}{2\times 1.2108} = 3.39971\sqrt[3]{\exp\left(-\frac{i\oint_L \frac{e^{-t}}{\sqrt{-t}}\,dt}{\sqrt{2}\,\pi\int_{\frac{\pi}{2}}^{\frac{\pi}{4}}\sin(t)\,dt}\right)}$$

(((((24^2-18) * exp (((1 / ((((((gamma (1/2) * cos (Pi/4)))) / ((2^0.5))))))))))^1/15

Input:

$$\sqrt[15]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}$$

Open code

- $\Gamma(x)$ is the gamma function

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Exact result:

$$3^{2/15}\sqrt[15]{62}\,e^{2/(15\sqrt{\pi})}$$

Decimal approximation:

- More digits

1.643534669192275248507581807188522885681657910273860039639...

Open code

1.643534669192275248507581807188522885681657910273860039639

Property:

$3^{2/15}\sqrt[15]{62}\,e^{2/(15\sqrt{\pi})}$ is a transcendental number

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{7+\cfrac{1}{3+\cfrac{1}{6+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{30+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{28+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{16+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

$$\sqrt[15]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)} = 3^{2/15}\sqrt[15]{62}\sqrt[15]{\exp\left(\frac{1}{\sqrt{2}\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{16}\right)^k\pi^{2k}}{(2k)!}\right)\sum_{k=0}^{\infty}\frac{2^{-k}\,\Gamma^{(k)}(1)}{k!}}\right)}$$

Open code

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$$\sqrt[15]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)} = 3^{2/15}\sqrt[15]{62}\sqrt[15]{\exp\left(\frac{\sqrt{2}}{\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{16}\right)^k\pi^{2k}}{(2k)!}\right)\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}-z_0\right)^k\Gamma^{(k)}(z_0)}{k!}}\right)} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Open code

$$\sqrt[15]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)} = 3^{2/15}\sqrt[15]{62}\sqrt[15]{\exp\left(\frac{1}{\sqrt{2}\left(J_0\left(\frac{\pi}{4}\right)+2\sum_{k=1}^{\infty}(-1)^k J_{2k}\left(\frac{\pi}{4}\right)\right)\sum_{k=0}^{\infty}\frac{2^{-k}\,\Gamma^{(k)}(1)}{k!}}\right)}$$

Open code

$$\sqrt[15]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)} = 3^{2/15}\sqrt[15]{62}\sqrt[15]{\exp\left(\frac{\sqrt{2}}{\left(J_0\left(\frac{\pi}{4}\right)+2\sum_{k=1}^{\infty}(-1)^k J_{2k}\left(\frac{\pi}{4}\right)\right)\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}-z_0\right)^k\Gamma^{(k)}(z_0)}{k!}}\right)}$$

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

Integral representations:

- More

$$\sqrt[15]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)} = 3^{2/15}\sqrt[15]{62}\sqrt[15]{\exp\left(-\frac{i}{\pi}\oint_L \frac{e^t}{\sqrt{t}}\,dt\right)}$$

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$$\sqrt[15]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)} = 3^{2/15}\sqrt[15]{62}\sqrt[15]{\exp\left(\frac{2\sqrt{2}}{4\,i\,\pi-i\left(4-2\sqrt{2}\right)\pi}\oint_L \frac{e^t}{\sqrt{t}}\,dt\right)}$$

$$\sqrt[15]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)} = 3^{2/15}\sqrt[15]{62}\sqrt[15]{\exp\left(-\frac{i\oint_L \frac{e^{-t}}{\sqrt{-t}}\,dt}{\sqrt{2}\,\pi\int_{\frac{\pi}{2}}^{\frac{\pi}{4}}\sin(t)\,dt}\right)}$$

And for 16th root, we have:

Input:

$$\sqrt[16]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}$$

Open code

- $\Gamma(x)$ is the gamma function

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Exact result:

$$\sqrt[8]{3}\ \sqrt[16]{62}\ \sqrt[8\sqrt{\pi}]{e}$$

Decimal approximation:

- More digits

1.593282148731711327413667684874651400090254183445316871107...

Open code

Property:

$\sqrt[8]{3}\ \sqrt[16]{62}\ \sqrt[8\sqrt{\pi}]{e}$ is a transcendental number

Thence:

((((1.59328214873171+(((((24^2-18) * exp (((1 / ((((((gamma (1/2) * cos (Pi/4)))) / ((2^0.5))))))))))))^1/15))))

Input interpretation:

$$\frac{1}{2}\left(1.59328214873171+\sqrt[15]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}\right)$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- Fewer digits
- More digits

1.618408408961992624253790903594261442840828955136930019819...

1.6184084089619926242537909035942614428408289551369300

Series representations:

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

$$\frac{1}{2}\left(1.593282148731710000+\sqrt[15]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}\right)=$$

$$0.762217561906064750\left(1.045162318713449669+\right.$$

$$\left.1.000000000000000000\sqrt[15]{\exp\left(\frac{1}{\sqrt{2}\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{16}\right)^k\pi^{2k}}{(2k)!}\right)\sum_{k=0}^{\infty}\frac{2^{-k}\Gamma^{(k)}(1)}{k!}}\right)}\right)$$

Open code

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$$\frac{1}{2}\left(1.593282148731710000+\sqrt[15]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}\right)=$$

$$0.762217561906064750\left(1.045162318713449669+1.000000000000000000\right.$$

$$\left.\sqrt[15]{\exp\left(\frac{\sqrt{2}}{\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{16}\right)^k\pi^{2k}}{(2k)!}\right)\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}-z_0\right)^k\Gamma^{(k)}(z_0)}{k!}}\right)}\right)\quad \text{for } (z_0\notin\mathbb{Z}\text{ or } z_0>0)$$

Open code

$$\frac{1}{2}\left(1.593282148731710000+\sqrt[15]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}\right)=$$

$$0.762217561906064750\left(1.045162318713449669+1.000000000000000000\sqrt[15]{\exp\left(\frac{1}{\sqrt{2}\left(J_0\left(\frac{\pi}{4}\right)+2\sum_{k=1}^{\infty}(-1)^k J_{2k}\left(\frac{\pi}{4}\right)\right)\sum_{k=0}^{\infty}\frac{2^{-k}\Gamma^{(k)}(1)}{k!}}\right)}\right)$$

$$\frac{1}{2}\left(1.593282148731710000+\sqrt[15]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}\right)=$$

$$0.762217561906064750\left(1.045162318713449669+1.000000000000000000\sqrt[15]{\exp\left(\frac{\sqrt{2}}{\left(J_0\left(\frac{\pi}{4}\right)+2\sum_{k=1}^{\infty}(-1)^k J_{2k}\left(\frac{\pi}{4}\right)\right)\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}-z_0\right)^k\Gamma^{(k)}(z_0)}{k!}}\right)}\right)$$

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

Integral representations:

- More

$$\frac{1}{2}\left(1.593282148731710000+\sqrt[15]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}\right)=$$

$$0.796641074365855000+0.762217561906064750\sqrt[15]{\exp\left(-\frac{i}{\pi}\oint_L\frac{e^t}{\sqrt{t}}\,dt\right)}$$

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$$\frac{1}{2}\left(1.593282148731710000+\sqrt[15]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}\right)=$$

$$0.796641074365855000+$$
$$0.762217561906064750\sqrt[15]{\exp\left(\frac{2\sqrt{2}}{4 i\pi - i(4-2\sqrt{2})\pi}\oint_L \frac{e^t}{\sqrt{t}}\,dt\right)}$$

$$\frac{1}{2}\left(1.593282148731710000+\sqrt[15]{(24^2-18)\exp\left(\frac{1}{\frac{\Gamma\left(\frac{1}{2}\right)\cos\left(\frac{\pi}{4}\right)}{\sqrt{2}}}\right)}\right)=$$

$$0.796641074365855000+0.762217561906064750\sqrt[15]{\exp\left(-\frac{i\oint_L \frac{e^{-t}}{\sqrt{-t}}\,dt}{\sqrt{2}\,\pi\int_{\frac{\pi}{2}}^{\frac{\pi}{4}}\sin(t)\,dt}\right)}$$

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{12+\cfrac{1}{1+\cfrac{1}{31+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{17+\cfrac{1}{46+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

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Possible closed forms:

- More

$$\frac{4602797188\,\pi}{8934774283}\approx 1.61840840896199262424 0227$$

root of $2326x^4-283x^3-5501x^2-809x+960$ near $x=1.61841$ ≈

1.618408408961992624251 3189

root of $6170x^3+24185x^2-19586x-57803$ near $x=1.61841$ ≈

1.61840840896199262424 5543

We have:

Clearly, we need to require that $p > 0$. Also, from the asymptotic expansion of $J_n(x)$ as x tends to ∞ (see Whittaker and Watson's text [1, p. 368]), the integrals above converge if $p < n + \frac{3}{2}$. In Hardy's notation, $1/\psi(s) = 2^{n+1+2s}\Gamma(s+1)\Gamma(n+s+1)$ and $A = \pi + \varepsilon$, for any $\varepsilon > 0$, by Stirling's formula. Thus, Hardy's theorem is inapplicable. However, formally applying Ramanujan's Master Theorem, we find that

$$\int_0^\infty x^{p-n-1} J_n(x)\, dx = \Gamma(\tfrac{1}{2}p)\varphi(-\tfrac{1}{2}p) = \frac{2^{p-n-1}\Gamma(\frac{1}{2}p)}{\Gamma(n+1-\frac{1}{2}p)},$$

where $0 < p < n + \frac{3}{2}$. Despite the faulty procedure, this result is again correct (Gradshteyn and Ryzhik [1, p. 684]; Watson [3, p. 391]).

For p = 3,4 and n = 2, we obtain:

(((2^0.4) gamma (3.4/2))) / (((gamma ((2+1-(3.4/2)))))

Input:

$$\frac{2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

1.33593...

Series representations:

$$\frac{2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)} = \frac{1.31951 \sum_{k=0}^{\infty} \frac{(1.7-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}{\sum_{k=0}^{\infty} \frac{(1.3-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Open code

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$$\frac{2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)} = \frac{1.31951 \sum_{k=0}^{\infty} (1.3-z_0)^k \sum_{j=0}^{k} \frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}}{\sum_{k=0}^{\infty} (1.7-z_0)^k \sum_{j=0}^{k} \frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}}$$

Integral representations:

- More

$$\frac{2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)} = 1.31951 \exp\left(\int_0^1 \frac{0.4-0.4\,x-x^{1.3}+x^{1.7}}{(-1+x)\log(x)}\,dx\right)$$

Open code

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$$\frac{2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)} = 1.31951 \exp\left(-0.4\,\gamma + \int_0^1 \frac{x^{1.3}-x^{1.7}-\log\left(x^{1.3}\right)+\log\left(x^{1.7}\right)}{\log(x)-x\log(x)}\,dx\right)$$

Open code

$$\frac{2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)} = \frac{1.31951 \int_0^1 \log^{0.7}\left(\frac{1}{t}\right)dt}{\int_0^1 \log^{0.3}\left(\frac{1}{t}\right)dt}$$

sqrt(((2*(((2^0.4) gamma (3.4/2))) / (((gamma ((2+1-(3.4/2)))))))))

Input:

$$\sqrt{2\times\frac{2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}}$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- Fewer digits
- More digits

1.634581130846305862805157244074889658241972614935123210024...

1.6345811308463058628051572440748896582419726149351232

Series representations:

- More

$$\sqrt{\frac{2\left(2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}} = \sqrt{-1+\frac{2.63902\,\Gamma(1.7)}{\Gamma(1.3)}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+\frac{2.63902\,\Gamma(1.7)}{\Gamma(1.3)}\right)^{-k}$$

Open code

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$$\sqrt{\frac{2\left(2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}} = \sqrt{-1+\frac{2.63902\,\Gamma(1.7)}{\Gamma(1.3)}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+\frac{2.63902\,\Gamma(1.7)}{\Gamma(1.3)}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$\sqrt{\frac{2\left(2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}} = \sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{2.63902\,\Gamma(1.7)}{\Gamma(1.3)}-z_0\right)^k z_0^{-k}}{k!}$$

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

Integral representations:

- More

$$\sqrt{\frac{2\left(2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}} = \sqrt{2.63902\exp\left(\int_0^1 \frac{0.4-0.4\,x-x^{1.3}+x^{1.7}}{(-1+x)\log(x)}\,dx\right)}$$

Open code

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$$\sqrt{\frac{2\left(2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}} = \sqrt{2.63902\exp\left(-0.4\,\gamma+\int_0^1 \frac{x^{1.3}-x^{1.7}-\log(x^{1.3})+\log(x^{1.7})}{\log(x)-x\log(x)}\,dx\right)}$$

Open code

$$\sqrt{\frac{2\left(2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}} = \sqrt{\frac{2.63902\int_0^1\log^{0.7}\left(\frac{1}{t}\right)dt}{\int_0^1\log^{0.3}\left(\frac{1}{t}\right)dt}}$$

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{10+\cfrac{1}{123+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Open code

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Possible closed forms:

- More

$$\frac{2\,385\,461\,356\,\pi}{4\,584\,751\,243} \approx 1.63458113084630586278958$$

$\text{root of } 54\,279\,x^3 - 104\,420\,x^2 + 26\,742\,x - 1773 \text{ near } x = 1.63458 \approx$

1.634581130846305862813983

$\pi\ \text{root of } 26\,003\,x^3 - 58\,205\,x^2 - 3405\,x + 13\,866 \text{ near } x = 0.520303 \approx$

1.63458113084630586280528693

1.2108 * (((2^0.4) gamma (3.4/2))) / (((gamma ((2+1-(3.4/2)))))))

Where 1,2108 is a Hausdorff dimension

Input interpretation:

$$1.2108 \times \frac{2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}$$

Open code

- $\Gamma(x)$ is the gamma function

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1.617541303547194308363559039077385257421270838960277781927...

1.6175413035471943083635590390773852574212708389602777

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

Series representations:

$$\frac{1.2108\left(2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)} = \frac{1.59766\sum_{k=0}^{\infty}\frac{(1.7-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}{\sum_{k=0}^{\infty}\frac{(1.3-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Open code

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$$\frac{1.2108\left(2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)} = \frac{1.59766\sum_{k=0}^{\infty}(1.3-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}}{\sum_{k=0}^{\infty}(1.7-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}}$$

Open code

- $\mathbb{Z}$ is the set of integers
  - More information

Integral representations:

- More

$$\frac{1.2108\left(2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)} = 1.59766\exp\left(\int_0^1\frac{0.4-0.4x-x^{1.3}+x^{1.7}}{(-1+x)\log(x)}\,dx\right)$$

Open code

$$\frac{1.2108\left(2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)} = 1.59766\exp\left(-0.4\gamma+\int_0^1\frac{x^{1.3}-x^{1.7}-\log\left(x^{1.3}\right)+\log\left(x^{1.7}\right)}{\log(x)-x\log(x)}\,dx\right)$$

Open code

$$\frac{1.2108\left(2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)} = \frac{1.59766\int_0^1\log^{0.7}\left(\frac{1}{t}\right)dt}{\int_0^1\log^{0.3}\left(\frac{1}{t}\right)dt}$$

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{14+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Possible closed forms:

- More

$$\frac{959\,387\,201\,\pi}{1\,863\,324\,155} \approx 1.61754130354719430834480 9$$

$$\frac{240 - 8003\,\mathcal{K}_{-10}}{3\,(4503\,\mathcal{K}_{-10} - 6668)} \approx 1.617541303547194306624 2$$

$$\frac{2710 + 18\,874\,e + 5445\,e^2}{21\,435\,e} \approx 1.61754130354719430828367$$

36^2 * (((2^0.4) gamma (3.4/2))) / (((gamma ((2+1-(3.4/2)))))))

Input:

$$36^2 \times \frac{2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

1731.36...

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

Series representations:

$$\frac{36^2 \left(2^{0.4}\, \Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)} = \frac{1710.08 \sum_{k=0}^{\infty} \frac{(1.7-z_0)^k\, \Gamma^{(k)}(z_0)}{k!}}{\sum_{k=0}^{\infty} \frac{(1.3-z_0)^k\, \Gamma^{(k)}(z_0)}{k!}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Open code

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$$\frac{36^2 \left(2^{0.4}\, \Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)} = \frac{1710.08 \sum_{k=0}^{\infty} (1.3-z_0)^k \sum_{j=0}^{k} \frac{(-1)^j\, \pi^{-j+k} \sin\left(\frac{1}{2}\pi(-j+k+2 z_0)\right) \Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}}{\sum_{k=0}^{\infty} (1.7-z_0)^k \sum_{j=0}^{k} \frac{(-1)^j\, \pi^{-j+k} \sin\left(\frac{1}{2}\pi(-j+k+2 z_0)\right) \Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}}$$

Open code

- $\mathbb{Z}$ is the set of integers
  - More information

Integral representations:

- More

$$\frac{36^2 \left(2^{0.4}\, \Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)} = 1710.08 \exp\left(\int_0^1 \frac{0.4 - 0.4\,x - x^{1.3} + x^{1.7}}{(-1+x)\log(x)}\, dx\right)$$

Open code

$$\frac{36^2 \left(2^{0.4}\, \Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)} = 1710.08 \exp\left(-0.4\,\gamma + \int_0^1 \frac{x^{1.3} - x^{1.7} - \log(x^{1.3}) + \log(x^{1.7})}{\log(x) - x\log(x)}\, dx\right)$$

Open code

$$\frac{36^2 \left(2^{0.4}\, \Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)} = \frac{1710.08 \int_0^1 \log^{0.7}\left(\frac{1}{t}\right) dt}{\int_0^1 \log^{0.3}\left(\frac{1}{t}\right) dt}$$

(((((((36^2 * (((2^0.4) gamma (3.4/2))) / (((gamma ((2+1-(3.4/2)))))))))))))^1/3

Input:

$$\sqrt[3]{36^2 \times \frac{2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}}$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

12.00778...

