On the detailed analysis of the Table I of Ramanujan's work "Modular equations and approximations to π". New possible mathematical connections with the Cosmological Constant values and some topics of String Theory.

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Abstract

In this paper, we analyze the Table I of Ramanujan's work "Modular equations and approximations to π". New possible mathematical connections with the Cosmological Constant values and some topics of String Theory.

I want to dedicate this work to Prof. George E. Andrew, always available and very kind for any clarification and who always encourages me to go forward in my research

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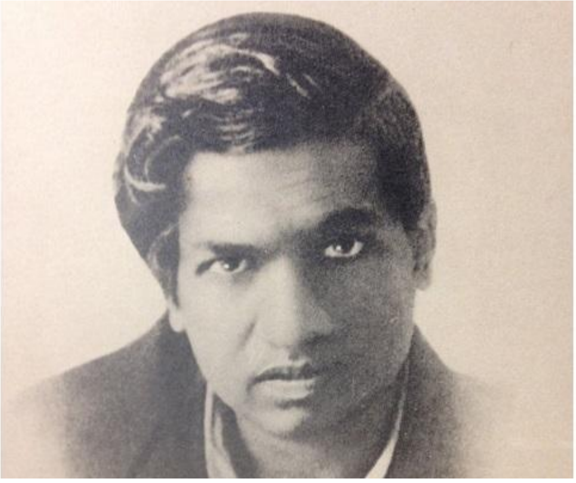
Srinivasa Ramanujan (1887-1920)



https://www.moduscc.it/ramanujan-il-grande-matematico-indiano-13453-131115/

Vesuvius landscape with gorse – Naples

https://www.pinterest.it/pin/95068242114589901/

From:

New Quantum Structure of the Space-Time - *Norma G. SANCHEZ* -
arXiv:1910.13382v1 [physics.gen-ph] 28 Oct 2019

With regard the Dark Energy and Cosmological constant, we have:

The classical Universe today U_Λ is precisely a *classical dilute gravity vacuum dominated by voids and supervoids as shown by observations:* The observed value of ρ_Λ or Λ today is *precisely the classical dual* of its quantum precursor values ρ_Q, Λ_Q in the quantum very early precursor vacuum U_Q as determined by our dual Equations.

$$\Lambda = 3H^2 = \lambda_P (H / h_P)^2 = \lambda_P (l_P / L_H)^2$$
$$= (2.846 \pm 0.076)\, 10^{-122}\, m_P^2$$

$$\Lambda_Q = 3H_Q^2 = \lambda_P (h_P / H)^2 = \lambda_P (L_H / l_P)^2$$
$$= (0.3516 \pm 0.094)\, 10^{122} m_P^2$$

$$\Lambda_Q \Lambda = \lambda_P^2 \quad , \quad \lambda_P = 3\, h_P^2 .$$

The quantum dual value Λ_Q is precisely the quantum value from particle physics:

$$\rho_Q = \rho_P\, (\Lambda_Q / \lambda_P) = \rho_P^2 / \rho_\Lambda = 10^{122}\, \rho_P$$

Fundamental are the following results: $2.846 * 10^{-122}$ and $0.3516 * 10^{122}$

$$\Lambda = 3H^2 = \lambda_P (H / h_P)^2 = \lambda_P (l_P / L_H)^2$$
$$= (2.846 \pm 0.076)\ 10^{-122}\ m_P^2$$

$$\Lambda_Q = 3H_Q^2 = \lambda_P (h_P / H)^2 = \lambda_P (L_H / l_P)^2$$
$$= (0.3516 \pm 0.094)\ 10^{122} m_P^2$$

From:

Modular equations and approximations to π – *Srinivasa Ramanujan* - Quarterly Journal of Mathematics, XLV, 1914, 350 – 372

We have that:

TABLE I

$$g_{62} + \frac{1}{g_{62}} = \frac{1}{2}\{\sqrt{(1+\sqrt{2})} + \sqrt{(9+5\sqrt{2})}\},$$

$$G_{65}^2 = \sqrt{\left\{\left(\frac{1+\sqrt{5}}{2}\right)\left(\frac{3+\sqrt{13}}{2}\right)\right\}}\left\{\sqrt{\left(\frac{1+\sqrt{65}}{8}\right)} + \sqrt{\left(\frac{9+\sqrt{65}}{8}\right)}\right\},$$

$$g_{66}^2 = \sqrt{(\sqrt{2}+\sqrt{3})}(7\sqrt{2}+3\sqrt{11})^{\frac{1}{6}}\left\{\sqrt{\left(\frac{7+\sqrt{33}}{8}\right)} + \sqrt{\left(\frac{\sqrt{33}-1}{8}\right)}\right\},$$

$$G_{69}^2 = (3\sqrt{3}+\sqrt{23})^{\frac{1}{4}}\left(\frac{5+\sqrt{23}}{4}\right)^{\frac{1}{6}}\left\{\sqrt{\left(\frac{6+3\sqrt{3}}{4}\right)} + \sqrt{\left(\frac{2+3\sqrt{3}}{4}\right)}\right\},$$

$$G_{77}^2 = \{\frac{1}{2}(\sqrt{7}+\sqrt{11})(8+3\sqrt{7})\}^{\frac{1}{4}}\left\{\sqrt{\left(\frac{6+\sqrt{11}}{4}\right)} + \sqrt{\left(\frac{2+\sqrt{11}}{4}\right)}\right\},$$

$$G_{81}^3 = \frac{(2\sqrt{3}+2)^{\frac{1}{3}}+1}{(2\sqrt{3}-2)^{\frac{1}{3}}-1},$$

We obtain:

$$\frac{1}{2}\{\sqrt{(1+\sqrt{2})} + \sqrt{(9+5\sqrt{2})}\},$$

1/2*[sqrt(1+sqrt2)+sqrt(9+5sqrt2)]

Input

$$\frac{1}{2}\left(\sqrt{1+\sqrt{2}} + \sqrt{9+5\sqrt{2}}\right)$$

Decimal approximation

2.7813238039205475596483625188461181855042766742963763507332949901...

2.781323803920547....

Alternate forms

$$\frac{1}{2}\left(\sqrt{1+\sqrt{2}}+\sqrt{9+5\sqrt{2}}\right)$$

$$\sqrt{\frac{1}{2}\left(5+3\sqrt{2}+\sqrt{19+14\sqrt{2}}\right)}$$

$$\frac{\sqrt{2(9-5\sqrt{2})}+2\sqrt{9-\sqrt{31}}+\sqrt{2}\left(2\sqrt{1+\sqrt{2}}+\frac{\sqrt{10+9\sqrt{2}}}{\sqrt[4]{2}}\right)}{4\sqrt{2}}$$

Minimal polynomial

$$x^8-10x^6+19x^4-12x^2+4$$

Expanded form

$$\frac{\sqrt{1+\sqrt{2}}}{2}+\frac{1}{2}\sqrt{9+5\sqrt{2}}$$

From:

$$: \sqrt{\left\{\left(\frac{1+\sqrt{5}}{2}\right)\left(\frac{3+\sqrt{13}}{2}\right)\right\}}\left\{\sqrt{\left(\frac{1+\sqrt{65}}{8}\right)}+\sqrt{\left(\frac{9+\sqrt{65}}{8}\right)}\right\},$$

Sqrt(((1+sqrt5)/2)((3+sqrt13)/2))*((sqrt((1+sqrt65)/8)+sqrt((9+sqrt65)/8)))

Input

$$\sqrt{\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)\left(\frac{1}{2}\left(3+\sqrt{13}\right)\right)}\left(\sqrt{\frac{1}{8}\left(1+\sqrt{65}\right)}+\sqrt{\frac{1}{8}\left(9+\sqrt{65}\right)}\right)$$

Result

$$\frac{1}{2}\sqrt{\left(1+\sqrt{5}\right)\left(3+\sqrt{13}\right)}\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(1+\sqrt{65}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(9+\sqrt{65}\right)}\right)$$

Decimal approximation

5.8364372603724419137911559828280153147254752692005302828075165079
...