This result is very near to the value of black hole entropy 12,1904

2 * (((((((36^2 * (((2^0.4) gamma (3.4/2))) / (((gamma ((2+1-(3.4/2)))))))))))))^1/3

Input:

$$2\sqrt[3]{36^2 \times \frac{2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}}$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

24.01556...

This value is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

Series representations:

$$2\sqrt[3]{\frac{36^2\left(2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}} = 23.9168\sqrt[3]{\frac{\sum_{k=0}^{\infty}\frac{(1.7-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}{\sum_{k=0}^{\infty}\frac{(1.3-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Open code

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$$2\sqrt[3]{\frac{36^2\left(2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}} = 23.9168\sqrt[3]{\frac{\sum_{k=0}^{\infty}(1.3-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!(-j+k)!}}{\sum_{k=0}^{\infty}(1.7-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!(-j+k)!}}}$$

Open code

- $\mathbb{Z}$ is the set of integers
  - More information

Integral representations:

- More

$$2\sqrt[3]{\frac{36^2\left(2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}} = 23.9168\sqrt[3]{\exp\left(\int_0^1\frac{0.4-0.4x-x^{1.3}+x^{1.7}}{(-1+x)\log(x)}\,dx\right)}$$

Open code

$$2\sqrt[3]{\frac{36^2\left(2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}} = 23.9168\sqrt[3]{\frac{\int_0^1\log^{0.7}\left(\frac{1}{t}\right)dt}{\int_0^1\log^{0.3}\left(\frac{1}{t}\right)dt}}$$

Open code

$$2\sqrt[3]{\frac{36^2\left(2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}} = 23.9168\sqrt[3]{\exp\left(-0.4\gamma+\int_0^1\frac{x^{1.3}-x^{1.7}-\log(x^{1.3})+\log(x^{1.7})}{\log(x)-x\log(x)}\,dx\right)}$$

(((((((36^2 * (((2^0.4) gamma (3.4/2))) / (((gamma ((2+1-(3.4/2))))))))))))^1/15

Input:

$$\sqrt[15]{36^2\times\frac{2^{0.4}\,\Gamma\left(\frac{3.4}{2}\right)}{\Gamma\left(2+1-\frac{3.4}{2}\right)}}$$

Open code

• $\Gamma(x)$ is the gamma function

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1.643964863900773229341487245763046272664075464181993540278...

1.643964863900773229341487245763046272664075464181 9935

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{6+\cfrac{1}{10+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{13+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Possible closed forms:

- More

$$\frac{5\,937\,885\,107\,\pi}{11\,347\,211\,026} \approx 1.64396486390077322938603$$

$$\pi \;\text{root of}\; 26\,459\,x^3 + 102\,420\,x^2 - 70\,560\,x + 5086 \;\text{near}\; x = 0.52329 \approx 1.64396486390077322938385$$

$$\frac{\left(\frac{52\,590\,379}{997\,993}\right)^{2/3}}{5\sqrt[3]{5}} \approx 1.6439648639007732236727$$

Now, we have that:

Example (b). Let $n=2$ and replace t by $\sqrt{t}$ in (1.9) to find that

$$\int_0^\infty \frac{dt}{(-\sqrt{t};q)_\infty} = \lim_{n\to 2} \frac{2\pi(1-q^{1-n})(1-q^{2-n})}{\sin(\pi n)}$$

$$= \frac{2(q-1)\operatorname{Log} q}{q}.$$

From the right-hand side, for q = 0.5

$$\frac{2(q-1)\operatorname{Log} q}{q}$$

we obtain:

((2(0.5-1) * ln (0.5))) / (0.5)

Input:

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

Open code

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

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Result:

- Fewer digits
- More digits

1.386294361119890618834464242916353136151000268720510508241...

Series representations:

- More

$$\frac{2((0.5-1)\log(0.5))}{0.5} = 2\sum_{k=1}^{\infty}\frac{(-1)^k(-0.5)^k}{k}$$

Open code

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

Open code

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

Open code

- $\arg(z)$ is the complex argument
- $\lfloor x \rfloor$ is the floor function
- i is the imaginary unit
- More information

Integral representation:

$$\frac{2((0.5-1)\log(0.5))}{0.5} = -2\int_1^{0.5}\frac{1}{t}\,dt$$

(((((2(0.5-1) * ln (0.5))) / (0.5))))^(3/2)

Input:

$$\left(\frac{2(0.5-1)\log(0.5)}{0.5}\right)^{3/2}$$

Open code

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

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1.632236874939246015608836681340887681234869148017356136660...

1.632236874939246015608836681340887681234869148017356 1

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{12+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{5+\cfrac{1}{38+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Possible closed forms:

- More

$2\sqrt{2}\ \log^{3/2}(2) \approx$
1.632236874939246015608836681340887681234869148017356136660

$2\sqrt{2}\ C_{\ln 2}^{3/2} \approx$
1.632236874939246015608836681340887681234869148017356136660

$\frac{(-b_4(2))^{3/2}}{2\sqrt{2}} \approx$
1.632236874939246015608836681340887681234869148017356136660

sqrt((((((2(0.5-1) * ln (0.5))) / (0.5))))^3)))) *Pi

Input:

$$\sqrt{\left(\frac{2\,(0.5-1)\log(0.5)}{0.5}\right)^3}\ \pi$$

Open code

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

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Result:

- More digits

5.12782...

This value 5,12782 is very near to the first value of upper bound dark photon energy range (1.8 * 10^{15} – 4.95 * 10^{16} – 5.4 * 10^{16}) (Physics Letters B 731 (2014) 265–271 - **Searching a dark photon with HADES**)

Series representations:

- More

$$\sqrt{\left(\frac{2\,((0.5-1)\log(0.5))}{0.5}\right)^3}\,\pi = \pi\sqrt{8\left(\sum_{k=1}^{\infty}\frac{(-1)^k\,(-0.5)^k}{k}\right)^3}$$

Open code

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$$\sqrt{\left(\frac{2\,((0.5-1)\log(0.5))}{0.5}\right)^3}\,\pi = \pi\sqrt{-1-8\log^3(0.5)}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1-8\log^3(0.5)\right)^{-k}$$

Open code

$$\sqrt{\left(\frac{2\,((0.5-1)\log(0.5))}{0.5}\right)^3}\,\pi = \pi\sqrt{-1-8\log^3(0.5)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1-8\log^3(0.5)\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

Integral representation:

$$\sqrt{\left(\frac{2\,((0.5-1)\log(0.5))}{0.5}\right)^3}\,\pi = \pi\sqrt{-8\left(\int_1^{0.5}\frac{1}{t}\,dt\right)^3}$$

10^3 * ((2(0.5-1) * ln (0.5))) / (0.5) * (1.2619+1.2108)/2

Where 1,2619 and 1,2108 are Hausdorff dimensions

Input interpretation:

$$10^3\times\frac{2\,(0.5-1)\log(0.5)}{0.5}\times\frac{1.2619+1.2108}{2}$$

Open code

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

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1713.95...

Or:

10^3 * ((2(0.5-1) * ln (0.5))) / (0.5) * 1/2*sqrt(2Pi)

Input:

$$10^3 \times \frac{2\,(0.5-1)\log(0.5)}{0.5} \times \frac{1}{2}\sqrt{2\,\pi}$$

Open code

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

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1737.46…

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

Series representations:

- More

$$\frac{\left(10^3\sqrt{2\,\pi}\right)2\,((0.5-1)\log(0.5))}{0.5\times 2} = 1000\sqrt{-1+2\,\pi}\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}(-0.5)^{k_1}(-1+2\,\pi)^{-k_2}\binom{\frac{1}{2}}{k_2}}{k_1}$$

Open code

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$$\frac{\left(10^3\sqrt{2\,\pi}\right)2\,((0.5-1)\log(0.5))}{0.5\times 2} = 1000\sqrt{-1+2\,\pi}\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(-0.5)^{k_1}(-1+2\,\pi)^{-k_2}\left(-\frac{1}{2}\right)_{k_2}}{k_2!\,k_1}$$

Open code

$$\frac{\left(10^3\sqrt{2\,\pi}\right)2\,((0.5-1)\log(0.5))}{0.5\times 2} = -1000\exp\left(i\,\pi\left\lfloor\frac{\arg(2\,\pi-x)}{2\,\pi}\right\rfloor\right)\log(0.5)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2\,\pi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!} \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

Open code

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\arg(z)$ is the complex argument
- $\lfloor x \rfloor$ is the floor function
- i is the imaginary unit
- $\mathbb{R}$ is the set of real numbers
- More information

Integral representation:

$$\frac{(10^3 \sqrt{2\pi})\, 2\, ((0.5-1)\log(0.5))}{0.5 \times 2} = -1000 \sqrt{2\pi} \int_1^{0.5} \frac{1}{t}\, dt$$

((((10^3 * ((2(0.5-1) * ln (0.5))) / (0.5) * 1/2*sqrt(2Pi)))))^1/3

Input:

$$\sqrt[3]{10^3 \times \frac{2\,(0.5-1)\log(0.5)}{0.5} \times \frac{1}{2}\sqrt{2\pi}}$$

Open code

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

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

12.0219...

This result is very near to the value of black hole entropy 12,1904

2*((((10^3 * ((2(0.5-1) * ln (0.5))) / (0.5) * 1/2*sqrt(2Pi)))))^1/3

Input:

$$2\sqrt[3]{10^3 \times \frac{2\,(0.5-1)\log(0.5)}{0.5} \times \frac{1}{2}\sqrt{2\pi}}$$

Open code

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

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Result:

- More digits

24.0437...

This value is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

Series representations:

- More

$$2\sqrt[3]{\frac{\left(10^3\sqrt{2\pi}\right)2\left((0.5-1)\log(0.5)\right)}{0.5\times 2}} = 20.\sqrt[3]{\sqrt{-1+2\pi}\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}(-0.5)^{k_1}(-1+2\pi)^{-k_2}\binom{\frac{1}{2}}{k_2}}{k_1}}$$

Open code

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$$2\sqrt[3]{\frac{\left(10^3\sqrt{2\pi}\right)2\left((0.5-1)\log(0.5)\right)}{0.5\times 2}} = 20.\sqrt[3]{\sqrt{-1+2\pi}\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(-0.5)^{k_1}(-1+2\pi)^{-k_2}\left(-\frac{1}{2}\right)_{k_2}}{k_2!\,k_1}}$$

Open code

$$2\sqrt[3]{\frac{\left(10^3\sqrt{2\pi}\right)2\left((0.5-1)\log(0.5)\right)}{0.5\times 2}} = 20.\sqrt[3]{-\exp\left(i\pi\left\lfloor\frac{\arg(2\pi-x)}{2\pi}\right\rfloor\right)\log(0.5)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2\pi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

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

Open code

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\arg(z)$ is the complex argument
- $\lfloor x\rfloor$ is the floor function
- i is the imaginary unit
- $\mathbb{R}$ is the set of real numbers
- More information

- Integral representation:

- $$2\sqrt[3]{\frac{(10^3\sqrt{2\pi})\,2\,((0.5-1)\log(0.5))}{0.5\times 2}} = 20.\sqrt[3]{-\sqrt{2\pi}\int_1^{0.5}\frac{1}{t}\,dt}$$

((((10^3 * ((2(0.5-1) * ln (0.5))) / (0.5) * 1/2*sqrt(2Pi)))))^1/15

Input:

$$\sqrt[15]{10^3\times\frac{2\,(0.5-1)\log(0.5)}{0.5}\times\frac{1}{2}\sqrt{2\pi}}$$

Open code

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

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1.6443503673832899642739552816589703672093624903877284535 56...

1.6443503673832899642739552816589703672093624903877284

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{15+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{5+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{135+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Open code

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Possible closed forms:

- More

$$-\cot\left(\csc\left(\frac{30341139}{4697939}\right)\right)\approx 1.644350367383290019$$

$$\frac{10\sqrt{\frac{10090130}{37810141}}}{\pi}\approx 1.644350367383289980411$$

$$\frac{1848134522\pi}{3530929875} \approx 1.6443503673832899643312 7$$

•

3*((((10^3 * ((2(0.5-1) * ln (0.5))) / (0.5) * 1/2*sqrt(2Pi)))))^1/15

Input:

$$3\sqrt[15]{10^3 \times \frac{2(0.5-1)\log(0.5)}{0.5} \times \frac{1}{2}\sqrt{2\pi}}$$

Open code

• log(x) is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

• More digits

4.933051...

This value 4,933051 is very near to the first value of upper bound dark photon energy range ($1.8 * 10^{15} – 4.95 * 10^{16} – 5.4 * 10^{16}$) (Physics Letters B 731 (2014) 265–271 - **Searching a dark photon with HADES**)

Series representations:

• More

$$3\sqrt[15]{\frac{(10^3\sqrt{2\pi})\,2\,((0.5-1)\log(0.5))}{0.5\times 2}} = 4.75468\sqrt[15]{\sqrt{-1+2\pi}\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}(-0.5)^{k_1}(-1+2\pi)^{-k_2}\binom{\frac{1}{2}}{k_2}}{k_1}}$$

Open code

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$$3\sqrt[15]{\frac{(10^3\sqrt{2\pi})\,2\,((0.5-1)\log(0.5))}{0.5\times 2}} = 4.75468\sqrt[15]{\sqrt{-1+2\pi}\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(-0.5)^{k_1}(-1+2\pi)^{-k_2}\left(-\frac{1}{2}\right)_{k_2}}{k_2!\,k_1}}$$

Open code

$$3\sqrt[15]{\frac{(10^3\sqrt{2\pi})\,2\,((0.5-1)\log(0.5))}{0.5\times 2}} =$$

$$4.75468\sqrt[15]{-\exp\left(i\pi\left\lfloor\frac{\arg(2\pi-x)}{2\pi}\right\rfloor\right)\log(0.5)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2\pi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

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

Integral representation:

$$3\sqrt[15]{\frac{(10^3\sqrt{2\pi})\,2\,((0.5-1)\log(0.5))}{0.5\times 2}} = 4.75468\sqrt[15]{-\sqrt{2\pi}\int_1^{0.5}\frac{1}{t}\,dt}$$

8*((((10^3 * ((2(0.5-1) * ln (0.5))) / (0.5) * 1/2*sqrt(2Pi)))))^1/15

Input:

$$8\sqrt[15]{10^3\times\frac{2\,(0.5-1)\log(0.5)}{0.5}\times\frac{1}{2}\sqrt{2\pi}}$$

Open code

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

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

13.15480...

This result is very near to the Rydberg constant 13,605693 eV that is used to express the limiting value of the highest wavenumber (inverse wavelength) of any photon that can be emitted from an atom, or, alternatively, the wavenumber of the lowest-energy photon capable of ionizing an atom from its ground state.