5.8364372603724….

Alternate forms

$$\frac{1}{8}\sqrt{\left(1+\sqrt{5}\right)\left(3+\sqrt{13}\right)}\left(\sqrt{2\left(1+\sqrt{65}\right)}+\sqrt{2\left(9+\sqrt{65}\right)}\right)$$

$$\frac{1}{4}\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)\left(3+\sqrt{13}\right)}\left(\sqrt{1+\sqrt{65}}+\sqrt{9+\sqrt{65}}\right)$$

$$\left(\frac{1}{8}\sqrt{1-8i}+\frac{1}{8}\sqrt{1+8i}+\frac{\sqrt{5}}{8}+\frac{\sqrt{13}}{8}\right)\sqrt{(1+\sqrt{5})(3+\sqrt{13})}$$

Minimal polynomial

$$x^8-8x^7+12x^6+8x^5-27x^4+8x^3+12x^2-8x+1$$

Expanded forms

$$\frac{1}{4}\left(\sqrt{34+8\sqrt{5}+8\sqrt{13}+2\sqrt{65}}+\sqrt{46+20\sqrt{5}+12\sqrt{13}+6\sqrt{65}}\right)$$

$$\frac{1}{4}\sqrt{\frac{1}{2}(1+\sqrt{5})(3+\sqrt{13})\left(1+\sqrt{65}\right)}+\frac{1}{4}\sqrt{\frac{1}{2}(1+\sqrt{5})(3+\sqrt{13})\left(9+\sqrt{65}\right)}$$

From:

$$\sqrt{(\sqrt{2}+\sqrt{3})}(7\sqrt{2}+3\sqrt{11})^{\frac{1}{6}}\left\{\sqrt{\left(\frac{7+\sqrt{33}}{8}\right)}+\sqrt{\left(\frac{\sqrt{33}-1}{8}\right)}\right\},$$

Sqrt(sqrt2+sqrt3) (7sqrt2+3sqrt11)^(1/6) ((sqrt((7+sqrt33)/8)+sqrt((sqrt33 - 1)/8)))

Input

$$\sqrt{\sqrt{2}+\sqrt{3}}\,\sqrt[6]{7\sqrt{2}+3\sqrt{11}}\left(\sqrt{\frac{1}{8}(7+\sqrt{33})}+\sqrt{\frac{1}{8}(\sqrt{33}-1)}\right)$$

Result

$$\sqrt{\sqrt{2}+\sqrt{3}}\ \sqrt[6]{7\sqrt{2}+3\sqrt{11}}\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(\sqrt{33}-1\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(7+\sqrt{33}\right)}\right)$$

Decimal approximation

5.9316041484156843631215221854067364890013778319170782799968092734
…

5.93160414841568….

Alternate forms

$$\frac{1}{4}\sqrt{\sqrt{2}+\sqrt{3}}\ \sqrt[6]{7\sqrt{2}+3\sqrt{11}}\left(\sqrt{2\left(\sqrt{33}-1\right)}+\sqrt{2\left(7+\sqrt{33}\right)}\right)$$

$$\frac{1}{2}\sqrt[4]{5+2\sqrt{6}}\ \sqrt[12]{197+42\sqrt{22}}\ \sqrt{3+\sqrt{33}+\sqrt{26+6\sqrt{33}}}$$

$\left(\text{root of } x^8-204x^7-972x^6-1716x^5-2410x^4-1716x^3-972x^2-204x+1 \text{ near } x=208.697\right)$ ^(1/3)

Minimal polynomial

$$x^{24}-204x^{21}-972x^{18}-1716x^{15}-2410x^{12}-1716x^9-972x^6-204x^3+1$$

Expanded forms

$$\frac{1}{2}\sqrt[6]{7\sqrt{2}+3\sqrt{11}}\left(\sqrt{-\frac{1}{\sqrt{2}}-\frac{\sqrt{3}}{2}+\frac{3\sqrt{11}}{2}+\sqrt{\frac{33}{2}}}+\sqrt{\frac{7}{\sqrt{2}}+\frac{7\sqrt{3}}{2}+\frac{3\sqrt{11}}{2}+\sqrt{\frac{33}{2}}}\right)$$

$$\frac{\sqrt[6]{7\sqrt{2}+3\sqrt{11}}\sqrt{(\sqrt{2}+\sqrt{3})(\sqrt{33}-1)}}{2\sqrt{2}}+\frac{\sqrt[6]{7\sqrt{2}+3\sqrt{11}}\sqrt{(\sqrt{2}+\sqrt{3})(7+\sqrt{33})}}{2\sqrt{2}}$$

From:

$$(3\sqrt{3}+\sqrt{23})^{\frac{1}{4}}\left(\frac{5+\sqrt{23}}{4}\right)^{\frac{1}{6}}\left\{\sqrt{\left(\frac{6+3\sqrt{3}}{4}\right)}+\sqrt{\left(\frac{2+3\sqrt{3}}{4}\right)}\right\},$$

(3sqrt3+sqrt23)^0.25 (1/4*5+sqrt23)^(1/6) ((sqrt((6+3sqrt3)/4)+sqrt((2+3sqrt3)/4)))

Input

$$(3\sqrt{3}+\sqrt{23})^{0.25}\sqrt[6]{\frac{1}{4}(5+\sqrt{23})}\left(\sqrt{\frac{1}{4}(6+3\sqrt{3})}+\sqrt{\frac{1}{4}(2+3\sqrt{3})}\right)$$

Result

6.222025219332928944522313995338605669252179352491261596073246147 3
...

6.2220252193329….

From:

$$\{\frac{1}{2}(\sqrt{7}+\sqrt{11})(8+3\sqrt{7})\}^{\frac{1}{4}}\left\{\sqrt{\left(\frac{6+\sqrt{11}}{4}\right)}+\sqrt{\left(\frac{2+\sqrt{11}}{4}\right)}\right\},$$

((1/2(sqrt7+sqrt11)(8+3sqrt7))^0.25 ((sqrt((6+sqrt11)/4)+sqrt((2+sqrt11)/4)))

Input

$$\left(\frac{1}{2}\left(\sqrt{7}+\sqrt{11}\right)\left(8+3\sqrt{7}\right)\right)^{0.25}\left(\sqrt{\frac{1}{4}\left(6+\sqrt{11}\right)}+\sqrt{\frac{1}{4}\left(2+\sqrt{11}\right)}\right)$$

Result

7.0336566102533820668630429692660792210320262042164304387709010049
...

7.033656610253….

From:

$$\frac{(2\sqrt{3}+2)^{\frac{1}{3}}+1}{(2\sqrt{3}-2)^{\frac{1}{3}}-1},$$

(((2sqrt3+2)^(1/3)+1)) / (((2sqrt3 – 2)^(1/3) – 1))

Input

$$\frac{\sqrt[3]{2\sqrt{3}+2}+1}{\sqrt[3]{2\sqrt{3}-2}-1}$$

Decimal approximation

20.377499977251773758491214090560486670678090121282523865667554079…

20.37749997725….

Alternate forms

$$\frac{\sqrt[3]{2+2\sqrt{3}}}{\sqrt[3]{2\sqrt{3}-2}-1}+\frac{1}{\sqrt[3]{2\sqrt{3}-2}-1}$$

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

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root of $x^6-18x^5-45x^4-68x^3-45x^2-18x+1$ near $x=20.3775$

Minimal polynomial

$$x^6-18x^5-45x^4-68x^3-45x^2-18x+1$$

From the sum of the above results, we obtain:

(2.781323803920547 + 5.8364372603724 + 5.93160414841568 + 6.2220252193329 + 7.033656610253 + 20.37749997725)

Input interpretation

2.781323803920547 + 5.8364372603724 + 5.93160414841568 + 6.2220252193329 + 7.033656610253 + 20.37749997725

Result

48.182547019544527

48.182547019544527

From which:

(2.781323803920547 + 5.8364372603724 + 5.93160414841568 + 6.2220252193329 + 7.033656610253 + 20.37749997725)^(1/(3+(sqrt(29)-5)))

where

$\sqrt{29} - 5 \approx 0.38516480$

Input interpretation

$$(2.781323803920547 + 5.8364372603724 + 5.93160414841568 + 6.2220252193329 + 7.033656610253 + 20.37749997725)\,\hat{}\left(\frac{1}{3 + \left(\sqrt{29} - 5\right)}\right)$$

Result

3.141497564718…

3.141497564718….≈ π

Multiplying the various results, we obtain:

(2.781323 * 5.836437 * 5.931604 * 6.222025 * 7.033656 * 20.377499)^(1/10) +((2 log(3))/3^4)

Input interpretation

$$\sqrt[10]{2.781323 \times 5.836437 \times 5.931604 \times 6.222025 \times 7.033656 \times 20.377499} + \frac{2\log(3)}{3^4}$$

log(x) is the natural logarithm

Result

3.1415916511053978047750264704704836995957104773679259231156236466…

3.1415916511…. ≈ π

Alternative representations

$$\sqrt[10]{2.78132\times 5.83644\times 5.9316\times 6.22203\times 7.03366\times 20.3775} + \frac{2\log(3)}{3^4} = \sqrt[10]{85868.7} + \frac{2\log_e(3)}{3^4}$$

$$\sqrt[10]{2.78132\times 5.83644\times 5.9316\times 6.22203\times 7.03366\times 20.3775} + \frac{2\log(3)}{3^4} = \sqrt[10]{85868.7} + \frac{2\log(a)\log_a(3)}{3^4}$$

$$\sqrt[10]{2.78132\times 5.83644\times 5.9316\times 6.22203\times 7.03366\times 20.3775} + \frac{2\log(3)}{3^4} = \sqrt[10]{85868.7} + \frac{4\coth^{-1}(2)}{3^4}$$

Series representations

$$\sqrt[10]{2.78132\times 5.83644\times 5.9316\times 6.22203\times 7.03366\times 20.3775} + \frac{2\log(3)}{3^4} = 3.11447 + 0.0246914\log(2) - 0.0246914\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k}{k}$$

$$\sqrt[10]{2.78132\times 5.83644\times 5.9316\times 6.22203\times 7.03366\times 20.3775} + \frac{2\log(3)}{3^4} = 3.11447 + \frac{4}{81}i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor + \frac{2\log(x)}{81} - \frac{2}{81}\sum_{k=1}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\sqrt[10]{2.78132 \times 5.83644 \times 5.9316 \times 6.22203 \times 7.03366 \times 20.3775} + \frac{2\log(3)}{3^4} =$$
$$3.11447 + \frac{2}{81}\left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor \log\left(\frac{1}{z_0}\right) + \frac{2\log(z_0)}{81} +$$
$$\frac{2}{81}\left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor \log(z_0) - \frac{2}{81}\sum_{k=1}^{\infty}\frac{(-1)^k (3-z_0)^k z_0^{-k}}{k}$$

Integral representations

$$\sqrt[10]{2.78132 \times 5.83644 \times 5.9316 \times 6.22203 \times 7.03366 \times 20.3775} + \frac{2\log(3)}{3^4} =$$
$$3.11447 + 0.0246914 \int_1^3 \frac{1}{t}\,dt$$

$$\sqrt[10]{2.78132 \times 5.83644 \times 5.9316 \times 6.22203 \times 7.03366 \times 20.3775} + \frac{2\log(3)}{3^4} =$$
$$3.11447 + \frac{1}{81\,i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{2^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

1/3*ln(2.781323 * 5.836437 * 5.931604 * 6.222025 * 7.033656 * 20.377499)-(1/3(((((√((113+5√505)/8)+√((105+5√505)/8))^3))^(1/14))+φ+zeta(2))-1)

where

$$\frac{1}{3}\left(\phi + \left(\frac{1}{2}\sqrt{\frac{1}{2}\left(105+5\sqrt{505}\right)} + \frac{1}{2}\sqrt{\frac{1}{2}\left(113+5\sqrt{505}\right)}\right)^{3/14} + \frac{\pi^2}{6}\right) - 1$$

0.6395842014676220030987838542575903154991090651644197533701212155
...

value that is the mean between ζ(2) = $\frac{\pi^2}{6}$ = 1.644934 ..., the value of golden ratio 1.61803398… and the 14th root of the Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3$ = 1164.2696 i.e. 1.65578..., i.e. 1.6395842014.., minus 1

Input interpretation

$$\frac{1}{3}\log(2.781323\times 5.836437\times 5.931604\times 6.222025\times 7.033656\times 20.377499) - \left(\frac{1}{3}\left(\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3}+\phi+\zeta(2)\right)-1\right)$$

log(x) is the natural logarithm

ζ(s) is the Riemann zeta function

ϕ is the golden ratio

Result

3.1472742095601914382035073953983339724975463043107755529103047041...

3.14727420956…..≈ π

Alternative representations

$$\frac{1}{3}\log(2.78132\times 5.83644\times 5.9316\times 6.22203\times 7.03366\times 20.3775) - \left(\frac{1}{3}\left(\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3}+\phi+\zeta(2)\right)-1\right) = 1+\frac{\log(85\,868.7)}{3}+\frac{1}{3}\left(-\phi-\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}\right)^3}-\zeta(2,1)\right)$$

$$\frac{1}{3}\log(2.78132\times 5.83644\times 5.9316\times 6.22203\times 7.03366\times 20.3775) - \left(\frac{1}{3}\left(\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3}+\phi+\zeta(2)\right)-1\right) = 1+\frac{\log(85\,868.7)}{3}+\frac{1}{3}\left(-\phi-\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}\right)^3}-\frac{\zeta\left(2,\frac{1}{2}\right)}{3}\right)$$

$$\frac{1}{3}\log(2.78132\times 5.83644\times 5.9316\times 6.22203\times 7.03366\times 20.3775) - \left(\frac{1}{3}\left(\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3}+\phi+\zeta(2)\right)-1\right) = 1+\frac{\log_e(85\,868.7)}{3}+\frac{1}{3}\left(-\phi-\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}\right)^3}-\zeta(2,1)\right)$$