Series representations:

- More

$$8\sqrt[15]{\frac{(10^3\sqrt{2\pi})\,2\,((0.5-1)\log(0.5))}{0.5\times 2}} =$$

$$12.6791\sqrt[15]{\sqrt{-1+2\pi}\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}(-0.5)^{k_1}(-1+2\pi)^{-k_2}\binom{\frac{1}{2}}{k_2}}{k_1}}$$

Open code

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$$8 \sqrt[15]{\frac{(10^3 \sqrt{2\pi})\, 2\,((0.5-1)\log(0.5))}{0.5 \times 2}} =$$

$$12.6791 \sqrt[15]{\sqrt{-1+2\pi} \sum_{k_1=1}^{\infty} \sum_{k_2=0}^{\infty} \frac{(-1)^{k_1+k_2} (-0.5)^{k_1} (-1+2\pi)^{-k_2} \left(-\frac{1}{2}\right)_{k_2}}{k_2!\, k_1}}$$

Open code

$$8 \sqrt[15]{\frac{(10^3 \sqrt{2\pi})\, 2\,((0.5-1)\log(0.5))}{0.5 \times 2}} =$$

$$12.6791 \sqrt[15]{-\exp\left(i\pi \left\lfloor \frac{\arg(2\pi - x)}{2\pi} \right\rfloor\right) \log(0.5) \sqrt{x} \sum_{k=0}^{\infty} \frac{(-1)^k (2\pi - x)^k x^{-k} \left(-\frac{1}{2}\right)_k}{k!}}$$

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

Integral representation:

$$8 \sqrt[15]{\frac{(10^3 \sqrt{2\pi})\, 2\,((0.5-1)\log(0.5))}{0.5 \times 2}} = 12.6791 \sqrt[15]{-\sqrt{2\pi} \int_1^{0.5} \frac{1}{t}\, dt}$$

Example (c). Letting $n = 3$ and replacing t by $t^{1/3}$ in (1.9), we deduce that

$$\int_0^{\infty} \frac{dt}{(-t^{1/3}; q)_{\infty}} = \lim_{n \to 3} \frac{3\pi(1-q^{1-n})(1-q^{2-n})(1-q^{3-n})}{\sin(\pi n)}$$

$$= -\frac{3(1-q)(1-q^2)\,\mathrm{Log}\, q}{q^3}.$$

Example (d). Let $n = \frac{1}{2}$, $q = a^2$, and $t = x^2$ in (1.9) to discover the elegant identity

$$\int_0^{\infty} \frac{dx}{(-x^2; a^2)_{\infty}} = \frac{\pi}{2} \prod_{k=1}^{\infty} \frac{1-a^{2k-1}}{1-a^{2k}},$$

which was first posed as a problem by Ramanujan [6], [15, p. 326].

We have that:

$$\int_0^\infty \frac{dt}{(-t^{1/3};q)_\infty} = \lim_{n\to 3} \frac{3\pi(1-q^{1-n})(1-q^{2-n})(1-q^{3-n})}{\sin(\pi n)}$$
$$= -\frac{3(1-q)(1-q^2)\ \mathrm{Log}\ q}{q^3}.$$

From the right-hand side of example (c):

$$-\frac{3(1-q)(1-q^2)\ \mathrm{Log}\ q}{q^3}.$$

We obtain:

-(((3(1-0.5) * (1-0.5)^2 * ln (0.5))) / (((0.5)^2)))

Result:

- More digits

1.03972...

Series representations:

- More

$$-\frac{3\,(1-0.5)\,(1-0.5)^2\,\log(0.5)}{0.5^2} = 1.5\sum_{k=1}^{\infty}\frac{(-1)^k\,(-0.5)^k}{k}$$

Open code

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$$-\frac{3\,(1-0.5)\,(1-0.5)^2\,\log(0.5)}{0.5^2} = -3\,i\,\pi\left\lfloor\frac{\arg(0.5-x)}{2\,\pi}\right\rfloor - 1.5\log(x) + 1.5\sum_{k=1}^{\infty}\frac{(-1)^k\,(0.5-x)^k\,x^{-k}}{k} \quad \text{for } x<0$$

Open code

$$-\frac{3\,(1-0.5)\,(1-0.5)^2\,\log(0.5)}{0.5^2} = -1.5\left\lfloor\frac{\arg(0.5-z_0)}{2\,\pi}\right\rfloor\log\left(\frac{1}{z_0}\right) - 1.5\log(z_0) - 1.5\left\lfloor\frac{\arg(0.5-z_0)}{2\,\pi}\right\rfloor\log(z_0) + 1.5\sum_{k=1}^{\infty}\frac{(-1)^k\,(0.5-z_0)^k\,z_0^{-k}}{k}$$

Open code

- arg(z) is the complex argument
- ⌊x⌋ is the floor function
- i is the imaginary unit
- More information

Integral representation:

$$-\frac{3(1-0.5)(1-0.5)^2\log(0.5)}{0.5^2} = -1.5\int_1^{0.5}\frac{1}{t}\,dt$$

(((-(((3(1-0.5) * (1-0.5)^2 * ln (0.5))) / (((0.5)^2))))))^13

Input:

$$\left(-\frac{3(1-0.5)(1-0.5)^2\log(0.5)}{0.5^2}\right)^{13}$$

Open code

- log(x) is the natural logarithm

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Result:

- Fewer digits
- More digits

1.659271146945157736663855548941017181895451034554491541403...

1.6592711469451577366638555489410171818954510345544915

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{14+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{16+\cfrac{1}{8+\cfrac{1}{9+\cfrac{1}{8+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{11+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Possible closed forms:

- More

$$\frac{1594323 \log^{13}(2)}{8192} \approx 1.659271146945157736663855548941017181895451034554491541403$$

$$\frac{733\, \mathcal{D}_{DHA} + 4000}{5\,(91\, \mathcal{D}_{DHA} + 480)} \approx 1.659271146945157726627$$

$$\frac{829079408\pi}{1569743307} \approx 1.65927114694515773653622$$

10^3 * (((-(((3(1-0.5) * (1-0.5)^2 * ln (0.5))) / (((0.5)^2))))))^13 * ((sqrt(((1/12)+1))))

Input:

$$10^3 \left(-\frac{3\,(1-0.5)\,(1-0.5)^2 \log(0.5)}{0.5^2}\right)^{13} \sqrt{\frac{1}{12}+1}$$

Open code

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

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1727.02...

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

Series representations:

- More

$$10^3 \left(-\frac{3\,(1-0.5)\,(1-0.5)^2 \log(0.5)}{0.5^2}\right)^{13} \sqrt{\frac{1}{12}+1} = -194620. \log^{13}(0.5) \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{12}\right)^k \left(-\frac{1}{2}\right)_k}{k!}$$

Open code

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$$10^3 \left(-\frac{3\,(1-0.5)\,(1-0.5)^2 \log(0.5)}{0.5^2}\right)^{13} \sqrt{\frac{1}{12}+1} = 194620. \left(\sum_{k=1}^{\infty} \frac{(-1)^k (-0.5)^k}{k}\right)^{13} \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{12}\right)^k \left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$10^3 \left(-\frac{3(1-0.5)(1-0.5)^2 \log(0.5)}{0.5^2}\right)^{13} \sqrt{\frac{1}{12}+1} = -194620. \exp\left(i\pi \left\lfloor \frac{\arg\left(\frac{13}{12}-x\right)}{2\pi} \right\rfloor\right) \log^{13}(0.5) \sqrt{x} \sum_{k=0}^{\infty} \frac{(-1)^k \left(\frac{13}{12}-x\right)^k x^{-k} \left(-\frac{1}{2}\right)_k}{k!} \quad \text{for } (x \in \mathbb{R} \text{ and } x < 0)$$

Open code

- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\arg(z)$ is the complex argument
- $\lfloor x \rfloor$ is the floor function
- i is the imaginary unit
- $\mathbb{R}$ is the set of real numbers
- More information

Integral representation:

$$10^3 \left(-\frac{3(1-0.5)(1-0.5)^2 \log(0.5)}{0.5^2}\right)^{13} \sqrt{\frac{1}{12}+1} = -194620. \left(\int_1^{0.5} \frac{1}{t}\, dt\right)^{13} \sqrt{\frac{13}{12}}$$

(((((10^3 * (((-(((3(1-0.5) * (1-0.5)^2 * ln (0.5))) / (((0.5)^2)))))))^13 * ((sqrt(((1/12)+1))))))))^1/3

Input:

$$\sqrt[3]{10^3 \left(-\frac{3(1-0.5)(1-0.5)^2 \log(0.5)}{0.5^2}\right)^{13} \sqrt{\frac{1}{12}+1}}$$

Open code

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

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Result:

- More digits

11.9977...

This result is very near to the value of black hole entropy 12,1904

2 * (((((10^3 * (((-(((3(1-0.5) * (1-0.5)^2 * ln (0.5))) / (((0.5)^2)))))))^13 * ((sqrt(((1/12)+1))))))))^1/3

Input:

$$2\sqrt[3]{10^3\left(-\frac{3(1-0.5)(1-0.5)^2\log(0.5)}{0.5^2}\right)^{13}}\sqrt{\frac{1}{12}+1}$$

Open code

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

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Result:

- More digits

23.9955...

This value is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

Series representations:

- More

$$2\sqrt[3]{10^3\left(-\frac{3(1-0.5)(1-0.5)^2\log(0.5)}{0.5^2}\right)^{13}}\sqrt{\frac{1}{12}+1} = 115.902\sqrt[3]{-\log^{13}(0.5)\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{12}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}$$

Open code

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$$2\sqrt[3]{10^3\left(-\frac{3(1-0.5)(1-0.5)^2\log(0.5)}{0.5^2}\right)^{13}}\sqrt{\frac{1}{12}+1} = 115.902\sqrt[3]{\left(\sum_{k=1}^{\infty}\frac{(-1)^k(-0.5)^k}{k}\right)^{13}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{12}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}$$

Open code

$$2\sqrt[3]{10^3\left(-\frac{3(1-0.5)(1-0.5)^2\log(0.5)}{0.5^2}\right)^{13}}\sqrt{\frac{1}{12}+1} = 115.902\sqrt[3]{-\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{13}{12}-x\right)}{2\pi}\right\rfloor\right)\log^{13}(0.5)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{13}{12}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

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

Integral representation:

$$2\sqrt[3]{10^3\left(-\frac{3(1-0.5)(1-0.5)^2\log(0.5)}{0.5^2}\right)^{13}\sqrt{\frac{1}{12}+1}} =$$

$$115.902\sqrt[3]{-\left(\int_1^{0.5}\frac{1}{t}\,dt\right)^{13}\sqrt{\frac{13}{12}}}$$

(((((10^3 * (((-(((3(1-0.5) * (1-0.5)^2 * ln (0.5))) / (((0.5)^2))))))^13 * ((sqrt(((1/12)+1))))))))^1/15

Input:

$$\sqrt[15]{10^3\left(-\frac{3(1-0.5)(1-0.5)^2\log(0.5)}{0.5^2}\right)^{13}\sqrt{\frac{1}{12}+1}}$$

Open code

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

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1.6436899293229325707357376717213919215345606701327689811410...

1.6436899293229325707357376717213919215345606701327689

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{10+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{4+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Possible closed forms:

- More

$$\frac{620\,\pi\,\pi! + 1864 - 4\,\pi - 1591\,\pi^2}{29\,\pi} \approx 1.64368992932293257 39066$$

$$\frac{826\,837\,795\,\pi}{1\,580\,339\,148} \approx 1.64368992932293257 07 98000$$

π [root of $810\,x^4 - 4334\,x^3 + 2638\,x^2 + 1030\,x - 701$ near $x = 0.523203$] $\approx$
1.6436899293229325709 8728

$$\int_0^\infty \frac{dx}{(-x^2; a^2)_\infty} = \frac{\pi}{2} \prod_{k=1}^{\infty} \frac{1-a^{2k-1}}{1-a^{2k}},$$

$$\sum_{k=1}^{\infty} a^{k(k-1)/2} = \prod_{k=1}^{\infty} \frac{1-a^{2k}}{1-a^{2k-1}}.$$

From the right-hand side:

$$\frac{\pi}{2} \prod_{k=1}^{\infty} \frac{1-a^{2k\;\;1}}{1-a^{2k}},$$

(We remember that a typical use of the production ∏ is the factorial definition of a number n

$$n! = \prod_{k=1}^{n} k = 1 \cdot 2 \cdot 3 \cdot \ldots \cdot (n-1) \cdot n$$

For k = 1 and n = 2, we have 2!, thence k = 1*2 = 2)

For a = 0,70710678118654752440084436210485 q = 0.5 and k = 2

(Pi/2) * (((1-0.70710678^3) / (1-0.70710678^4)))

Input interpretation:

$$\frac{\pi}{2} \times \frac{1 - 0.70710678^3}{1 - 0.70710678^4}$$

Open code

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Result:

- More digits

1.3539146...

Series representations:

- More

$$\frac{(1-0.707107^3)\,\pi}{(1-0.707107^4)\,2} = 1.72386 \sum_{k=0}^{\infty} \frac{(-1)^k}{1+2\,k}$$

Open code

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$$\frac{(1-0.707107^3)\pi}{(1-0.707107^4)2} = -0.861929 + 0.861929 \sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}$$

Open code

$$\frac{(1-0.707107^3)\pi}{(1-0.707107^4)2} = 0.430964 \sum_{k=0}^{\infty} \frac{2^{-k}(-6+50k)}{\binom{3k}{k}}$$

Integral representations:

- More

$$\frac{(1-0.707107^3)\pi}{(1-0.707107^4)2} = 0.861929 \int_0^{\infty} \frac{1}{1+t^2}\,dt$$

Open code

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$$\frac{(1-0.707107^3)\pi}{(1-0.707107^4)2} = 1.72386 \int_0^1 \sqrt{1-t^2}\,dt$$

Open code

$$\frac{(1-0.707107^3)\pi}{(1-0.707107^4)2} = 0.861929 \int_0^{\infty} \frac{\sin(t)}{t}\,dt$$

sqrt((((2*(Pi/2) * (((1-0.70710678^3) / (1-0.70710678^4)))))))

Input interpretation:

$$\sqrt{2\times\frac{\pi}{2}\times\frac{1-0.70710678^3}{1-0.70710678^4}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1.645548305823057930798219392220359525983634086850635180325...

1.64554830582305793079821939222035952598363408685063 51

Series representations:

- More

$$\sqrt{\frac{(2(1-0.707107^3))\pi}{(1-0.707107^4)2}} = \sqrt{-1+0.861929\pi} \sum_{k=0}^{\infty} (-1+0.861929\pi)^{-k} \binom{\frac{1}{2}}{k}$$

Open code

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$$\sqrt{\frac{(2(1-0.707107^3))\pi}{(1-0.707107^4)2}} = \sqrt{-1+0.861929\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+0.861929\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$\sqrt{\frac{(2(1-0.707107^3))\pi}{(1-0.707107^4)2}} = \sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(0.861929\pi-z_0)^k z_0^{-k}}{k!}$$

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

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{7+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{217+\cfrac{1}{6+\cfrac{1}{4+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{39+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Possible closed forms:

- More

$$\frac{5\sqrt{\frac{66926270}{6343309}}}{\pi^2} \approx 1.64554830582305790027 7$$

$$\frac{-826+400\pi+65\pi^2}{3(-126-7\pi+37\pi^2)} \approx 1.645548305823057932697 3$$

$$\frac{2527987315\pi}{4826297927} \approx 1.64554830582305793081769$$

3 * sqrt((((2*(Pi/2) * (((1-0.70710678^3) / (1-0.70710678^4)))))))

Input interpretation:

$$3\sqrt{2\times\frac{\pi}{2}\times\frac{1-0.70710678^3}{1-0.70710678^4}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

4.9366449...

This value 4,93664 is very near to the first value of upper bound dark photon energy range (1.8 * 10^{15} – 4.95 * 10^{16} – 5.4 * 10^{16}) (Physics Letters B 731 (2014) 265–271 - **Searching a dark photon with HADES**)

8 * sqrt((((2*(Pi/2) * (((1-0.70710678^3) / (1-0.70710678^4)))))))

Input interpretation:

$$8\sqrt{2\times\frac{\pi}{2}\times\frac{1-0.70710678^3}{1-0.70710678^4}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

13.164386...

This result is very near to the Rydberg constant 13,605693 eV that is used to express the limiting value of the highest wavenumber (inverse wavelength) of any photon that can be emitted from an atom, or, alternatively, the wavenumber of the lowest-energy photon capable of ionizing an atom from its ground state.

Series representations:

- More

$$8\sqrt{\frac{(2(1-0.707107^3))\pi}{(1-0.707107^4)2}}=8\sqrt{-1+0.861929\pi}\sum_{k=0}^{\infty}(-1+0.861929\pi)^{-k}\binom{\frac{1}{2}}{k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$8\sqrt{\frac{(2(1-0.707107^3))\pi}{(1-0.707107^4)2}}=8\sqrt{-1+0.861929\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+0.861929\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$8\sqrt{\frac{(2(1-0.707107^3))\pi}{(1-0.707107^4)2}} = 8\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(0.861929\pi-z_0)^k z_0^{-k}}{k!}$$

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

48 + 32^2 * sqrt((((2*(Pi/2) * (((1-0.70710678^3) / (1-0.70710678^4)))))))

Input interpretation:

$$48+32^2\sqrt{2\times\frac{\pi}{2}\times\frac{1-0.70710678^3}{1-0.70710678^4}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1733.0415...

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

Series representations:

- More

$$48+32^2\sqrt{\frac{(2(1-0.707107^3))\pi}{(1-0.707107^4)2}} = 48+1024\sqrt{-1+0.861929\pi}\sum_{k=0}^{\infty}(-1+0.861929\pi)^{-k}\binom{\frac{1}{2}}{k}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$48+32^2\sqrt{\frac{(2(1-0.707107^3))\pi}{(1-0.707107^4)2}} = 48+1024\sqrt{-1+0.861929\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+0.861929\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

Open code

$$48+32^2\sqrt{\frac{(2(1-0.707107^3))\pi}{(1-0.707107^4)2}} =$$

$$48+1024\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(0.861929\pi-z_0)^k z_0^{-k}}{k!}$$

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

((((48 + 32^2 * sqrt((((2*(Pi/2) * (((1-0.70710678^3) / (1-0.70710678^4))))))))))^1/3

Input interpretation:

$$\sqrt[3]{48+32^2\sqrt{2\times\frac{\pi}{2}\times\frac{1-0.70710678^3}{1-0.70710678^4}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

12.011659...