$\zeta(s, a)$ is the generalized Riemann zeta function

Series representations

$$\frac{1}{3}\log(2.78132\times 5.83644\times 5.9316\times 6.22203\times 7.03366\times 20.3775) - \left(\frac{1}{3}\left(\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3}+\phi+\zeta(2)\right)-1\right) = \frac{1}{3}\left(3-\phi+\log(85\,867.7)+3\sum_{k=1}^{\infty}-\frac{1+(-0.0000116458)^k k}{3k^2} - \left(\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^k x^{-k}\left(-\frac{1}{2}\right)_k\left(\exp\left(i\pi\left\lfloor\frac{\arg\left(-x+\frac{1}{8}\left(113+5\sqrt{505}\right)\right)}{2\pi}\right\rfloor\right)\left(\frac{113}{8}-x+\frac{5\sqrt{505}}{8}\right)^k + \exp\left(i\pi\left\lfloor\frac{\arg\left(-x+\frac{5}{8}\left(21+\sqrt{505}\right)\right)}{2\pi}\right\rfloor\right)\left(-x+\frac{5}{8}\left(21+\sqrt{505}\right)\right)^k\right)\sqrt{x}\right)^3 \wedge (1/14)\right) \text{ for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\frac{1}{3}\log(2.78132\times 5.83644\times 5.9316\times 6.22203\times 7.03366\times 20.3775) - \left(\frac{1}{3}\left(\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3}+\phi+\zeta(2)\right)-1\right) =$$

$$\frac{1}{3}\left(3-\phi-\exp\left(-\sum_{k=1}^{\infty}\log\left(1-\frac{1}{(p_k)^2}\right)\right)+\log(85\,867.7)-\sum_{k=1}^{\infty}\frac{(-1)^k e^{-11.3606\,k}}{k} - \left(\sqrt{x}^3\left(\sum_{k=0}^{\infty}\frac{1}{k!}x^{-k}\left(-\frac{1}{2}\right)_k\left(\left(-\frac{1}{8}\right)^k \exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{113}{8}-x+\frac{5\sqrt{505}}{8}\right)}{2\pi}\right\rfloor\right)\left(113-8x+5\sqrt{505}\right)^k + (-1)^k \exp\left(i\pi\left\lfloor\frac{\arg\left(-x+\frac{5}{8}\left(21+\sqrt{505}\right)\right)}{2\pi}\right\rfloor\right)\left(-x+\frac{5}{8}\left(21+\sqrt{505}\right)\right)^k\right)\right)\right)^3\right)\text{^}(1/14)\right) \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\frac{1}{3}\log(2.78132\times 5.83644\times 5.9316\times 6.22203\times 7.03366\times 20.3775) - \left(\frac{1}{3}\left(\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3}+\phi+\zeta(2)\right)-1\right) =$$

$$\frac{1}{3}\left(3-\phi-\exp\left(\sum_{k=1}^{\infty}\frac{P(2k)}{k}\right)+\log(85\,867.7)-\sum_{k=1}^{\infty}\frac{(-1)^k e^{-11.3606k}}{k} - \left(\sqrt{x}^3\left(\sum_{k=0}^{\infty}\frac{1}{k!}x^{-k}\left(-\frac{1}{2}\right)_k\left(\left(-\frac{1}{8}\right)^k\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{113}{8}-x+\frac{5\sqrt{505}}{8}\right)}{2\pi}\right\rfloor\right)\left(113-8x+5\sqrt{505}\right)^k+(-1)^k\exp\left(i\pi\left\lfloor\frac{\arg\left(-x+\frac{5}{8}\left(21+\sqrt{505}\right)\right)}{2\pi}\right\rfloor\right)\left(-x+\frac{5}{8}\left(21+\sqrt{505}\right)\right)^k\right)\right)\right)^3\right)^{\wedge}(1/14)\right) \text{ for } (x\in\mathbb{R} \text{ and } x<0)$$

Integral representations

$$\frac{1}{3}\log(2.78132\times 5.83644\times 5.9316\times 6.22203\times 7.03366\times 20.3775) - \left(\frac{1}{3}\left(\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3}+\phi+\zeta(2)\right)-1\right) =$$

$$1-\frac{\phi}{3}-\frac{1}{6\times 0!}\int_0^1\frac{\log^2(1-t)}{t^2}\,dt+\frac{\log(85\,868.7)}{3}-\frac{1}{3}\sqrt[14]{\left(\sqrt{\frac{5}{8}\left(21+\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}\right)^3}$$

$$\frac{1}{3}\log(2.78132\times 5.83644\times 5.9316\times 6.22203\times 7.03366\times 20.3775) - \left(\frac{1}{3}\left(\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3}+\phi+\zeta(2)\right)-1\right) = 1-\frac{\phi}{3}+\int_1^{85\,868.7}\left(\frac{1}{3\,t}-\frac{14\,311.3\log^2(1.00001-0.0000116458\,t)}{(-1+t)^2\,0!}\right)dt - \frac{1}{3}\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}\right)^3}$$

$$\frac{1}{3}\log(2.78132\times 5.83644\times 5.9316\times 6.22203\times 7.03366\times 20.3775) - \left(\frac{1}{3}\left(\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3}+\phi+\zeta(2)\right)-1\right) = -\frac{1}{18\times 0!}\left(-18\times 0!+6\,\phi\,0!-6\times 0!\int_1^{85\,868.7}\frac{1}{t}\,dt+\pi^2\int_0^1 E_0(x)\,dx + 6\times 0!\sqrt[14]{\left(\sqrt{\frac{5}{8}\left(21+\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}\right)^3}\right)$$

$E_n(x)$ is the Euler polynomial

1/(5+0.96254)*(-(-2.781323 - 5.836437 + 5.931604 + 6.222025 +7.033656 - 20.377499))

Input interpretation

$$\frac{1}{5+0.96254}\left(-(-2.781323-5.836437+5.931604+6.222025+7.033656-20.377499)\right)$$

Result

1.644932193327004934138806615972387606624022648066092638372237335 0

...

1.644932193327….≈ ζ(2) = $\frac{\pi^2}{6}$ = 1.644934 ... (trace of the instanton shape)

From which:

((1/(5+0.96254)*(-(-2.781323 - 5.836437 + 5.931604 + 6.222025 +7.033656 - 20.377499))))^15-18+1/3

Input interpretation

$$\left(\frac{1}{5+0.96254}\left(-(-2.781323-5.836437+5.931604+6.222025+7.033656-20.377499)\right)\right)^{15}-18+\frac{1}{3}$$

Result

1729.040110808342077302422993178454913413927948872161804698690704 3

...

1729.0401108….

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. (1728 = $8^2 * 3^3$) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

(1/27(((1/(5+0.96254)*(-(-2.781323 - 5.836437 + 5.931604 + 6.222025 +7.033656 - 20.377499))))^15-18-1/sqrt2))^2

Input interpretation

$$\left(\frac{1}{27}\left(\left(\frac{1}{5+0.96254}\left(-(-2.781323-5.836437+5.931604+6.222025+7.033656-20.377499)\right)\right)^{15}-18-\frac{1}{\sqrt{2}}\right)\right)^2$$

Result

4096.00…

4096.00…. ≈ 64^2

We obtain also:

1/2(11468+14258-1010-812-1729-216)/(299792458(1/2.781323 * 1/5.836437 * 1/5.931604 * 1/6.222025 * 1/7.033656 * 1/20.377499))

where 299792458 = c speed of light and all the numbers highlighted in red can be to obtain easily from the following Ramanujan taxicab numbers:

$$135^3 + 138^3 = 172^3 - 1$$

$$11161^3 + 11468^3 = 14258^3 + 1$$

$$791^3 + 812^3 = 1010^3 - 1$$

$$9^3 + 10^3 = 12^3 + 1$$

$$6^3 + 8^3 = 9^3 - 1$$

Input interpretation

$$\frac{1}{2} \times \frac{11468 + 14258 - 1010 - 812 - 1729 - 216}{299792458\left(\frac{1}{2.781323} \times \frac{1}{5.836437} \times \frac{1}{5.931604} \times \frac{1}{6.222025} \times \frac{1}{7.033656} \times \frac{1}{20.377499}\right)}$$

Result

3.144828706176182771586973832301811989440904480659083158122676988 7…

3.14482870617… ≈ π

We have that:

$$\begin{aligned}
g_{90} &= \{(2+\sqrt{5})(\sqrt{5}+\sqrt{6})\}^{\frac{1}{6}}\left\{\sqrt{\left(\frac{3+\sqrt{6}}{4}\right)}+\sqrt{\left(\frac{\sqrt{6}-1}{4}\right)}\right\},\\
g_{94} &+ \frac{1}{g_{94}} = \frac{1}{2}\{\sqrt{(7+\sqrt{2})}+\sqrt{(7+5\sqrt{2})}\},\\
g_{98} &+ \frac{1}{g_{98}} = \frac{1}{2}\{\sqrt{2}+\sqrt{(14+4\sqrt{14})}\},\\
g_{114}^2 &= \sqrt{(\sqrt{2}+\sqrt{3})}(3\sqrt{2}+\sqrt{19})^{\frac{1}{6}}\left\{\sqrt{\left(\frac{23+3\sqrt{57}}{8}\right)}+\sqrt{\left(\frac{15+3\sqrt{57}}{8}\right)}\right\},
\end{aligned}$$

From:

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

((2+sqrt5)(sqrt5+sqrt6))^(1/6) [(1/4*(3+sqrt6))^0.5+(1/4*(sqrt6 – 1))^0.5]

Input

$$\sqrt[6]{(2+\sqrt{5})(\sqrt{5}+\sqrt{6})}\left(\sqrt{\frac{1}{4}(3+\sqrt{6})}+\sqrt{\frac{1}{4}(\sqrt{6}-1)}\right)$$

Exact result

$$\sqrt[6]{(2+\sqrt{5})(\sqrt{5}+\sqrt{6})}\left(\frac{1}{2}\sqrt{\sqrt{6}-1}+\frac{\sqrt{3+\sqrt{6}}}{2}\right)$$

Decimal approximation

2.9111166557745929627683335068014893928756125470088426388712758640

…

2.911116655774….

Alternate forms

$$\frac{1}{2}\sqrt[6]{5+2\sqrt{5}+2\sqrt{6}+\sqrt{30}}\left(\sqrt{\sqrt{6}-1}+\sqrt{3+\sqrt{6}}\right)$$

$$\sqrt[6]{\boxed{\text{root of } x^8-608x^7-388x^6+544x^5-506x^4-544x^3-388x^2+608x+1 \text{ near } x=608.636}}$$

Minimal polynomial

$$x^{48}-608x^{42}-388x^{36}+544x^{30}-506x^{24}-544x^{18}-388x^{12}+608x^6+1$$

Expanded forms

$$\frac{1}{2}\sqrt{\sqrt{6}-1}\sqrt[6]{(2+\sqrt{5})\left(\sqrt{5}+\sqrt{6}\right)}+\frac{1}{2}\sqrt{3+\sqrt{6}}\sqrt[6]{(2+\sqrt{5})\left(\sqrt{5}+\sqrt{6}\right)}$$

$$\frac{1}{2}\sqrt{\sqrt{6}-1}\sqrt[6]{5+2\sqrt{5}+2\sqrt{6}+\sqrt{30}}+\frac{1}{2}\sqrt{3+\sqrt{6}}\sqrt[6]{5+2\sqrt{5}+2\sqrt{6}+\sqrt{30}}$$

From:

$$\frac{1}{2}\{\sqrt{(7+\sqrt{2})}+\sqrt{(7+5\sqrt{2})}\},$$

1/2 [(7+sqrt2)^0.5 + (7+5sqrt2)^0.5]

Input

$$\frac{1}{2}\left(\sqrt{7+\sqrt{2}}+\sqrt{7+5\sqrt{2}}\right)$$

Decimal approximation

3.3259342931326123801433172293996761089308505243459596578805645089
…

3.32593429313….

Alternate forms

$$\sqrt{\frac{1}{2}\left(7+3\sqrt{2}+\sqrt{59+42\sqrt{2}}\right)}$$

$$\frac{1}{2}\left(\sqrt{\frac{7}{2}-\frac{i}{2}}+\sqrt{\frac{7}{2}+\frac{i}{2}}+\sqrt{7+\sqrt{2}}\right)$$

$$\frac{1}{2}\sqrt{\frac{7}{2}-\frac{i}{2}}+\frac{1}{2}\sqrt{\frac{7}{2}+\frac{i}{2}}+\frac{\sqrt{7+\sqrt{2}}}{2}$$

Minimal polynomial

$$x^8-14x^6+35x^4-28x^2+4$$

Expanded form

$$\frac{\sqrt{7+\sqrt{2}}}{2}+\frac{1}{2}\sqrt{7+5\sqrt{2}}$$

From:

$$\frac{1}{2}\{\sqrt{2}+\sqrt{(14+4\sqrt{14})}\},$$

1/2 [(sqrt2) + (14+4sqrt14)^0.5]

Input

$$\frac{1}{2}\left(\sqrt{2}+\sqrt{14+4\sqrt{14}}\right)$$

Decimal approximation

3.398139554449248125950660033238987673196116325142606870803439415 4

...

3.39813955444….

Alternate forms

$$\frac{1}{\sqrt{2}}+\sqrt{\frac{7}{2}+\sqrt{14}}$$

$$\frac{1+\sqrt{7+2\sqrt{14}}}{\sqrt{2}}$$

$$\frac{1}{\sqrt{2}}+\sqrt{\frac{1}{2}\left(7+2\sqrt{14}\right)}$$

Minimal polynomial

$$x^8-16x^6+54x^4-32x^2+25$$

Expanded form

$$\frac{1}{\sqrt{2}}+\frac{1}{2}\sqrt{14+4\sqrt{14}}$$

From:

$$\sqrt{(\sqrt{2}+\sqrt{3})}(3\sqrt{2}+\sqrt{19})^{\frac{1}{6}}\left\{\sqrt{\left(\frac{23+3\sqrt{57}}{8}\right)}+\sqrt{\left(\frac{15+3\sqrt{57}}{8}\right)}\right\},$$

(sqrt2+sqrt3)^0.5 (3sqrt2+sqrt19)^(1/6)
[(1/8*(23+3sqrt57))^0.5+(1/8*(15+3sqrt57))^0.5]

Input

$$\sqrt{\sqrt{2}+\sqrt{3}}\sqrt[6]{3\sqrt{2}+\sqrt{19}}\left(\sqrt{\frac{1}{8}(23+3\sqrt{57})}+\sqrt{\frac{1}{8}(15+3\sqrt{57})}\right)$$

Exact result

$$\sqrt{\sqrt{2}+\sqrt{3}}\sqrt[6]{3\sqrt{2}+\sqrt{19}}\left(\frac{1}{2}\sqrt{\frac{1}{2}(15+3\sqrt{57})}+\frac{1}{2}\sqrt{\frac{1}{2}(23+3\sqrt{57})}\right)$$

Decimal approximation

11.573048152106843872312344073975316163654599436688727342946157522
...