This result is very near to the value of black hole entropy 12,1904

2 * ((((48 + 32^2 * sqrt((((2*(Pi/2) * (((1-0.70710678^3) / (1-0.70710678^4))))))))))^1/3

Input interpretation:

$$2\sqrt[3]{48+32^2\sqrt{2\times\frac{\pi}{2}\times\frac{1-0.70710678^3}{1-0.70710678^4}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

24.023317...

This value is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

Series representations:

- More

$$2\sqrt[3]{48+32^2\sqrt{\frac{(2(1-0.707107^3))\pi}{(1-0.707107^4)2}}} =$$

$$2\sqrt[3]{48+1024\sqrt{-1+0.861929\pi}\sum_{k=0}^{\infty}(-1+0.861929\pi)^{-k}\binom{\frac{1}{2}}{k}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$2\sqrt[3]{48+32^2\sqrt{\frac{(2(1-0.707107^3))\pi}{(1-0.707107^4)2}}} =$$

$$2\sqrt[3]{48+1024\sqrt{-1+0.861929\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+0.861929\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

Open code

$$2\sqrt[3]{48+32^2\sqrt{\frac{(2(1-0.707107^3))\pi}{(1-0.707107^4)2}}} =$$

$$2\sqrt[3]{48+1024\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(0.861929\pi-z_0)^k z_0^{-k}}{k!}}$$

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

((((48 + 32^2 * sqrt((((2*(Pi/2) * (((1-0.70710678^3) / (1-0.70710678^4))))))))))^1/15

Input interpretation:

$$\sqrt[15]{48+32^2\sqrt{2\times\frac{\pi}{2}\times\frac{1-0.70710678^3}{1-0.70710678^4}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1.644071106371330028680582965350820832501744289058258860838...

1.6440711063713300286805829653508208325017442890582588

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{86+\cfrac{1}{30+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{163+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{20+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Possible closed forms:

- More

$$\frac{10\sqrt{\frac{17323078}{6579371}}}{\pi^2} \approx 1.64407110637133008 2785$$

$$-e^{47/2+14/e+14e-2/\pi-6\pi}\,\pi^{2-18e}\tan^3(e\pi)\sec^{14}(e\pi) \approx 1.6440711063713300252078$$

$$\frac{3930+24256\pi-6243\pi^2}{3585\pi} \approx 1.644071106371330028 29041$$

We have that:

(vi) In the last example of this section, Ramanujan shows that if $a > 0$, $m < 1$, and $m + n > 0$, then

$$\int_0^\infty \frac{\Gamma(x+a)\,dx}{\Gamma(x+a+n+1)x^m} = \frac{\pi\csc(\pi m)}{\Gamma(n+1)}\sum_{k=0}^{\infty}\binom{n}{k}\frac{(-1)^k}{(a+k)^m}. \tag{1.10}$$

We now present Ramanujan's derivation. From (1.6) and (1.5), for $x + a$, $n + 1 > 0$,

$$\frac{\Gamma(x+a)\Gamma(n+1)}{\Gamma(x+a+n+1)} = \int_0^1 t^{x+a-1}(1-t)^n \, dt$$

$$= \int_0^1 t^{x+a-1} \sum_{k=0}^{\infty} \binom{n}{k} (-t)^k \, dt$$

$$= \sum_{k=0}^{\infty} \binom{n}{k} \frac{(-1)^k}{x+a+k}$$

$$= \sum_{k=0}^{\infty} \binom{n}{k} \frac{(-1)^k}{a+k} \sum_{j=0}^{\infty} \left(\frac{-x}{a+k}\right)^j$$

$$= \sum_{j=0}^{\infty} \psi(j)(-x)^j, \qquad (1.11)$$

provided that $|x| < a$, where

$$\psi(s) = \sum_{k=0}^{\infty} \binom{n}{k} \frac{(-1)^k}{(a+k)^{s+1}}, \qquad s + n + 1 > 0.$$

From left-hand side, for x = 1, a = 4 and n = 2, we obtain:

$$\frac{\Gamma(x+a)\Gamma(n+1)}{\Gamma(x+a+n+1)}$$

(((gamma (1+4) gamma (2+1)))) / (((gamma (1+4+2+1))))

Input:

$$\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)}$$

Open code

- $\Gamma(x)$ is the gamma function

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Exact result:

$$\frac{1}{105}$$

Decimal approximation:

- More digits

0.009523809523809523809523809523809523809523809523809523809...

Open code

Series representations:

$$\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)} = \frac{\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(3-z_0)^{k_1}\,(5-z_0)^{k_2}\,\Gamma^{(k_1)}(z_0)\,\Gamma^{(k_2)}(z_0)}{k_1!\,k_2!}}{\sum_{k=0}^{\infty}\frac{(8-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Open code

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$$\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)} = \left(\pi \sum_{k=0}^{\infty}(8-z_0)^k \sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\,\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right) \Big/ \left(\left(\sum_{k=0}^{\infty}(3-z_0)^k \sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\,\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right) \sum_{k=0}^{\infty}(5-z_0)^k \sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\,\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)$$

- $\mathbb{Z}$ is the set of integers
  - More information

Integral representations:

More

- $$\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)} = e^{\int_0^1 (1+x+x^2-x^5-x^6-x^7)/\log(x)\,dx}$$

Open code

$$\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)} = \int_0^1\int_0^1 \log^2\left(\frac{1}{t_1}\right)\log^4\left(\frac{1}{t_2}\right)dt_2\,dt_1$$

Open code

$$\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)} = \exp\left(\int_0^1 \frac{1-x^3-x^5+x^8+\log(x^3)+\log(x^5)-\log(x^8)}{\log(x)-x\log(x)}\,dx\right)$$

1 / (((((((gamma (1+4) gamma (2+1)))) / (((gamma (1+4+2+1)))))))

Input:

$$\frac{1}{\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)}}$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

105

Alternative representations:

- More

$$\frac{1}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}} = \frac{1}{\frac{576}{\frac{12 \times 125\,411\,328\,000}{24\,883\,200}}}$$

Open code

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$$\frac{1}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}} = \frac{1}{\frac{2! \times 4!}{7!}}$$

Open code

$$\frac{1}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}} = \frac{1}{\frac{\Gamma(3,0)\Gamma(5,0)}{\Gamma(8,0)}}$$

Integral representations:

- More

$$\frac{1}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}} = e^{\int_0^1 (-1-x-x^2+x^5+x^6+x^7)/\log(x)\,dx}$$

Open code

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$$\frac{1}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}} = \exp\left(\int_0^1 \frac{1-x^3-x^5+x^8+\log(x^3)+\log(x^5)-\log(x^8)}{(-1+x)\log(x)}\,dx\right)$$

Open code

$$\frac{1}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}} = \frac{\int_0^1 \log^7\left(\frac{1}{t}\right)dt}{\left(\int_0^1 \log^2\left(\frac{1}{t}\right)dt\right)\int_0^1 \log^4\left(\frac{1}{t}\right)dt}$$

Open code

sqrt(272) * (((((((1 / ((((((gamma (1+4) gamma (2+1)))) / (((gamma (1+4+2+1))))))))))))))

Input:

$$\sqrt{272} \times \frac{1}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}$$

Open code

- $\Gamma(x)$ is the gamma function

Enlarge Data Customize A Plaintext Interactive

Exact result:

$420\sqrt{17}$

Decimal approximation:

- More digits

1731.704362759417430924992139509112350561823674656920582447...

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

Series representations:

- More

$$\frac{\sqrt{272}}{\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)}} = \frac{\exp\left(i\pi\left\lfloor\frac{\arg(272-x)}{2\pi}\right\rfloor\right)\Gamma(8)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(272-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}{\Gamma(3)\,\Gamma(5)}$$

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

Open code

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$$\frac{\sqrt{272}}{\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)}} = \frac{\Gamma(8)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(272-z_0)/(2\pi)\rfloor} z_0^{1/2(1+\lfloor\arg(272-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(272-z_0)^k z_0^{-k}}{k!}}{\Gamma(3)\,\Gamma(5)}$$

Open code

$$\frac{\sqrt{272}}{\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)}} = \frac{\sqrt{271}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{271^{-k_1}\binom{\frac{1}{2}}{k_1}(8-z_0)^{k_2}\,\Gamma^{(k_2)}(z_0)}{k_2!}}{\left(\sum_{k=0}^{\infty}\frac{(3-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}$$

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

Integral representations:

- More

$$\frac{\sqrt{272}}{\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)}} = e^{\int_0^1\left(-1-x-x^2+x^5+x^6+x^7\right)/\log(x)\,dx}\sqrt{272}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}} = \exp\left(\int_0^1 \frac{1-x^3-x^5+x^8+\log(x^3)+\log(x^5)-\log(x^8)}{(-1+x)\log(x)}\,dx\right)\sqrt{272}$$

Open code

$$\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}} = \frac{\sqrt{272}\int_0^1 \log^7\left(\frac{1}{t}\right)dt}{\left(\int_0^1 \log^2\left(\frac{1}{t}\right)dt\right)\int_0^1 \log^4\left(\frac{1}{t}\right)dt}$$

(((((sqrt(272) * (((((((1 / (((((((gamma (1+4) gamma (2+1)))) / (((gamma (1+4+2+1))))))))))))))))))))^1/3

Input:

$$\sqrt[3]{\sqrt{272}\times\frac{1}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}}$$

Open code

- $\Gamma(x)$ is the gamma function

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$2^{2/3}\sqrt[6]{17}\sqrt[3]{105}$$

Decimal approximation:

- More digits

12.00856879365317651556542694803024905187296464631813099747...

This result is very near to the value of black hole entropy 12,1904

Series representations:

- More

$$\sqrt[3]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = \sqrt[3]{\frac{\exp\left(i\pi\left\lfloor\frac{\arg(272-x)}{2\pi}\right\rfloor\right)\Gamma(8)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(272-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}{\Gamma(3)\Gamma(5)}}$$

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

Open code

Enlarge Data Customize A Plaintext Interactive

$$\sqrt[3]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = \sqrt[3]{\frac{\Gamma(8)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(272-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(272-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(272-z_0)^k z_0^{-k}}{k!}}{\Gamma(3)\Gamma(5)}}$$

Open code

$$\sqrt[3]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = \sqrt[3]{\frac{\sqrt{271}\,\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{271^{-k_1}\binom{\frac{1}{2}}{k_1}(8-z_0)^{k_2}\,\Gamma^{(k_2)}(z_0)}{k_2!}}{\left(\sum_{k=0}^{\infty}\frac{(3-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Integral representations:

- More

$$\sqrt[3]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = \sqrt[3]{e^{\int_0^1 (-1-x-x^2+x^5+x^6+x^7)/\log(x)\,dx}\,\sqrt{272}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\sqrt[3]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = \sqrt[3]{\exp\left(\int_0^1 \frac{1-x^3-x^5+x^8+\log(x^3)+\log(x^5)-\log(x^8)}{(-1+x)\log(x)}\,dx\right)\sqrt{272}}$$

Open code

$$\sqrt[3]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = \sqrt[3]{\frac{\sqrt{272}\,\int_0^1 \log^7\left(\frac{1}{t}\right)dt}{\left(\int_0^1 \log^2\left(\frac{1}{t}\right)dt\right)\int_0^1 \log^4\left(\frac{1}{t}\right)dt}}$$

2 * (((((sqrt(272) * (((((((1 / (((((((gamma (1+4) gamma (2+1)))) / (((gamma (1+4+2+1)))))))))))))))))))))^1/3

Input:

$$2\sqrt[3]{\sqrt{272}\times\frac{1}{\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)}}}$$

Open code

- $\Gamma(x)$ is the gamma function

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$2\times 2^{2/3}\sqrt[6]{17}\sqrt[3]{105}$$

Decimal approximation:

- More digits

24.01713758730635303113085389606049810374592929263626199494...

This value is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

Series representations:

- More

$$2\sqrt[3]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 2\sqrt[3]{\frac{\exp\left(i\pi\left\lfloor\frac{\arg(272-x)}{2\pi}\right\rfloor\right)\Gamma(8)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(272-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}{\Gamma(3)\Gamma(5)}}$$

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

Open code

Enlarge Data Customize A Plaintext Interactive

$$2\sqrt[3]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} =$$

$$2\sqrt[3]{\frac{\Gamma(8)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(272-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(272-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(272-z_0)^k z_0^{-k}}{k!}}{\Gamma(3)\Gamma(5)}}$$

Open code

$$2\sqrt[3]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 2\sqrt[3]{\frac{\sqrt{271}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{271^{-k_1}\binom{\frac{1}{2}}{k_1}(8-z_0)^{k_2}\Gamma^{(k_2)}(z_0)}{k_2!}}{\left(\sum_{k=0}^{\infty}\frac{(3-z_0)^k\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(5-z_0)^k\Gamma^{(k)}(z_0)}{k!}}}$$

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

Integral representations:

- More

$$2\sqrt[3]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 2\sqrt[3]{e^{\int_0^1(-1-x-x^2+x^5+x^6+x^7)/\log(x)\,dx}\sqrt{272}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$2\sqrt[3]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 2\sqrt[3]{\exp\left(\int_0^1\frac{1-x^3-x^5+x^8+\log(x^3)+\log(x^5)-\log(x^8)}{(-1+x)\log(x)}\,dx\right)\sqrt{272}}$$

Open code

$$2\sqrt[3]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 2\sqrt[3]{\frac{\sqrt{272}\int_0^1\log^7\left(\frac{1}{t}\right)dt}{\left(\int_0^1\log^2\left(\frac{1}{t}\right)dt\right)\int_0^1\log^4\left(\frac{1}{t}\right)dt}}$$

(((((sqrt(272) * (((((((1 / (((((((gamma (1+4) gamma (2+1)))) / (((gamma (1+4+2+1))))))))))))))))))))^1/15

Input:

$$\sqrt[15]{\sqrt{272} \times \frac{1}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}}$$

Open code

- $\Gamma(x)$ is the gamma function

Enlarge Data Customize A Plaintext Interactive

Exact result:

$$2^{2/15} \sqrt[30]{17} \sqrt[15]{105}$$

Decimal approximation:

- More digits

1.643986511999339301098564787220770670509947815264553524624...

1.643986511999339301098564787220770670509947815264553524624

Series representations:

- More

$$\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = \sqrt[15]{\frac{\exp\left(i\pi\left\lfloor\frac{\arg(272-x)}{2\pi}\right\rfloor\right)\Gamma(8)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(272-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}{\Gamma(3)\Gamma(5)}}$$

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

Open code

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$$\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = \sqrt[15]{\frac{\Gamma(8)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(272-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(272-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(272-z_0)^k z_0^{-k}}{k!}}{\Gamma(3)\Gamma(5)}}$$

Open code

$$\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = \sqrt[15]{\frac{\sqrt{271}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{271^{-k_1}\binom{\frac{1}{2}}{k_1}(8-z_0)^{k_2}\Gamma^{(k_2)}(z_0)}{k_2!}}{\left(\sum_{k=0}^{\infty}\frac{(3-z_0)^k\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(5-z_0)^k\Gamma^{(k)}(z_0)}{k!}}}$$

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

Integral representations:

- More

$$\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = \sqrt[15]{e^{\int_0^1 \left(-1-x-x^2+x^5+x^6+x^7\right)/\log(x)\,dx}\,\sqrt{272}}$$

Open code

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$$\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = \sqrt[15]{\exp\left(\int_0^1 \frac{1-x^3-x^5+x^8+\log(x^3)+\log(x^5)-\log(x^8)}{(-1+x)\log(x)}\,dx\right)\sqrt{272}}$$

Open code

$$\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = \sqrt[15]{\frac{\sqrt{272}\,\int_0^1 \log^7\left(\frac{1}{t}\right)dt}{\left(\int_0^1 \log^2\left(\frac{1}{t}\right)dt\right)\int_0^1 \log^4\left(\frac{1}{t}\right)dt}}$$

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{4+\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{27+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{8+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

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Possible closed forms:

- More

π root of $5231x^4+15x^3+31x^2-2700x+1010$ near $x = 0.523297$ $\approx$ 1.643986511999339301 32129

$\left(\frac{43\,393\,382}{20\,586\,197}\right)^{2/3} \approx 1.64398651199933930\,83573$

$\frac{2\left(-10+224\,e+93\,e^2\right)}{638+137\,e+75\,e^2} \approx 1.643986511999339301\,41302$

3 * (((((sqrt(272) * (((((((1 / (((((((gamma (1+4) gamma (2+1)))) / (((gamma (1+4+2+1)))))))))))))))))))))^1/15

Input:

$$3 \sqrt[15]{\sqrt{272} \times \frac{1}{\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)}}}$$

Open code

- $\Gamma(x)$ is the gamma function

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Exact result:

$$3 \times 2^{2/15} \sqrt[30]{17} \sqrt[15]{105}$$

Decimal approximation:

- More digits

4.931959535998017903295694361662312011529843445793660573874...