11.5730481521….

Alternate forms

$$\frac{1}{4}\sqrt[4]{5+2\sqrt{6}}\ \sqrt[12]{37+6\sqrt{38}}\left(3\sqrt{3}+\sqrt{19}+\sqrt{6\left(5+\sqrt{57}\right)}\right)$$

$$\frac{1}{4}\sqrt{\sqrt{2}+\sqrt{3}}\ \sqrt[6]{3\sqrt{2}+\sqrt{19}}\left(\sqrt{6\left(5+\sqrt{57}\right)}+\sqrt{46+6\sqrt{57}}\right)$$

$$\sqrt[3]{\text{root of } x^8-1548x^7-3180x^6+24588x^5-47914x^4+24588x^3-3180x^2-1548x+1 \text{ near } x=1550.04}$$

Minimal polynomial

$$x^{24}-1548x^{21}-3180x^{18}+24588x^{15}-47914x^{12}+24588x^9-3180x^6-1548x^3+1$$

Expanded forms

$$\frac{1}{2}\sqrt[6]{3\sqrt{2}+\sqrt{19}}\left(\sqrt{\frac{15}{\sqrt{2}}+\frac{15\sqrt{3}}{2}+\frac{9\sqrt{19}}{2}+3\sqrt{\frac{57}{2}}}+\sqrt{\frac{23}{\sqrt{2}}+\frac{23\sqrt{3}}{2}+\frac{9\sqrt{19}}{2}+3\sqrt{\frac{57}{2}}}\right)$$

$$\frac{\sqrt[6]{3\sqrt{2}+\sqrt{19}}\ \sqrt{\left(\sqrt{2}+\sqrt{3}\right)\left(15+3\sqrt{57}\right)}}{2\sqrt{2}}+\frac{\sqrt[6]{3\sqrt{2}+\sqrt{19}}\ \sqrt{\left(\sqrt{2}+\sqrt{3}\right)\left(23+3\sqrt{57}\right)}}{2\sqrt{2}}$$

Dividing the second by the first expression and adding 2, we obtain:

((1/2 [(7+sqrt2)^0.5 + (7+5sqrt2)^0.5])) / ((((2+sqrt5)(sqrt5+sqrt6))^(1/6) [(1/4*(3+sqrt6))^0.5+(1/4*(sqrt6 – 1))^0.5])) + 2

Input

$$\frac{\frac{1}{2}\left(\sqrt{7+\sqrt{2}}+\sqrt{7+5\sqrt{2}}\right)}{\sqrt[6]{(2+\sqrt{5})\left(\sqrt{5}+\sqrt{6}\right)}\left(\sqrt{\frac{1}{4}\left(3+\sqrt{6}\right)}+\sqrt{\frac{1}{4}\left(\sqrt{6}-1\right)}\right)}+2$$

Exact result

$$2+\frac{\sqrt{7+\sqrt{2}}+\sqrt{7+5\sqrt{2}}}{2\sqrt[6]{(2+\sqrt{5})\left(\sqrt{5}+\sqrt{6}\right)}\left(\frac{1}{2}\sqrt{\sqrt{6}-1}+\frac{\sqrt{3+\sqrt{6}}}{2}\right)}$$

Decimal approximation

3.142494336850147390200177028616888380268304270107723489736974316 0 …

3.14249433685…. ≈ π

Alternate forms

$$2+\left(\text{root of } x^4-14x^2+50 \text{ near } x=2.65246-0.188504\,i+\text{root of } x^4-14x^2+50 \text{ near } x=2.65246+0.188504\,i+\text{root of } x^4-28x^2+188 \text{ near } x=4.10225\right)\Big/\left(\sqrt{2}\sqrt[6]{(2+\sqrt{5})\left(\sqrt{5}+\sqrt{6}\right)}\left(\text{root of } x^4-6x^2+3 \text{ near } x=2.33441+\text{root of } x^4+2x^2-5 \text{ near } x=1.20395\right)\right)$$

$$\left(\sqrt{7+\sqrt{2}}+\sqrt{7+5\sqrt{2}}+2\sqrt{\sqrt{6}-1}\sqrt[6]{5+2\sqrt{5}+2\sqrt{6}+\sqrt{30}}+2\sqrt{3+\sqrt{6}}\sqrt[6]{5+2\sqrt{5}+2\sqrt{6}+\sqrt{30}}\right)\Big/\left(\sqrt[6]{5+2\sqrt{5}+2\sqrt{6}+\sqrt{30}}\left(\sqrt{\sqrt{6}-1}+\sqrt{3+\sqrt{6}}\right)\right)$$

$$\Big(\text{root of } x^4-14x^2+50 \text{ near } x=2.65246-0.188504\,i + \text{root of } x^4-14x^2+50 \text{ near } x=2.65246+0.188504\,i + \text{root of } x^4-28x^2+188 \text{ near } x=4.10225 + 2\sqrt{2}\sqrt[6]{(2+\sqrt{5})(\sqrt{5}+\sqrt{6})}\ \text{root of } x^4-6x^2+3 \text{ near } x=2.33441 + 2\sqrt{2}\sqrt[6]{(2+\sqrt{5})(\sqrt{5}+\sqrt{6})}\ \text{root of } x^4+2x^2-5 \text{ near } x=1.20395\Big)\Big/\left(\sqrt{2}\sqrt[6]{(2+\sqrt{5})(\sqrt{5}+\sqrt{6})}\left(\text{root of } x^4-6x^2+3 \text{ near } x=2.33441 + \text{root of } x^4+2x^2-5 \text{ near } x=1.20395\right)\right)$$

Expanded forms

$$2+\frac{\sqrt{7+\sqrt{2}}}{2\sqrt[6]{(2+\sqrt{5})(\sqrt{5}+\sqrt{6})}\left(\frac{1}{2}\sqrt{\sqrt{6}-1}+\frac{\sqrt{3+\sqrt{6}}}{2}\right)}+\frac{\sqrt{7+5\sqrt{2}}}{2\sqrt[6]{(2+\sqrt{5})(\sqrt{5}+\sqrt{6})}\left(\frac{1}{2}\sqrt{\sqrt{6}-1}+\frac{\sqrt{3+\sqrt{6}}}{2}\right)}$$

$$2+\frac{\sqrt{7+\sqrt{2}}}{\sqrt{\sqrt{6}-1}\,\sqrt[6]{5+2\sqrt{5}+2\sqrt{6}+\sqrt{30}}+\sqrt{3+\sqrt{6}}\,\sqrt[6]{5+2\sqrt{5}+2\sqrt{6}+\sqrt{30}}}+\frac{\sqrt{7+5\sqrt{2}}}{\sqrt{\sqrt{6}-1}\,\sqrt[6]{5+2\sqrt{5}+2\sqrt{6}+\sqrt{30}}+\sqrt{3+\sqrt{6}}\,\sqrt[6]{5+2\sqrt{5}+2\sqrt{6}+\sqrt{30}}}$$

In conclusion, from the various results, after some calculations, we obtain:

(((3.32593429313)*2.911116655774*((11.5730481521/(3.39813955444+3.32593429313) *1/2.911116655774))))-0.9270108-((√((113+5√505)/8)+√((105+5√505)/8))^3)^1/14

Input interpretation

$$3.32593429313\times 2.911116655774\left(\frac{11.5730481521}{3.39813955444+3.32593429313}\times\frac{1}{2.911116655774}\right)-0.9270108-\sqrt[14]{\left(\sqrt{\frac{1}{8}(113+5\sqrt{505})}+\sqrt{\frac{1}{8}(105+5\sqrt{505})}\right)^3}$$

Result

3.1415911760434952274826374031214729294618082485247885964116134105...