This value 4,931959 is very near to the first value of upper bound dark photon energy range (1.8 * 10^{15} – 4.95 * 10^{16} – 5.4 * 10^{16}) (Physics Letters B 731 (2014) 265–271 - **Searching a dark photon with HADES**)

Series representations:

- More

$$3 \sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 3 \sqrt[15]{\frac{\exp\left(i \pi \left\lfloor \frac{\arg(272-x)}{2\pi} \right\rfloor\right) \Gamma(8) \sqrt{x} \sum_{k=0}^{\infty} \frac{(-1)^k (272-x)^k x^{-k} \left(-\frac{1}{2}\right)_k}{k!}}{\Gamma(3)\,\Gamma(5)}}$$

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

Open code

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$$3 \sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\,\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 3 \sqrt[15]{\frac{\Gamma(8) \left(\frac{1}{z_0}\right)^{1/2 \lfloor \arg(272-z_0)/(2\pi) \rfloor} z_0^{1/2+1/2 \lfloor \arg(272-z_0)/(2\pi) \rfloor} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (272-z_0)^k z_0^{-k}}{k!}}{\Gamma(3)\,\Gamma(5)}}$$

Open code

$$3\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 3\sqrt[15]{\frac{\sqrt{271}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{271^{-k_1}\binom{\frac{1}{2}}{k_1}(8-z_0)^{k_2}\Gamma^{(k_2)}(z_0)}{k_2!}}{\left(\sum_{k=0}^{\infty}\frac{(3-z_0)^k\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(5-z_0)^k\Gamma^{(k)}(z_0)}{k!}}}$$

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

Integral representations:

- More

$$3\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 3\sqrt[15]{e^{\int_0^1(-1-x-x^2+x^5+x^6+x^7)/\log(x)\,dx}\sqrt{272}}$$

Open code

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$$3\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} =$$

$$3\sqrt[15]{\exp\left(\int_0^1\frac{1-x^3-x^5+x^8+\log(x^3)+\log(x^5)-\log(x^8)}{(-1+x)\log(x)}\,dx\right)\sqrt{272}}$$

Open code

$$3\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 3\sqrt[15]{\frac{\sqrt{272}\int_0^1\log^7\left(\frac{1}{t}\right)dt}{\left(\int_0^1\log^2\left(\frac{1}{t}\right)dt\right)\int_0^1\log^4\left(\frac{1}{t}\right)dt}}$$

8 * (((((sqrt(272) * (((((((1 / (((((((gamma (1+4) gamma (2+1)))) / (((gamma (1+4+2+1)))))))))))))))))))^1/15

Input:

$$8\sqrt[15]{\sqrt{272}\times\frac{1}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}}$$

Open code

- $\Gamma(x)$ is the gamma function

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Exact result:

$$8\times 2^{2/15}\sqrt[30]{17}\sqrt[15]{105}$$

Decimal approximation:

- More digits

13.151892095994714408788518297766165364079582522116428196 99...

This result is very near to the Rydberg constant 13,605693 eV that is used to express the limiting value of the highest wavenumber (inverse wavelength) of any photon that can be emitted from an atom, or, alternatively, the wavenumber of the lowest-energy photon capable of ionizing an atom from its ground state.

Series representations:

- More

$$8\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 8\sqrt[15]{\frac{\exp\left(i\pi\left\lfloor\frac{\arg(272-x)}{2\pi}\right\rfloor\right)\Gamma(8)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(272-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}{\Gamma(3)\Gamma(5)}}$$

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

Open code

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$$8\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} =$$

$$8\sqrt[15]{\frac{\Gamma(8)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(272-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(272-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(272-z_0)^k z_0^{-k}}{k!}}{\Gamma(3)\Gamma(5)}}$$

Open code

$$8\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 8\sqrt[15]{\frac{\sqrt{271}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{271^{-k_1}\binom{\frac{1}{2}}{k_1}(8-z_0)^{k_2}\Gamma^{(k_2)}(z_0)}{k_2!}}{\left(\sum_{k=0}^{\infty}\frac{(3-z_0)^k\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(5-z_0)^k\Gamma^{(k)}(z_0)}{k!}}}$$

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

Integral representations:

- More

$$8\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 8\sqrt[15]{e^{\int_0^1\left(-1-x-x^2+x^5+x^6+x^7\right)/\log(x)\,dx}\sqrt{272}}$$

Open code

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$$8\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} =$$

$$8\sqrt[15]{\exp\left(\int_0^1\frac{1-x^3-x^5+x^8+\log(x^3)+\log(x^5)-\log(x^8)}{(-1+x)\log(x)}\,dx\right)\sqrt{272}}$$

Open code

$$8\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 8\sqrt[15]{\frac{\sqrt{272}\int_0^1 \log^7\left(\frac{1}{t}\right)dt}{\left(\int_0^1 \log^2\left(\frac{1}{t}\right)dt\right)\int_0^1 \log^4\left(\frac{1}{t}\right)dt}}$$

15 * (((((sqrt(272) * (((((((1 / (((((((gamma (1+4) gamma (2+1)))) / (((gamma (1+4+2+1)))))))))))))))))))))^1/15

Input:

$$15\sqrt[15]{\sqrt{272}\times\frac{1}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}}$$

Open code

- $\Gamma(x)$ is the gamma function

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Exact result:

$$15\times 2^{2/15}\sqrt[30]{17}\sqrt[15]{105}$$

Decimal approximation:

- More digits

24.65979767999008951647847180831156005764921722896830286937...

This result is very near to the values of black hole entropies 24.2477 - 24.7812

Series representations:

- More

$$15\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 15\sqrt[15]{\frac{\exp\left(i\pi\left\lfloor\frac{\arg(272-x)}{2\pi}\right\rfloor\right)\Gamma(8)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(272-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}{\Gamma(3)\Gamma(5)}}$$

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

Open code

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$$15\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} =$$

$$15\sqrt[15]{\frac{\Gamma(8)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(272-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(272-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(272-z_0)^k z_0^{-k}}{k!}}{\Gamma(3)\Gamma(5)}}$$

Open code

$$15\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 15\sqrt[15]{\frac{\sqrt{271}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{271^{-k_1}\binom{\frac{1}{2}}{k_1}(8-z_0)^{k_2}\Gamma^{(k_2)}(z_0)}{k_2!}}{\left(\sum_{k=0}^{\infty}\frac{(3-z_0)^k\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(5-z_0)^k\Gamma^{(k)}(z_0)}{k!}}}$$

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

Integral representations:

- More

$$15\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 15\sqrt[15]{e^{\int_0^1(-1-x-x^2+x^5+x^6+x^7)/\log(x)\,dx}\sqrt{272}}$$

Open code

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$$15\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} =$$

$$15\sqrt[15]{\exp\left(\int_0^1\frac{1-x^3-x^5+x^8+\log(x^3)+\log(x^5)-\log(x^8)}{(-1+x)\log(x)}\,dx\right)\sqrt{272}}$$

Open code

$$15\sqrt[15]{\frac{\sqrt{272}}{\frac{\Gamma(1+4)\Gamma(2+1)}{\Gamma(1+4+2+1)}}} = 15\sqrt[15]{\frac{\sqrt{272}\int_0^1\log^7\left(\frac{1}{t}\right)dt}{\left(\int_0^1\log^2\left(\frac{1}{t}\right)dt\right)\int_0^1\log^4\left(\frac{1}{t}\right)dt}}$$

Now, we have that:

(i) We first want to expand $(2/(1+\sqrt{1+4x}))^n$ in powers of x when $n>0$. Let $0<p<n/2$ and consider

$$I \equiv \int_0^\infty x^{p-1}\left(\frac{2}{1+\sqrt{1+4x}}\right)^n dx.$$

Setting $x=y+y^2$ and then $y=z/(1-z)$, we find that

$$I = \int_0^\infty y^{p-1}(1+y)^{p-n-1}(1+2y)\,dy$$
$$= \int_0^1 z^{p-1}(1-z)^{n-2p-1}(1+z)\,dz$$
$$= \frac{\Gamma(p)\Gamma(n-2p)}{\Gamma(n-p)} + \frac{\Gamma(p+1)\Gamma(n-2p)}{\Gamma(n-p+1)} = \frac{n\Gamma(p)\Gamma(n-2p)}{\Gamma(n-p+1)},$$

where we have employed (1.6). Hence, in the notation of (1.1), $\varphi(p) = n\Gamma(n+2p)/\Gamma(n+p+1)$. Ramanujan thus concludes that

$$\left(\frac{2}{1+\sqrt{1+4x}}\right)^n = n\sum_{k=0}^{\infty}\frac{\Gamma(n+2k)(-x)^k}{\Gamma(n+k+1)k!}, \qquad |x|\le\tfrac{1}{4}. \tag{1.12}$$

We remember that: $0 \le k < \infty$ (for∑ k = 0 to 2, thence: 0+1+2 = 3)

From the right hand side of (1.12) for n = 2, k = 3 and x = 0.25, we obtain:

2 * (((gamma (2+6) * (-0.25)^3))) / (((gamma (3+2+1) * 3!)))

Input:

$$2\times\frac{\Gamma(2+6)\,(-0.25)^3}{\Gamma(3+2+1)\times 3!}$$

Open code

- $\Gamma(x)$ is the gamma function
- $n!$ is the factorial function

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Result:

−0.21875

Series representations:

$$\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!} = -\frac{0.03125\,\Gamma(8)}{\Gamma(6)\sum_{k=0}^{\infty}\frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}} \quad \text{for } ((n_0 \notin \mathbb{Z} \text{ or } n_0 \ge 0) \text{ and } n_0 \to 3)$$

Open code

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$$\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!} = -\frac{0.03125 \sum_{k=0}^{\infty} \frac{(8-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}{\left(\sum_{k=0}^{\infty} \frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}\right) \sum_{k=0}^{\infty} \frac{(6-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}$$

for $((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $(z_0 \notin \mathbb{Z}$ or $z_0 > 0)$ and $n_0 \to 3)$

Open code

$$\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!} = -\frac{0.03125 \sum_{k=0}^{\infty} (6-z_0)^k \sum_{j=0}^{k} \frac{(-1)^j\,\pi^{-j+k} \sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}}{\left(\sum_{k=0}^{\infty} (8-z_0)^k \sum_{j=0}^{k} \frac{(-1)^j\,\pi^{-j+k} \sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right) \sum_{k=0}^{\infty} \frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}}$$

for $((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $n_0 \to 3)$

Integral representations:

- More

$$\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!} = -\frac{0.03125\,\Gamma(8)}{\Gamma(6)\int_0^{\infty} e^{-t}\,t^3\,dt}$$

Open code

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$$\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!} = -\frac{0.03125}{6+e^{-\infty}\left(-(\infty+3\,\infty+6)\,\infty+-6\right)\oint_L \frac{e^t}{t^8}\,dt} \oint_L \frac{e^t}{t^6}\,dt$$

$$\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!} = -\frac{0.00520833}{\oint_L \frac{e^t}{t^8}\,dt} \oint_L \frac{e^t}{t^6}\,dt$$

(((((1/ -((((2 * (((gamma (2+6) * (-0.25)^3))) / (((gamma (3+2+1) * 3!)))))))))))^1/3

Input:

$$\sqrt[3]{-\frac{1}{2\times\frac{\Gamma(2+6)(-0.25)^3}{\Gamma(3+2+1)\times 3!}}}$$

Open code

- $\Gamma(x)$ is the gamma function
- $n!$ is the factorial function

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Result:

- Fewer digits
- More digits

1.659653066732486882001982993900316515934234961025130865451...

128 * 3 * (((((1/ -((((2 * (((gamma (2+6) * (-0.25)^3))) / (((gamma (3+2+1) * 3!)))))))))))

Input:

$$128\times 3\left(-\frac{1}{2\times\frac{\Gamma(2+6)(-0.25)^3}{\Gamma(3+2+1)\times 3!}}\right)$$

Open code

- $\Gamma(x)$ is the gamma function
- $n!$ is the factorial function

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Result:

- More digits

1755.4285714285714285714285714285714285714285714285714285714 71...

Open code

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

Series representations:

$$-\frac{128\times 3}{\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!}}=\frac{12\,288\,\Gamma(6)\sum_{k=0}^{\infty}\frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}}{\Gamma(8)}\quad\text{for } ((n_0\notin\mathbb{Z}\text{ or } n_0\geq 0)\text{ and } n_0\to 3)$$

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$$-\frac{128\times 3}{\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!}}=\frac{12\,288\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(3-n_0)^{k_1}\,(6-z_0)^{k_2}\,\Gamma^{(k_1)}(1+n_0)\,\Gamma^{(k_2)}(z_0)}{k_1!\,k_2!}}{\sum_{k=0}^{\infty}\frac{(8-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}$$

$$\text{for } ((n_0\notin\mathbb{Z}\text{ or } n_0\geq 0)\text{ and } (z_0\notin\mathbb{Z}\text{ or } z_0>0)\text{ and } n_0\to 3)$$

$$-\frac{128\times 3}{\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!}}=\left(12\,288\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{1}{k_2!}(3-n_0)^{k_2}(8-z_0)^{k_1}\left(\sum_{j=0}^{k_1}\frac{(-1)^j\,\pi^{-j+k_1}\sin\left(\frac{1}{2}\pi(-j+k_1+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k_1)!}\right)\Gamma^{(k_2)}(1+n_0)\right)\Bigg/\left(\sum_{k=0}^{\infty}(6-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)$$

$$\text{for } ((n_0\notin\mathbb{Z}\text{ or } n_0\geq 0)\text{ and } n_0\to 3)$$

Integral representations:

- More

$$-\frac{128\times 3}{\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!}} = \frac{12\,288\,\Gamma(6)}{\Gamma(8)}\int_0^\infty e^{-t}\,t^3\,dt$$

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$$-\frac{128\times 3}{\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!}} = \frac{12\,288\,(6+e^{-\infty}\,(-(\infty+3\,\infty+6)\,\infty+-6))}{\oint_L \frac{e^t}{t^6}\,dt}\oint_L \frac{e^t}{t^8}\,dt$$

$$-\frac{128\times 3}{\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!}} = \frac{73\,728}{\oint_L \frac{e^t}{t^6}\,dt}\oint_L \frac{e^t}{t^8}\,dt$$

(((((128 * 3 * (((((1/ -((((2 * (((gamma (2+6) * (-0.25)^3))) / (((gamma (3+2+1) * 3!)))))))))))))))))^1/3

Input:

$$\sqrt[3]{128\times 3\left(-\frac{1}{2\times\frac{\Gamma(2+6)(-0.25)^3}{\Gamma(3+2+1)\times 3!}}\right)}$$

Open code

- $\Gamma(x)$ is the gamma function
- $n!$ is the factorial function

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Result:

- More digits

12.0632...

This result is very near to the value of black hole entropy 12,1904

2*(((((128 * 3 * (((((1/ -((((2 * (((gamma (2+6) * (-0.25)^3))) / (((gamma (3+2+1) * 3!)))))))))))))))))^1/3

Input:

$$2\sqrt[3]{128\times 3\left(-\frac{1}{2\times\frac{\Gamma(2+6)(-0.25)^3}{\Gamma(3+2+1)\times 3!}}\right)}$$

Open code

- $\Gamma(x)$ is the gamma function
- $n!$ is the factorial function

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Result:

- More digits

24.1263...

This result is very near to the value of black hole entropy 24.2477

Series representations:

$$2\sqrt[3]{-\frac{128\times 3}{\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!}}} = 46.152\sqrt[3]{\frac{\Gamma(6)\sum_{k=0}^{\infty}\frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}}{\Gamma(8)}}$$

for $((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $n_0 \to 3)$

Open code

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$$2\sqrt[3]{-\frac{128\times 3}{\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!}}} = 46.152\sqrt[3]{\frac{\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(3-n_0)^{k_1}\,(6-z_0)^{k_2}\,\Gamma^{(k_1)}(1+n_0)\,\Gamma^{(k_2)}(z_0)}{k_1!\,k_2!}}{\sum_{k=0}^{\infty}\frac{(8-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}}$$

for $((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $(z_0 \notin \mathbb{Z}$ or $z_0 > 0)$ and $n_0 \to 3)$

$$2\sqrt[3]{-\frac{128\times 3}{\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!}}} = 46.152$$

$$\sqrt[3]{\frac{\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(3-n_0)^{k_2}\,(8-z_0)^{k_1}\left(\sum_{j=0}^{k_1}\frac{(-1)^j\,\pi^{-j+k_1}\sin\left(\frac{1}{2}\pi\,(-j+k_1+2\,z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k_1)!}\right)\Gamma^{(k_2)}(1+n_0)}{k_2!}}{\sum_{k=0}^{\infty}(6-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi\left(-j+k+2\,z_0\right)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}}}$$

for $((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $n_0 \to 3)$

Integral representations:

- More

$$2\sqrt[3]{-\frac{128\times 3}{\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!}}} = 46.152\sqrt[3]{\frac{\Gamma(6)}{\Gamma(8)}\int_0^{\infty}e^{-t}\,t^3\,dt}$$

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$$2\sqrt[3]{-\frac{128\times 3}{\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!}}} = 46.152\sqrt[3]{\frac{6+e^{-\infty}\left(-(\infty+3\,\infty+6)\,\infty+-6\right)}{\oint_L\frac{e^t}{t^6}\,dt}\oint_L\frac{e^t}{t^8}\,dt}$$

$$2\sqrt[3]{-\frac{128\times 3}{\frac{2\left(\Gamma(2+6)(-0.25)^3\right)}{\Gamma(3+2+1)\,3!}}} = 46.152\sqrt[3]{\frac{6}{\oint_L \frac{e^t}{t^6}\,dt}\oint_L \frac{e^t}{t^8}\,dt}$$

(((((128 * 3 * (((((1/ -((((2 * (((gamma (2+6) * (-0.25)^3))) / (((gamma (3+2+1) * 3!)))))))))))))))))^1/15

Input:

$$\sqrt[15]{128\times 3\left(-\frac{1}{2\times\frac{\Gamma(2+6)(-0.25)^3}{\Gamma(3+2+1)\times 3!}}\right)}$$

Open code

- $\Gamma(x)$ is the gamma function
- $n!$ is the factorial function

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Result:

- Fewer digits
- More digits

1.645478495135390047169856552579973749707300926296030834090...

1.645478495135390047169856552579973749707300926296030 8

Continued fraction:

- Linear form

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

Open code

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Possible closed forms:

- More

$$\frac{\sqrt{\frac{13175209}{493030}}}{\pi} \approx 1.645478495135390089016$$

$$\sqrt[4]{\frac{11432454}{1559447}} \approx 1.645478495135390098710$$

$$\frac{158874323\,\pi}{303327213} \approx 1.645478495135390046 4932$$

(ii) We next wish to expand $(x+\sqrt{1+x^2})^{-n}$ in ascending powers of x when $n > 0$. Letting $x + \sqrt{1+x^2} = 1/\sqrt{y}$, Ramanujan considers, for $0 < p < n$,

$$\int_0^\infty \frac{x^{p-1}\,dx}{(x+\sqrt{1+x^2})^n} = \frac{1}{2^{p+1}} \int_0^1 (1-y)^{p-1} y^{(n-p)/2}(1+1/y)\,dy$$

$$= \frac{n\Gamma(p)\Gamma(\frac{1}{2}\{n-p\})}{2^{p+1}\Gamma(\frac{1}{2}\{n+p\}+1)},$$

by (1.6). In the notation of the Master Theorem,

$$\varphi(p) = \frac{n2^{p-1}\Gamma(\frac{1}{2}\{n+p\})}{\Gamma(\frac{1}{2}\{n-p\}+1)}.$$

Hence, Ramanujan concludes that

$$(x+\sqrt{1+x^2})^{-n} = n\sum_{k=0}^{\infty} \frac{2^{k-1}\Gamma(\frac{1}{2}\{n+k\})(-x)^k}{\Gamma(\frac{1}{2}\{n-k\}+1)k!}, \qquad |x| \le 1. \qquad (1.13)$$

From the right hand side of (1.13) for n = 2, k = 3 (∑ k = 0 to 2, thence: 0+1+2 = 3) and x = 0.25, we obtain:

2* ((((2^2 * gamma (0.5*5) * (-0.25)^3))) / ((((gamma ((-0.5*+1)) * 3!))))

Input:

$$2 \times \frac{2^2\,(\Gamma(0.5\times 5)\,(-0.25)^3)}{\Gamma(-0.5+1)\times 3!}$$

Open code

- $\Gamma(x)$ is the gamma function
- $n!$ is the factorial function

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Result:

-0.015625

Series representations:

$$\frac{2\left(2^2\left(\Gamma(0.5\times 5)(-0.25)^3\right)\right)}{\Gamma(-0.5+1)\,3!} = -\frac{0.125\,\Gamma(2.5)}{\Gamma(0.5)\sum_{k=0}^{\infty}\frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}}$$

for $((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $n_0 \to 3)$

Open code

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$$\frac{2\left(2^2\left(\Gamma(0.5\times 5)(-0.25)^3\right)\right)}{\Gamma(-0.5+1)\,3!} = -\frac{0.125\sum_{k=0}^{\infty}\frac{(2.5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}{\left(\sum_{k=0}^{\infty}\frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(0.5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}$$

for $((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $(z_0 \notin \mathbb{Z}$ or $z_0 > 0)$ and $n_0 \to 3)$

$$\frac{2\left(2^2\left(\Gamma(0.5\times 5)(-0.25)^3\right)\right)}{\Gamma(-0.5+1)\,3!} = -\frac{0.125\sum_{k=0}^{\infty}(0.5-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!(-j+k)!}}{\left(\sum_{k=0}^{\infty}(2.5-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!(-j+k)!}\right)\sum_{k=0}^{\infty}\frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}}$$

for $((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $n_0 \to 3)$

Integral representations:

- More

$$\frac{2\left(2^2\left(\Gamma(0.5\times 5)(-0.25)^3\right)\right)}{\Gamma(-0.5+1)\,3!} = -\frac{0.125\,\Gamma(2.5)}{\Gamma(0.5)\int_0^{\infty}e^{-t}\,t^3\,dt}$$

Open code

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$$\frac{2\left(2^2\left(\Gamma(0.5\times 5)(-0.25)^3\right)\right)}{\Gamma(-0.5+1)\,3!} = -\frac{0.125}{6+e^{-\infty}\left(-(\infty+3\,\infty+6)\,\infty+-6\right)\oint_L\frac{e^t}{t^{2.5}}\,dt}\oint_L\frac{e^t}{t^{0.5}}\,dt$$

$$\frac{2\left(2^2\left(\Gamma(0.5\times 5)(-0.25)^3\right)\right)}{\Gamma(-0.5+1)\,3!} = -\frac{0.0208333}{\oint_L\frac{e^t}{t^{2.5}}\,dt}\oint_L\frac{e^t}{t^{0.5}}\,dt$$

1 / -((((2* ((((2^2 * ((gamma (0.5*5)) * (-0.25)^3))) / (((((gamma ((-0.5+1)) * (3!)))))))

Input:

$$-\frac{1}{2\times\frac{2^2\left(\Gamma(0.5\times 5)(-0.25)^3\right)}{\Gamma(-0.5+1)\times 3!}}$$

Open code

- $\Gamma(x)$ is the gamma function
- $n!$ is the factorial function

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Result:

64

$64 = 8^2$

The value 8 is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") when the Ramanujan function is generalized, indeed, 24 is replaced by 8 (8 + 2 = 10) for fermionic strings

Series representations:

$$-\frac{1}{\frac{2\left(2^2\left(\Gamma(0.5\times 5)(-0.25)^3\right)\right)}{\Gamma(-0.5+1)\,3!}} = \frac{8\,\Gamma(0.5)\sum_{k=0}^{\infty}\frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}}{\Gamma(2.5)}$$

for $((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $n_0 \to 3)$

Open code

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$$-\frac{1}{\frac{2\left(2^2\left(\Gamma(0.5\times 5)(-0.25)^3\right)\right)}{\Gamma(-0.5+1)\,3!}} = \frac{8\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(3-n_0)^{k_1}\,(0.5-z_0)^{k_2}\,\Gamma^{(k_1)}(1+n_0)\,\Gamma^{(k_2)}(z_0)}{k_1!\,k_2!}}{\sum_{k=0}^{\infty}\frac{(2.5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}$$

for $((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $(z_0 \notin \mathbb{Z}$ or $z_0 > 0)$ and $n_0 \to 3)$

$$-\frac{1}{\frac{2\left(2^2\left(\Gamma(0.5\times 5)(-0.25)^3\right)\right)}{\Gamma(-0.5+1)\,3!}} = \frac{8\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(3-n_0)^{k_2}\,(2.5-z_0)^{k_1}\left(\sum_{j=0}^{k_1}\frac{(-1)^j\,\pi^{-j+k_1}\sin\left(\frac{1}{2}\pi(-j+k_1+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k_1)!}\right)\Gamma^{(k_2)}(1+n_0)}{k_2!}}{\sum_{k=0}^{\infty}(0.5-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}}$$

for $((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $n_0 \to 3)$

Integral representations:

- More

$$-\frac{1}{2\left(\frac{2^2(\Gamma(0.5\times5)(-0.25)^3)}{\Gamma(-0.5+1)\,3!}\right)}=\frac{8\,\Gamma(0.5)}{\Gamma(2.5)}\int_0^\infty e^{-t}\,t^3\,dt$$

Open code

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$$-\frac{1}{2\left(\frac{2^2(\Gamma(0.5\times5)(-0.25)^3)}{\Gamma(-0.5+1)\,3!}\right)}=\frac{8\left(6+e^{-\infty}\left(-(\infty+3\,\infty+6)\,\infty+-6\right)\right)}{\oint_L\frac{e^t}{t^{0.5}}\,dt}\oint_L\frac{e^t}{t^{2.5}}\,dt$$

$$-\frac{1}{2\left(\frac{2^2(\Gamma(0.5\times5)(-0.25)^3)}{\Gamma(-0.5+1)\,3!}\right)}=\frac{48}{\oint_L\frac{e^t}{t^{0.5}}\,dt}\oint_L\frac{e^t}{t^{2.5}}\,dt$$

27 * (((((1 / -((((2* ((((2^2 * ((gamma (0.5*5)) * (-0.25)^3))) / (((((gamma ((-0.5+1)) * (3!))))))))))))

Input:

$$27\left(-\frac{1}{2\times\frac{2^2(\Gamma(0.5\times5)(-0.25)^3)}{\Gamma(-0.5+1)\times3!}}\right)$$

Open code

- $\Gamma(x)$ is the gamma function
- $n!$ is the factorial function

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Result:

1728

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

Series representations:

$$-\frac{27}{2\left(\frac{2^2(\Gamma(0.5\times5)(-0.25)^3)}{\Gamma(-0.5+1)\,3!}\right)}=\frac{216\,\Gamma(0.5)\sum_{k=0}^{\infty}\frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}}{\Gamma(2.5)}$$

for $((n_0\notin\mathbb{Z}$ or $n_0\geq0)$ and $n_0\to3)$

Open code

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$$-\frac{27}{\frac{2\left(2^2\left(\Gamma(0.5\times 5)(-0.25)^3\right)\right)}{\Gamma(-0.5+1)\,3!}} = \frac{216\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(3-n_0)^{k_1}(0.5-z_0)^{k_2}\Gamma^{(k_1)}(1+n_0)\Gamma^{(k_2)}(z_0)}{k_1!\,k_2!}}{\sum_{k=0}^{\infty}\frac{(2.5-z_0)^k\Gamma^{(k)}(z_0)}{k!}}$$

for $((n_0 \notin \mathbb{Z} \text{ or } n_0 \geq 0)$ and $(z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$ and $n_0 \to 3)$

$$-\frac{27}{\frac{2\left(2^2\left(\Gamma(0.5\times 5)(-0.25)^3\right)\right)}{\Gamma(-0.5+1)\,3!}} = \left(216\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{1}{k_2!}(3-n_0)^{k_2}(2.5-z_0)^{k_1}\left(\sum_{j=0}^{k_1}\frac{(-1)^j\pi^{-j+k_1}\sin\left(\frac{1}{2}\pi(-j+k_1+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!(-j+k_1)!}\right)\Gamma^{(k_2)}(1+n_0)\right)\Big/\left(\sum_{k=0}^{\infty}(0.5-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!(-j+k)!}\right)$$

for $((n_0 \notin \mathbb{Z} \text{ or } n_0 \geq 0)$ and $n_0 \to 3)$

Integral representations:

- More

$$-\frac{27}{\frac{2\left(2^2\left(\Gamma(0.5\times 5)(-0.25)^3\right)\right)}{\Gamma(-0.5+1)\,3!}} = \frac{216\,\Gamma(0.5)}{\Gamma(2.5)}\int_0^{\infty}e^{-t}t^3\,dt$$

Open code

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$$-\frac{27}{\frac{2\left(2^2\left(\Gamma(0.5\times 5)(-0.25)^3\right)\right)}{\Gamma(-0.5+1)\,3!}} = \frac{216\left(6+e^{-\infty}\left(-(\infty+3\,\infty+6)\,\infty+-6\right)\right)}{\oint_L\frac{e^t}{t^{0.5}}\,dt}\oint_L\frac{e^t}{t^{2.5}}\,dt$$

$$-\frac{27}{\frac{2\left(2^2\left(\Gamma(0.5\times 5)(-0.25)^3\right)\right)}{\Gamma(-0.5+1)\,3!}} = \frac{1296}{\oint_L\frac{e^t}{t^{0.5}}\,dt}\oint_L\frac{e^t}{t^{2.5}}\,dt$$

(((((27 * (((((1 / -((((2* ((((4 * ((gamma (2.5)) * (-0.25)^3))) / (((((gamma ((0.5)) * 3!))))))))))))))))))^1/3

Input:

$$\sqrt[3]{27\left(-\frac{1}{2\times\frac{4\left(\Gamma(2.5)(-0.25)^3\right)}{\Gamma(0.5)\times 3!}}\right)}$$

Open code

- $\Gamma(x)$ is the gamma function
- $n!$ is the factorial function

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Result:

12

This result is very near to the value of black hole entropy 12,1904

2 * (((((27 * (((((1 / -((((2* ((((4 * ((gamma (2.5)) * (-0.25)^3))) / (((((gamma ((0.5)) * 3!)))))))))))))))))^1/3

Input:

$$2\sqrt[3]{27\left(-\frac{1}{2\times\frac{4\left(\Gamma(2.5)(-0.25)^3\right)}{\Gamma(0.5)\times 3!}}\right)}$$

Open code

- $\Gamma(x)$ is the gamma function
- $n!$ is the factorial function

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Result:

24

This value is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

Series representations:

$$2\sqrt[3]{-\frac{27}{\frac{2\left(4\left(\Gamma(2.5)(-0.25)^3\right)\right)}{\Gamma(0.5)\,3!}}} = 12.\sqrt[3]{\frac{\Gamma(0.5)\sum_{k=0}^{\infty}\frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}}{\Gamma(2.5)}}$$

for $((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $n_0 \to 3)$

Open code

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$$2\sqrt[3]{-\frac{27}{\frac{2\left(4\left(\Gamma(2.5)(-0.25)^3\right)\right)}{\Gamma(0.5)\,3!}}} = 12.\sqrt[3]{\frac{\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(3-n_0)^{k_1}\,(0.5-z_0)^{k_2}\,\Gamma^{(k_1)}(1+n_0)\,\Gamma^{(k_2)}(z_0)}{k_1!\,k_2!}}{\sum_{k=0}^{\infty}\frac{(2.5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}}$$

for $((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $(z_0 \notin \mathbb{Z}$ or $z_0 > 0)$ and $n_0 \to 3)$

$$2\sqrt[3]{-\frac{27}{\frac{2\left(4\left(\Gamma(2.5)(-0.25)^3\right)\right)}{\Gamma(0.5)\,3!}}} = 12.\left(\left(\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{1}{k_2!}(3-n_0)^{k_2}(2.5-z_0)^{k_1}\left(\sum_{j=0}^{k_1}\frac{(-1)^j\pi^{-j+k_1}\sin\left(\frac{1}{2}\pi(-j+k_1+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!(-j+k_1)!}\right)\Gamma^{(k_2)}(1+n_0)\right)\Big/\left(\sum_{k=0}^{\infty}(0.5-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!(-j+k)!}\right)\right)^\wedge(1/3)$$

for $((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $n_0 \to 3)$

Integral representations:

- More

$$2\sqrt[3]{-\frac{27}{\frac{2\left(4\left(\Gamma(2.5)(-0.25)^3\right)\right)}{\Gamma(0.5)\,3!}}} = 12.\sqrt[3]{\frac{\Gamma(0.5)}{\Gamma(2.5)}\int_0^{\infty}e^{-t}t^3\,dt}$$

Open code

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$$2\sqrt[3]{-\frac{27}{\frac{2\left(4\left(\Gamma(2.5)(-0.25)^3\right)\right)}{\Gamma(0.5)\,3!}}} = 12.\sqrt[3]{\frac{6+e^{-\infty}(-(\infty+3\,\infty+6)\,\infty+-6)}{\oint_L\frac{e^t}{t^{0.5}}\,dt}\oint_L\frac{e^t}{t^{2.5}}\,dt}$$

$$2\sqrt[3]{-\frac{27}{\frac{2\left(4\left(\Gamma(2.5)(-0.25)^3\right)\right)}{\Gamma(0.5)\,3!}}} = 12.\sqrt[3]{\frac{6}{\oint_L\frac{e^t}{t^{0.5}}\,dt}\oint_L\frac{e^t}{t^{2.5}}\,dt}$$

(((((27 * (((((1 / -((((2* ((((4 * ((gamma (2.5)) * (-0.25)^3))) / (((((gamma ((0.5)) * 3!))))))))))))))))^1/15

Input:

$$\sqrt[15]{27\left(-\frac{1}{2\times\frac{4\left(\Gamma(2.5)(-0.25)^3\right)}{\Gamma(0.5)\times 3!}}\right)}$$

Open code

- $\Gamma(x)$ is the gamma function
- $n!$ is the factorial function

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Result:

- Fewer digits
- More digits

1.643751829517225762308497936230979517383492589945475200411...