3.141591176…..≈ π

From which, after some calculations, we obtain:

(1/6((((3.32593429313)*2.911116655774*((11.5730481521/(3.39813955444+3.32593429313) *1/2.911116655774))))-0.9270108-((√((113+5√505)/8)+√((105+5√505)/8))^3)^1/14)^2)^15-18+1/Pi

Input interpretation

$$\left(\frac{1}{6}\left(3.32593429313\times 2.911116655774\left(\frac{11.5730481521}{3.39813955444+3.32593429313}\times\frac{1}{2.911116655774}\right)-0.9270108-\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3}\right)^2\right)^{15}-18+\frac{1}{\pi}$$

Result

1729.03…

1729.03…..

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. (1728 = $8^2 * 3^3$) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Series representations

$$\left(\frac{1}{6}\left((3.325934293130000\times 2.9111166557740000\times 11.57304815210000)/((3.398139554440000+3.325934293130000)\,2.9111166557740000)-0.927011-\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3}\right)^2\right)^{15}-18+\frac{1}{\pi}=-18+\frac{1}{\pi}+\frac{1}{470\,184\,984\,576}\left(4.79738-\left(\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(8^k\left(97+5\sqrt{505}\right)^{-k}\sqrt{\frac{97}{8}+\frac{5\sqrt{505}}{8}}+\left(\frac{8}{5}\right)^k\left(21+\sqrt{505}\right)^{-k}\sqrt{\frac{5}{8}\left(21+\sqrt{505}\right)}\right)\right)^3\wedge(1/14)\right)^{30}$$

$$\left(\frac{1}{6}\left((3.325934293130000\times 2.9111166557740000\times 11.57304815210000)/\left(((3.398139554440000+3.325934293130000)\ 2.9111166557740000)-0.927011-\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3}\right)^2\right)^{15}-18+\frac{1}{\pi}=-18+\frac{1}{\pi}+\frac{1}{470\,184\,984\,576}\right.$$

$$\left(4.79738-\left(\sum_{k=0}^{\infty}\frac{1}{k!}\left(-\frac{1}{2}\right)_k\left((-8)^k\left(97+5\sqrt{505}\right)^{-k}\sqrt{\frac{97}{8}+\frac{5\sqrt{505}}{8}}+\left(-\frac{8}{5}\right)^k\left(21+\sqrt{505}\right)^{-k}\sqrt{\frac{5}{8}\left(21+\sqrt{505}\right)}\right)\right)^3\ \text{^}\ (1/14)\right)^{30}$$

$$\left(\frac{1}{6}\left((3.325934293130000\times 2.9111166557740000\times 11.57304815210000)/\left(((3.398139554440000+3.325934293130000)\ 2.9111166557740000)-0.927011-\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3}\right)^2\right)^{15}-18+\frac{1}{\pi}=-18+\frac{1}{\pi}+\frac{1}{470\,184\,984\,576}\right.$$

$$\left(4.79738-\left(\sqrt{z_0}^{\,3}\left(\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^k\left(-\frac{1}{2}\right)_k\left(\left(\frac{113}{8}+\frac{5\sqrt{505}}{8}-z_0\right)^k+\left(\frac{5}{8}\left(21+\sqrt{505}\right)-z_0\right)^k\right)z_0^{-k}\right)^3\right)\text{^}\ (1/14)\right)^{30}\quad \text{for (not } (z_0\in\mathbb{R} \text{ and } -\infty<z_0\le 0))$$

(1/27((1/6((((3.32593429313)*2.911116655774*((11.5730481521/(3.39813955444+3.32593429313) *1/2.911116655774))))-0.9270108-((√((113+5√505)/8)+√((105+5√505)/8))^3)^1/14)^2)^15-18-1/√2))^2

Input interpretation

$$\left(\frac{1}{27}\left(\left(\frac{1}{6}\left(3.32593429313\times 2.911116655774\left(\frac{11.5730481521}{3.39813955444+3.32593429313}\times\frac{1}{2.911116655774}\right)-0.9270108-\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3}\right)\right)^2\right)^{15}-18-\frac{1}{\sqrt{2}}\right)\right)^2$$

Result

4096.02...

4096.02…..≈ 4096 = 64^2

Now, we have:

$$G_{117} = \frac{1}{2}\left(\frac{3+\sqrt{13}}{2}\right)^{\frac{1}{4}}(2\sqrt{3}+\sqrt{13})^{\frac{1}{6}}\{3^{\frac{1}{4}}+\sqrt{(4+\sqrt{3})}\},$$

$$\left.\begin{array}{lll} G_{121} & + \dfrac{1}{G_{121}} = \left(\dfrac{11}{2}\right)^{\frac{1}{6}}\left\{\left(3+\dfrac{1}{3\sqrt{3}}\right)^{\frac{1}{3}}+\left(3-\dfrac{1}{3\sqrt{3}}\right)^{\frac{1}{3}}\right\} \\ \dfrac{1}{G_{121}} & = \frac{1}{3\sqrt{2}}[(11-3\sqrt{11})^{\frac{1}{3}}\{(3\sqrt{11}+3\sqrt{3}-4)^{\frac{1}{3}}+(3\sqrt{11}-3\sqrt{3}-4)^{\frac{1}{3}}\}-2] \end{array}\right\},$$

From:

$$G_{117} = \frac{1}{2}\left(\frac{3+\sqrt{13}}{2}\right)^{\frac{1}{4}}(2\sqrt{3}+\sqrt{13})^{\frac{1}{6}}\{3^{\frac{1}{4}}+\sqrt{(4+\sqrt{3})}\},$$

1/2(1/2*(3+sqrt13))^0.25 (2sqrt3+sqrt13)^(1/6)*[3^0.25+(4+sqrt3)^0.5]

Input

$$\frac{1}{2}\left(\frac{1}{2}\left(3+\sqrt{13}\right)\right)^{0.25}\left(\sqrt[6]{2\sqrt{3}+\sqrt{13}}\left(3^{0.25}+\sqrt{4+\sqrt{3}}\right)\right)$$

Result

3.4646439795293348074582824939380623882292908597117985414969183228
…

3.464643979529….

From:

$$\left(\frac{11}{2}\right)^{\frac{1}{6}}\left\{\left(3+\frac{1}{3\sqrt{3}}\right)^{\frac{1}{3}}+\left(3-\frac{1}{3\sqrt{3}}\right)^{\frac{1}{3}}\right\}$$

(11/2)^(1/6) [(3+1/(3sqrt3))^(1/3)+(3-1/(3sqrt3))^(1/3)]

Input

$$\sqrt[6]{\frac{11}{2}}\left(\sqrt[3]{3+\frac{1}{3\sqrt{3}}}+\sqrt[3]{3-\frac{1}{3\sqrt{3}}}\right)$$

Decimal approximation

3.8305864363226477774611570629145635545308778360411986963564438610
…

3.830586436322…..