1.643751829517225762308497936230979517383492589945475 2

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{20+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

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Possible closed forms:

- More

$$2^{2/5}\sqrt[5]{3} \approx 1.64375182951722576230849793623097951738349258994547520041 1$$

$$4\sqrt{\frac{3139915}{18593681}} \approx 1.64375182951722583645$$

$$\frac{e^{\frac{3}{4}+\frac{29}{2e}-4e+\frac{9}{4\pi}-\frac{13\pi}{4}}\,\pi^{8e-7}\cos^6(e\pi)}{\sin^{5/2}(e\pi)} \approx 1.64375182951722576 53822$$

(iii) Let $a \geq 0$ and let x be the unique positive solution to the equation $\operatorname{Log} x = -ax$. For each positive number n, we want to expand x^n in ascending powers of a. Letting $0 < p < n$, $a = -(\operatorname{Log} x)/x$, and then $x = e^{-y}$, Ramanujan finds that

$$\int_0^\infty a^{p-1} x^n \, da = \int_0^1 \left(-\frac{\operatorname{Log} x}{x}\right)^{p-1} x^n \frac{1 - \operatorname{Log} x}{x^2} \, dx$$
$$= \int_0^\infty y^{p-1}(1+y)e^{-y(n-p)} \, dy$$
$$= \frac{n\Gamma(p)}{(n-p)^{p+1}}.$$

Thus, in the notation of the Master Theorem, $\varphi(p) = n(n+p)^{p-1}$. Therefore, Ramanujan concludes that

$$x^n = n \sum_{k=0}^{\infty} \frac{(n+k)^{k-1}(-a)^k}{k!}. \tag{1.14}$$

Using Stirling's formula (I6), one can show that the infinite series in (1.14) converges for $0 \leq a \leq 1/e$.

From (1.14) for n = 2, p = 1.5, k = 3 (∑ k = 0 to 2, thence: 0+1+2 = 3) and a = 0.25, we obtain:

2 * ((((2+3)^2 * (-0.25)^3))) / (((3!)))

Input:

$$2 \times \frac{(2+3)^2 (-0.25)^3}{3!}$$

Open code

- $n!$ is the factorial function

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Result:

- More digits

−0.13020833333333333333333333333333333333333333333333333...

Open code

Series representation:

$$\frac{2\left((2+3)^2 (-0.25)^3\right)}{3!} = -\frac{0.78125}{\sum_{k=0}^{\infty} \frac{(3-n_0)^k \Gamma^{(k)}(1+n_0)}{k!}} \text{ for } ((n_0 \notin \mathbb{Z} \text{ or } n_0 \geq 0) \text{ and } n_0 \to 3)$$

Open code

- $\mathbb{Z}$ is the set of integers
  - More information

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Integral representations:

$$\frac{2\left((2+3)^2 (-0.25)^3\right)}{3!} = -\frac{0.78125}{\int_0^\infty e^{-t}\, t^3\, dt}$$

Open code

$$\frac{2\left((2+3)^2 (-0.25)^3\right)}{3!} = -\frac{0.78125}{\int_0^1 \log^3\left(\frac{1}{t}\right) dt}$$

Open code

$$\frac{2\left((2+3)^2 (-0.25)^3\right)}{3!} = -\frac{0.78125}{\int_1^\infty e^{-t}\, t^3\, dt + \sum_{k=0}^\infty \frac{(-1)^k}{(4+k)\, k!}}$$

1 / ((((2 * ((((2+3)^2 * (-0.25)^3))) / (((3!)))))))

Input:

$$\frac{1}{2 \times \frac{(2+3)^2 (-0.25)^3}{3!}}$$

Open code

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

-7.68

Series representation:

$$\frac{1}{\frac{2\left((2+3)^2 (-0.25)^3\right)}{3!}} = -1.28 \sum_{k=0}^\infty \frac{(3-n_0)^k\, \Gamma^{(k)}(1+n_0)}{k!} \quad \text{for } ((n_0 \notin \mathbb{Z} \text{ or } n_0 \geq 0) \text{ and } n_0 \to 3)$$

Open code

- $\mathbb{Z}$ is the set of integers
  - More information

Enlarge Data Customize A Plaintext Interactive

Integral representations:

$$\frac{1}{\frac{2\left((2+3)^2 (-0.25)^3\right)}{3!}} = -1.28 \int_0^\infty e^{-t}\, t^3\, dt$$

Open code

$$\frac{1}{\frac{2\left((2+3)^2 (-0.25)^3\right)}{3!}} = -1.28 \int_0^1 \log^3\left(\frac{1}{t}\right) dt$$

Open code

$$\frac{1}{\frac{2\left((2+3)^2\,(-0.25)^3\right)}{3!}} = -1.28 \int_1^{\infty} e^{-t}\, t^3\, dt - 1.28 \sum_{k=0}^{\infty} \frac{(-1)^k}{(4+k)\,k!}$$

(((((-1 / ((((2 * ((((2+3)^2 * (-0.25)^3))) / (((3!)))))))))))^1/4

Input:

$$\sqrt[4]{-\frac{1}{2\times\frac{(2+3)^2\,(-0.25)^3}{3!}}}$$

Open code

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.66472...

1/2 * (((((-1 / ((((2 * ((((2+3)^2 * (-0.25)^3))) / (((3!)))))))))))^4

Input:

$$\frac{1}{2}\left(-\frac{1}{2\times\frac{(2+3)^2\,(-0.25)^3}{3!}}\right)^4$$

Open code

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

1739.46175488

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

Series representation:

$$\frac{1}{2}\left(-\frac{1}{\frac{2\left((2+3)^2\,(-0.25)^3\right)}{3!}}\right)^4 = 1.34218\left(\sum_{k=0}^{\infty} \frac{(3-n_0)^k\, \Gamma^{(k)}(1+n_0)}{k!}\right)^4$$

for $((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $n_0 \to 3)$

Open code

- $\mathbb{Z}$ is the set of integers
  - More information

Enlarge Data Customize A Plaintext Interactive

Integral representations:

$$\frac{1}{2}\left(-\frac{1}{\frac{2\left((2+3)^2(-0.25)^3\right)}{3!}}\right)^4 = 1.34218\left(\int_0^\infty e^{-t}\,t^3\,dt\right)^4$$

Open code

$$\frac{1}{2}\left(-\frac{1}{\frac{2\left((2+3)^2(-0.25)^3\right)}{3!}}\right)^4 = 1.34218\left(\int_0^1 \log^3\left(\frac{1}{t}\right)dt\right)^4$$

Open code

$$\frac{1}{2}\left(-\frac{1}{\frac{2\left((2+3)^2(-0.25)^3\right)}{3!}}\right)^4 = 1.34218\left(\int_1^\infty e^{-t}\,t^3\,dt + \sum_{k=0}^{\infty}\frac{(-1)^k}{(4+k)\,k!}\right)^4$$

(((((1/2 * (((((-1 / ((((2 * ((((2+3)^2 * (-0.25)^3))) / (((3!)))))))))))^4)))))^1/3

Input:

$$\sqrt[3]{\frac{1}{2}\left(-\frac{1}{2\times\frac{(2+3)^2(-0.25)^3}{3!}}\right)^4}$$

Open code

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

12.0265...

This result is very near to the value of black hole entropy 12,1904

2 * (((((1/2 * (((((-1 / ((((2 * ((((2+3)^2 * (-0.25)^3))) / (((3!)))))))))))^4)))))^1/3

Input:

$$2\sqrt[3]{\frac{1}{2}\left(-\frac{1}{2\times\frac{(2+3)^2(-0.25)^3}{3!}}\right)^4}$$

Open code

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits
  24.0529...

This value is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

Series representation:

$$2\sqrt[3]{\left(\frac{1}{2}\left(-\frac{1}{\frac{2\left((2+3)^2(-0.25)^3\right)}{3!}}\right)\right)^4} = 2.20614\sqrt[3]{\left(\sum_{k=0}^{\infty}\frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}\right)^4}$$

for $((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $n_0 \to 3)$

Open code

- $\mathbb{Z}$ is the set of integers
  - More information

Enlarge Data Customize A Plaintext Interactive

Integral representations:

$$2\sqrt[3]{\left(\frac{1}{2}\left(-\frac{1}{\frac{2\left((2+3)^2(-0.25)^3\right)}{3!}}\right)\right)^4} = 2.20614\sqrt[3]{\left(\int_0^1 \log^3\left(\frac{1}{t}\right)dt\right)^4}$$

Open code

$$2\sqrt[3]{\left(\frac{1}{2}\left(-\frac{1}{\frac{2\left((2+3)^2(-0.25)^3\right)}{3!}}\right)\right)^4} = 2.20614\sqrt[3]{\left(\int_0^{\infty} e^{-t}\,t^3\,dt\right)^4}$$

Open code

$$2\sqrt[3]{\left(\frac{1}{2}\left(-\frac{1}{\frac{2\left((2+3)^2(-0.25)^3\right)}{3!}}\right)\right)^4} = 2.20614\sqrt[3]{\left(\int_1^{\infty} e^{-t}\,t^3\,dt + \sum_{k=0}^{\infty}\frac{(-1)^k}{(4+k)\,k!}\right)^4}$$

(((((1/2 * (((((-1 / ((((2 * ((((2+3)^2 * (-0.25)^3))) / (((3!)))))))))))^4)))))^1/15

Input:

$$\sqrt[15]{\left(\frac{1}{2}\left(-\frac{1}{2\times\frac{(2+3)^2(-0.25)^3}{3!}}\right)\right)^4}$$

Open code

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1.644476451846641691123087091643855753545941459749245056360...

1.644476451846641691123087091643855753545941459749245O

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{14+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{28+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Possible closed forms:

- More

$$\frac{2}{5}\pi\tan^{-1}\left(\frac{2328915}{1059199}\right)^2 \approx 1.64447645184664169255 64$$

$$\frac{2954311015\,\pi}{5643888528} \approx 1.6444764518466416911 41974$$

$$\pi \;\text{root of } 623x^4+660x^3-3072x^2+1825x-255 \text{ near } x=0.523453 \approx$$

1.644476451846641691 49032

8 * (((((1/2 * (((((-1 / ((((2 * ((((2+3)^2 * (-0.25)^3))) / (((3!)))))))))))^4)))))^1/15

Input:

$$8\sqrt[15]{\frac{1}{2}\left(-\frac{1}{2\times\frac{(2+3)^2\,(-0.25)^3}{3!}}\right)^4}$$

Open code

- $n!$ is the factorial function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

13.1558...

This result is very near to the Rydberg constant 13,605693 eV that is used to express the limiting value of the highest wavenumber (inverse wavelength) of any photon that can be emitted from an atom, or, alternatively, the wavenumber of the lowest-energy photon capable of ionizing an atom from its ground state.

Series representation:

$$8\sqrt[15]{\frac{1}{2}\left(-\frac{1}{\frac{2\left((2+3)^2(-0.25)^3\right)}{3!}}\right)^4} = 8.15851\sqrt[15]{\left(\sum_{k=0}^{\infty}\frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}\right)^4}$$

for $((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $n_0 \to 3)$

Open code

- $\mathbb{Z}$ is the set of integers
  - More information

Enlarge Data Customize A Plaintext Interactive

Integral representations:

$$8\sqrt[15]{\frac{1}{2}\left(-\frac{1}{\frac{2\left((2+3)^2(-0.25)^3\right)}{3!}}\right)^4} = 8.15851\sqrt[15]{\left(\int_0^1 \log^3\left(\frac{1}{t}\right)dt\right)^4}$$

Open code

$$8\sqrt[15]{\frac{1}{2}\left(-\frac{1}{\frac{2\left((2+3)^2(-0.25)^3\right)}{3!}}\right)^4} = 8.15851\sqrt[15]{\left(\int_0^{\infty} e^{-t}\,t^3\,dt\right)^4}$$

Open code

$$8\sqrt[15]{\frac{1}{2}\left(-\frac{1}{\frac{2\left((2+3)^2(-0.25)^3\right)}{3!}}\right)^4} = 8.15851\sqrt[15]{\left(\int_1^{\infty} e^{-t}\,t^3\,dt+\sum_{k=0}^{\infty}\frac{(-1)^k}{(4+k)\,k!}\right)^4}$$

From:

$$\int_0^\infty a^{p-1}x^n\,da = \int_0^1 \left(-\frac{\operatorname{Log} x}{x}\right)^{p-1} x^n \frac{1-\operatorname{Log} x}{x^2}\,dx$$

$$= \int_0^\infty y^{p-1}(1+y)e^{-y(n-p)}\,dy$$

$$= \frac{n\Gamma(p)}{(n-p)^{p+1}}.$$

$$\frac{n\Gamma(p)}{(n-p)^{p+1}}.$$

From the right hand side, we obtain, for n = 2, p = 1.5:

2 * (((gamma (1.5))) / (((2-1.5)^2.5)))

Input:

$$2\times\frac{\Gamma(1.5)}{(2-1.5)^{2.5}}$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

10.0265...

Series representations:

$$\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}} = 11.3137\sum_{k=0}^{\infty}\frac{(1.5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Open code

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$$\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}} = \frac{11.3137\,\pi}{\sum_{k=0}^{\infty}(1.5-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!(-j+k)!}}$$

Open code

- $\mathbb{Z}$ is the set of integers
  - More information

Integral representations:

- More

$$\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}} = 11.3137 \int_0^\infty e^{-t}\, t^{0.5}\, dt$$

Open code

$$\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}} = 11.3137 \int_0^1 \log^{0.5}\left(\frac{1}{t}\right) dt$$

Open code

$$\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}} = 11.3137\, e^{\int_0^1 \frac{0.5-1.5\,x+x^{1.5}}{(-1+x)\log(x)}\, dx}$$

Open code

1 / (((2 * (((gamma (1.5))) / (((2-1.5)^2.5))))))

Input:

$$\frac{1}{2\times\frac{\Gamma(1.5)}{(2-1.5)^{2.5}}}$$

Open code

- $\Gamma(x)$ is the gamma function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

0.0997356...

Series representations:

$$\frac{1}{\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}}} = \frac{0.0883883}{\sum_{k=0}^{\infty} \frac{(1.5-z_0)^k\, \Gamma^{(k)}(z_0)}{k!}} \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Open code

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$$\frac{1}{\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}}} = \frac{0.0883883 \sum_{k=0}^{\infty} (1.5-z_0)^k \sum_{j=0}^{k} \frac{(-1)^j\, \pi^{-j+k} \sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}}{\pi}$$

Open code

- $\mathbb{Z}$ is the set of integers
  - More information

Integral representations:

- More

$$\frac{1}{\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}}} = \frac{0.0883883}{\int_0^\infty e^{-t}\, t^{0.5}\, dt}$$

Open code

$$\frac{1}{\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}}} = \frac{0.0883883}{\int_0^1 \log^{0.5}\left(\frac{1}{t}\right) dt}$$

Open code

$$\frac{1}{\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}}} = 0.0883883 \exp\left(-\int_0^1 \frac{0.5 - 1.5\,x + x^{1.5}}{(-1+x)\log(x)}\, dx\right)$$

(((((exp(((((1 / (((2 * (((gamma (1.5))) / (((2-1.5)^2.5)))))))))))))

Input:

$$\exp\left(\frac{1}{2\times\frac{\Gamma(1.5)}{(2-1.5)^{2.5}}}\right)$$

Open code

- $\Gamma(x)$ is the gamma function

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.10488...

This value is very near to the Cosmological constant 1,1056

(((((exp(((((1 / (((2 * (((gamma (1.5))) / (((2-1.5)^2.5)))))))))))))^5

Input:

$$\exp^5\left(\frac{1}{2\times\frac{\Gamma(1.5)}{(2-1.5)^{2.5}}}\right)$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

1.64654...

(24*4) + 10^3 * (((((exp(((((1 / (((2 * (((gamma (1.5))) / (((2-1.5)^2.5))))))))))))))^5

Input:

$$24\times 4+10^3 \exp^5\left(\frac{1}{2\times \frac{\Gamma(1.5)}{(2-1.5)^{2.5}}}\right)$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

1742.54...

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

Series representations:

$$24\times 4+10^3 \exp^5\left(\frac{1}{\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}}}\right)=96+1000\exp^5\left(\frac{0.0883883}{\sum_{k=0}^{\infty}\frac{(1.5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}\right)$$

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

Open code

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$$24\times 4+10^3 \exp^5\left(\frac{1}{\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}}}\right)=$$
$$8\left(12+125\exp^5\left(\frac{0.0883883\sum_{k=0}^{\infty}(1.5-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}}{\pi}\right)\right)$$

Open code

- $\mathbb{Z}$ is the set of integers
  - More information

Integral representations:

- More

$$24\times 4+10^3 \exp^5\left(\frac{1}{\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}}}\right)=96+1000\exp^5\left(\frac{0.0883883}{\int_0^1\log^{0.5}\left(\frac{1}{t}\right)dt}\right)$$

Open code

$$24\times 4+10^3\exp^5\left(\frac{1}{\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}}}\right)=96+1000\exp^5\left(\frac{0.0883883}{\int_0^\infty e^{-t}\,t^{0.5}\,dt}\right)$$

Open code

$$24\times 4+10^3\exp^5\left(\frac{1}{\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}}}\right)=$$
$$96+1000\exp^5\left(0.0883883\exp\left(-\int_0^1\frac{0.5-1.5\,x+x^{1.5}}{(-1+x)\log(x)}\,dx\right)\right)$$

(((((((24*4) + 10^3 * (((((exp(((((1 / (((2 * (((gamma (1.5))) / (((2-1.5)^2.5))))))))))))))^5))))))^1/3

Input:

$$\sqrt[3]{24\times 4+10^3\exp^5\left(\frac{1}{2\times\frac{\Gamma(1.5)}{(2-1.5)^{2.5}}}\right)}$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

12.0336...

This result is very near to the value of black hole entropy 12,1904

2 * (((((((24*4) + 10^3 * (((((exp(((((1 / (((2 * (((gamma (1.5))) / (((2-1.5)^2.5))))))))))))))^5))))))^1/3

Input:

$$2\sqrt[3]{24\times 4+10^3\exp^5\left(\frac{1}{2\times\frac{\Gamma(1.5)}{(2-1.5)^{2.5}}}\right)}$$

Open code

- $\Gamma(x)$ is the gamma function

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Result:

- More digits

24.0671...

This value is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

Series representations:

$$2\sqrt[3]{24\times 4+10^3\exp^5\left(\frac{1}{\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}}}\right)} = 4\sqrt[3]{12+125\exp^5\left(\frac{0.0883883}{\sum_{k=0}^{\infty}\frac{(1.5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}\right)}$$

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

Open code

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$$2\sqrt[3]{24\times 4+10^3\exp^5\left(\frac{1}{\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}}}\right)} = 4\left(12+125\exp^5\left(\frac{0.0883883\sum_{k=0}^{\infty}(1.5-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}}{\pi}\right)\right)^{\wedge}(1/3)$$

Open code

- $\mathbb{Z}$ is the set of integers
  - More information

Integral representations:

- More

$$2\sqrt[3]{24\times 4+10^3\exp^5\left(\frac{1}{\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}}}\right)} = 4\sqrt[3]{12+125\exp^5\left(\frac{0.0883883}{\int_0^1\log^{0.5}\left(\frac{1}{t}\right)dt}\right)}$$

Open code

$$2\sqrt[3]{24\times 4+10^3\exp^5\left(\frac{1}{\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}}}\right)} = 4\sqrt[3]{12+125\exp^5\left(\frac{0.0883883}{\int_0^{\infty}e^{-t}\,t^{0.5}\,dt}\right)}$$

Open code

$$2\sqrt[3]{24\times 4+10^3\exp^5\left(\frac{1}{\frac{2\,\Gamma(1.5)}{(2-1.5)^{2.5}}}\right)} =$$

$$4\sqrt[3]{12+125\exp^5\left(0.0883883\exp\left(-\int_0^1 \frac{0.5-1.5\,x+x^{1.5}}{(-1+x)\log(x)}\,dx\right)\right)}$$

(((((((24*4) + 10^3 * (((((exp(((((1 / (((2 * (((gamma (1.5))) / (((2-1.5)^2.5)))))))))))))^5))))))^1/15

Input:

$$\sqrt[15]{24\times 4+10^3\exp^5\left(\frac{1}{2\times\frac{\Gamma(1.5)}{(2-1.5)^{2.5}}}\right)}$$

Open code

- $\Gamma(x)$ is the gamma function

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1.644670481725964714423453317418339633540423803778787898949...

1.644670481725964714423453317418339633540423803778787 8

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{59+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{21+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Possible closed forms:

- More

$$\frac{77}{10}\sqrt{\frac{2697}{5758430}}\,\pi^2 \approx 1.644670481725964 63577$$

$$\frac{311573057\,\pi}{595156074} \approx 1.6446704817259647144 35117$$

$$\frac{\left(\frac{63973967}{7161955}\right)^{3/4}}{\pi} \approx 1.6446704817259647 25795$$

Now, we have that:

(iv) Consider the trinomial equation

$$aqx^p + x^q = 1, \tag{1.15}$$

where $a > 0$ and $0 < q < p$. We shall find an expansion for x^n in nonnegative powers of a, where n is any positive real number and x is a particular root of (1.15). Ramanujan's derivation is briefly presented in Hardy's book [20, pp. 194, 195].

Choose r so that $0 < pr < n$. Making the substitutions $a = (1-y)/(qy^{p/q})$ and $x = y^{1/q}$, we find that

$$\int_0^\infty a^{r-1}x^n\, da = \frac{1}{q^r}\int_0^1 y^{n/q}\left(\frac{1-y}{y^{p/q}}\right)^{r-1}\left\{\frac{p(1-y)}{qy^{p/q+1}} + y^{-p/q}\right\} dy$$

$$= \frac{p}{q^{r+1}}\int_0^1 y^{(n-pr)/q-1}(1-y)^r\, dy$$

$$+ \frac{1}{q^r}\int_0^1 y^{(n-pr)/q}(1-y)^{r-1}\, dy$$

$$= \frac{n\Gamma(r)\Gamma(\{n-pr\}/q)}{q^{r+1}\Gamma(\{n-pr\}/q+r+1)},$$

by (1.6). Thus, in the notation of the Master Theorem,

$$\varphi(r) = \frac{nq^{r-1}\Gamma(\{n+pr\}/q)}{\Gamma(\{n+pr\}/q-r+1)}.$$

Hence, Ramanujan concludes that

$$x^n = \frac{n}{q}\sum_{k=0}^{\infty}\frac{\Gamma(\{n+pk\}/q)(-qa)^k}{\Gamma(\{n+pk\}/q-k+1)k!}. \tag{1.16}$$

The expansion (1.16) is actually valid for all real numbers n, p, and q, and for complex a with

$$|a| \le |p|^{-p/q}|p-q|^{(p-q)/q}. \tag{1.17}$$

From the (1.16) for k = 3, (∑ k = 0 to 2, thence: 0+1+2 = 3) a = 0.25+i , n = 2.5, p = 1.5, q = 0.5, we obtain:

(2.5/0.5) * (((gamma (2.5+1.5*3)/0.5))) (((-0.5 * (0.25+i))9^3))) / (((gamma (2.5+1.5*3)/(0.5-3+1))) * 3!)))

(2.5/0.5) * (((gamma (((2.5+1.5*3)/0.5))) ((((-0.5 *(0.25+i)))^3)))) / (((gamma (((2.5+1.5*3)/(0.5-3+1))) * 3!)))

Input:

$$\frac{2.5}{0.5} \times \frac{\Gamma\left(\frac{2.5+1.5\times 3}{0.5}\right)(-0.5\,(0.25+i))^3}{\Gamma\left(\frac{2.5+1.5\times 3}{0.5-3+1}\right)\times 3!}$$

Open code

- $\Gamma(x)$ is the gamma function
- $n!$ is the factorial function
- i is the imaginary unit

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Result:

- More digits

$$-9.01506\ldots \times 10^9 - 9.97411\ldots \times 10^9\, i$$

Polar coordinates:

$r = 1.34445 \times 10^{10}$ (radius), $\theta = -132.109°$ (angle)

Open code

(1.34445×10^10)^1/48

Input interpretation:

$$\sqrt[48]{1.34445 \times 10^{10}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1.625591227680958954072687786420615864191641444309902576214...

27*4 + 10^3 * (1.34445×10^10)^1/48

Input interpretation:

$$27 \times 4 + 10^3 \sqrt[48]{1.34445 \times 10^{10}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1733.591227680958954072687786420615864191641444309902576214...

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

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

((((27*4 + 10^3 * (1.34445×10^10)^1/48))))^1/3

Input interpretation:

$$\sqrt[3]{27\times4+10^3\sqrt[48]{1.34445\times10^{10}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

12.01293...

This result is very near to the value of black hole entropy 12,1904

2 * ((((27*4 + 10^3 * (1.34445×10^10)^1/48))))^1/3

Input interpretation:

$$2\sqrt[3]{27\times4+10^3\sqrt[48]{1.34445\times10^{10}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

24.02586...

This value is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

((((27*4 + 10^3 * (1.34445×10^10)^1/48))))^1/15

Input interpretation:

$$\sqrt[15]{27\times4+10^3\sqrt[48]{1.34445\times10^{10}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1.644105870490292568029743586599771805811621260174606746168...

1.6441058704902925680297435865997718058116212601746067

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{11+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{4+\cfrac{1}{24+\cfrac{1}{3+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Possible closed forms:

- More

$$\frac{965510961\pi}{1844918990} \approx 1.64410587049029256805436 6$$

$$\frac{2\times 2^{2/9}}{81\, e^{118/9} \log^{440/9}(2) \log^{73/9}(3)} \approx 1.64410587049029256 17243$$

π [root of $537x^3 - 70866x^2 + 98319x - 32122$ near $x = 0.523335$] $\approx$ 1.64410587049029256803 00054

Conclusion

Note that 1.644... * 3 * 2.4739 = 12.20...

This result is very near to the value of black hole entropy 12,1904

1.64417732421... * 3 = 4.9325

This value 4,9325 is very near to the first value of upper bound dark photon energy range ($1.8 * 10^{15} – 4.95 * 10^{16} – 5.4 * 10^{16}$) (Physics Letters B 731 (2014) 265–271 - **Searching a dark photon with HADES**)

1.64417732421... * 8 = 13.1534

This result is very near to the Rydberg constant 13,605693 eV that is used to express the limiting value of the highest wavenumber (inverse wavelength) of any photon that can be emitted from an atom, or, alternatively, the wavenumber of the lowest-energy photon capable of ionizing an atom from its ground state.

1.64417732421 * 4 = 6,57670929684

This result is practically equal to the value of reduced Planck constant $6,582 * 10^{-16}$ eV * s

We have calculated the mean of some value obtained from the develop of various expression concerning the Ramanujan's Master Theorem. We have that:

(((1.6437518+1.6436362+1.64255716+1.6437439+1.6437518+1.643762+1.6435346+1.6439648+1.64435+1.643689+1.6455483+1.6440711+1.6439865+1.6454784+1.6437518+1.644476+1.64654+1.64467+1.6441058)/19

Input interpretation:

$$\frac{1}{19}(1.6437518 + 1.6436362 + 1.64255716 + 1.6437439 + 1.6437518 + 1.643762 + 1.6435346 + 1.6439648 + 1.64435 + 1.643689 + 1.6455483 + 1.6440711 + 1.6439865 + 1.6454784 + 1.6437518 + 1.644476 + 1.64654 + 1.64467 + 1.6441058)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.64417732421052631578947368421052631578947368421052631578 9...

(1.64417732421052631578947368421052631578947368421052631578 9)*(1.64417732421052631578947368421052631578947368421052631578 9)^1/10 * 10^3

Where 10 is the number of dimension in superstring theory

Input interpretation:

$$1.644177324210526315789473684210526315789473684210526315789 \sqrt[10]{1.644177324210526315789473684210526315789473684210526315789} \times 10^3$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$$1727.99913099481061928073222620907654221416642561325181179 1\ldots$$

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

Continued fraction:

- Linear form

$$1727+\cfrac{1}{1+\cfrac{1}{1149+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{10+\cfrac{1}{7+\cfrac{1}{27+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{85+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Possible closed forms:

- More

$$12\,\pi\,\text{csch}^2\left(\frac{26021617}{176810128}\right) \approx 1727.99913099481061930249$$

$$\frac{3271\,\pi!}{36} - \frac{3357}{4} - \frac{332}{3\,\pi} + \frac{1241\,\pi}{2} \approx 1727.9991309948106192745 25$$

$$\frac{2386\, e\, e! - 1208 - 2564\, e + 17709\, e^2}{32\, e} \approx 1727.99913099481061928888883$$

(1727.9991309948106192807322262090765422141664256132518117 91)^1/15

Input interpretation:

$$\sqrt[15]{1727.99913099481061928073222620907654221416642561325181179 1}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.6437517744080743296109455489015587618726730890483546690 35...

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{21+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{90+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{787+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Possible closed forms:

- More

π root of $5116\, x^3 - 68467\, x^2 + 9768\, x + 12900$ near $x = 0.523222$ $\approx$

1.64375177440807432960614 1

$$\frac{1249531640\, \pi}{2388146119} \approx 1.64375177440807432960811 1$$

$$\frac{1}{13}\left(-107\, e^{\pi} - 265\, \pi - 130 \log(\pi) + 2068 \log(2\, \pi) - 255 \tan^{-1}(\pi)\right) \approx$$

1.64375177440807432929872

(1.6437517744080743296109455489015587618726730890483546690 35)*(2388146 119) / (1249531640)

Input interpretation:

$1.64375177440807432961094554890155876187267308904835466903 5 \times \frac{2\,388\,146\,119}{1\,249\,531\,640}$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

3.14159265358979323846806023457683894280313654944069251915 1...

Open code

Continued fraction:

- Linear form

$$3+\cfrac{1}{7+\cfrac{1}{15+\cfrac{1}{1+\cfrac{1}{292+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{14+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Possible closed forms:

- More

$\pi \approx 3.14159265358979323846\,26433$

$\log(\mathcal{G}_{Ge}) \approx 3.14159265358979323846\,26433$

$\sqrt{6\,\zeta(2)} \approx 3.14159265358979323846\,26433$

-

2*(((1.643751774408074329610945548901558761872673089048354669035)*(2388146119) / (1249531640)))

Input interpretation:

$2\left(1.643751774408074329610945548901558761872673089048354669035 \times \frac{2\,388\,146\,119}{1\,249\,531\,640}\right)$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

6.283185307179586476936120469153677885606273098881385038303...

Continued fraction:

- Linear form

$$6+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{2+\cfrac{1}{146+\cfrac{1}{3+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{7+\cfrac{1}{5+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Possible closed forms:

- More

$2\pi \approx 6.28318530717958647692528\,6$

$\frac{1}{\mathcal{P}_A} \approx 6.283185307179586476925286$

$2\sqrt{6\,\zeta(2)} \approx 6.283185307179586476925286$

Thence, with this final result, we note that, is possible the link between the "glueball" mass that always we obtain and the form of the string representing it: a closed string that coincide with 2π, the length of a circle with radius equal to 1. Thence further fundamental mathematical and physical connection between golden ratio and π

Appendix A

From:

Three-dimensional AdS gravity and extremal CFTs at c = 8m

Spyros D. Avramis, Alex Kehagiasb and Constantina Mattheopoulou

Received: September 7, 2007 -Accepted: October 28, 2007 - Published: November 9, 2007

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.

From:

Phenomenological consequences of superfluid dark matter with baryon-phonon coupling

Lasha Berezhiani - Max-Planck-Institut fur Physik, Fohringer Ring 6, 80805 Munchen, Germany
Benoit Famaey - Universite de Strasbourg, CNRS UMR 7550, Observatoire astronomique de Strasbourg, 11 rue de l'Universite, F-67000 Strasbourg, France
Justin Khoury - Center for Particle Cosmology, Department of Physics and Astronomy, University of Pennsylvania, Philadelphia PA 19104, USA - (Dated: November 17, 2017)

Using (22) this translates to an upper bound on the mass of the DM particle:

$$m \lesssim 4.2 \left(\frac{\sigma/m}{\mathrm{cm}^2/\mathrm{g}} \right)^{1/4} \mathrm{eV}\,. \quad (24)$$

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 $\rho \propto r^{-3}$.

References

Bruce C. Berndt - **Ramanujan's Notebooks Part 1** - Springer-Verlag - (c) 1985 by Springer-Verlag New York Inc.

Wikipedia