Alternate forms

$$3^{-1/3}\sqrt[6]{\frac{11}{2}}\sqrt[3]{9-3^{-1/2}}+3^{-1/3}\sqrt[3]{9+3^{-1/2}}\sqrt[6]{\frac{11}{2}}$$

$\text{root of } x^6 - 22x^4 + 121x^2 - 198 \text{ near } x = 3.83059$

$$\frac{\sqrt[6]{\frac{11}{2}}\left(\sqrt[3]{27-\sqrt{3}}+\sqrt[3]{27+\sqrt{3}}\right)}{3^{2/3}}$$

Minimal polynomial

$x^6 - 22x^4 + 121x^2 - 198$

Expanded form

$$\sqrt[6]{\frac{11}{2}}\sqrt[3]{3-\frac{1}{3\sqrt{3}}}+\sqrt[6]{\frac{11}{2}}\sqrt[3]{3+\frac{1}{3\sqrt{3}}}$$

From:

$$\frac{1}{3\sqrt{2}}[(11-3\sqrt{11})^{\frac{1}{3}}\{(3\sqrt{11}+3\sqrt{3}-4)^{\frac{1}{3}}+(3\sqrt{11}-3\sqrt{3}-4)^{\frac{1}{3}}\}-2]$$

1/(3sqrt2) [(11-3sqrt11)^(1/3) [(3sqrt11+3sqrt3-4)^(1/3)+(3sqrt11-3sqrt3-4)^(1/3)]-2]

Input

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

Result

$$\frac{\sqrt[3]{11-3\sqrt{11}}\left(\sqrt[3]{-4-3\sqrt{3}+3\sqrt{11}}+\sqrt[3]{-4+3\sqrt{3}+3\sqrt{11}}\right)-2}{3\sqrt{2}}$$

Decimal approximation

0.2817853021919029973538826574520947893730103442412604309559156517
...

0.2817853021….

Alternate forms

$$\frac{1}{6}\left(\sqrt[3]{-143+33\sqrt{3}+45\sqrt{11}-9\sqrt{33}}+\sqrt[3]{-143-33\sqrt{3}+45\sqrt{11}+9\sqrt{33}}-2\right)\sqrt{2}$$

$\text{root of } x^{12}-16x^{10}+48x^{8}-68x^{6}+48x^{4}-16x^{2}+1 \text{ near } x=0.281785$

$$\sqrt{\text{root of } x^{6}-16x^{5}+48x^{4}-68x^{3}+48x^{2}-16x+1 \text{ near } x=0.079403}$$

Minimal polynomial

$$x^{12}-16x^{10}+48x^{8}-68x^{6}+48x^{4}-16x^{2}+1$$

Expanded forms

$$-\frac{\sqrt{2}}{3}+\frac{\sqrt[3]{-143+33\sqrt{3}+45\sqrt{11}-9\sqrt{33}}}{3\sqrt{2}}+\frac{\sqrt[3]{-143-33\sqrt{3}+45\sqrt{11}+9\sqrt{33}}}{3\sqrt{2}}$$

$$-\frac{\sqrt{2}}{3} + \frac{\sqrt[3]{\left(11 - 3\sqrt{11}\right)\left(-4 - 3\sqrt{3} + 3\sqrt{11}\right)}}{3\sqrt{2}} + \frac{\sqrt[3]{\left(11 - 3\sqrt{11}\right)\left(-4 + 3\sqrt{3} + 3\sqrt{11}\right)}}{3\sqrt{2}}$$

From which:

1/2(3.464643979529+(((11/2)^(1/6) [(3+1/(3sqrt3))^(1/3)+(3-1/(3sqrt3))^(1/3)]))+(1/(3sqrt2) [(11-3sqrt11)^(1/3) [(3sqrt11+3sqrt3-4)^(1/3)+(3sqrt11-3sqrt3-4)^(1/3)]-2]))-(log(34)/log(233))

where

$$\frac{\log(34)}{\log(233)} \approx 0.64691536386$$

Input interpretation

$$\frac{1}{2}\left(3.464643979529 + \sqrt[6]{\frac{11}{2}}\left(\sqrt[3]{3 + \frac{1}{3\sqrt{3}}} + \sqrt[3]{3 - \frac{1}{3\sqrt{3}}}\right) + \frac{1}{3\sqrt{2}}\left(\sqrt[3]{11 - 3\sqrt{11}}\left(\sqrt[3]{3\sqrt{11} + 3\sqrt{3} - 4} + \sqrt[3]{3\sqrt{11} - 3\sqrt{3} - 4}\right) - 2\right)\right) - \frac{\log(34)}{\log(233)}$$

log(x) is the natural logarithm

Result

3.141592495159…

3.141592495159…. ≈ π

Alternative representations

$$\frac{1}{2}\left(3.4646439795290000+\sqrt[6]{\frac{11}{2}}\left(\sqrt[3]{3+\frac{1}{3\sqrt{3}}}+\sqrt[3]{3-\frac{1}{3\sqrt{3}}}\right)+\frac{\sqrt[3]{11-3\sqrt{11}}\left(\sqrt[3]{3\sqrt{11}+3\sqrt{3}-4}+\sqrt[3]{3\sqrt{11}-3\sqrt{3}-4}\right)-2}{3\sqrt{2}}\right)-\frac{\log(34)}{\log(233)}=-\frac{\log_e(34)}{\log_e(233)}+\frac{1}{2}\left(3.4646439795290000+\sqrt[6]{\frac{11}{2}}\left(\sqrt[3]{3-\frac{1}{3\sqrt{3}}}+\sqrt[3]{3+\frac{1}{3\sqrt{3}}}\right)+\frac{-2+\sqrt[3]{11-3\sqrt{11}}\left(\sqrt[3]{-4-3\sqrt{3}+3\sqrt{11}}+\sqrt[3]{-4+3\sqrt{3}+3\sqrt{11}}\right)}{3\sqrt{2}}\right)$$

$$\frac{1}{2}\left(3.4646439795290000+\sqrt[6]{\frac{11}{2}}\left(\sqrt[3]{3+\frac{1}{3\sqrt{3}}}+\sqrt[3]{3-\frac{1}{3\sqrt{3}}}\right)+\frac{\sqrt[3]{11-3\sqrt{11}}\left(\sqrt[3]{3\sqrt{11}+3\sqrt{3}-4}+\sqrt[3]{3\sqrt{11}-3\sqrt{3}-4}\right)-2}{3\sqrt{2}}\right)-\frac{\log(34)}{\log(233)}=-\frac{\log(a)\log_a(34)}{\log(a)\log_a(233)}+\frac{1}{2}\left(3.4646439795290000+\sqrt[6]{\frac{11}{2}}\left(\sqrt[3]{3-\frac{1}{3\sqrt{3}}}+\sqrt[3]{3+\frac{1}{3\sqrt{3}}}\right)+\frac{-2+\sqrt[3]{11-3\sqrt{11}}\left(\sqrt[3]{-4-3\sqrt{3}+3\sqrt{11}}+\sqrt[3]{-4+3\sqrt{3}+3\sqrt{11}}\right)}{3\sqrt{2}}\right)$$

$$\frac{1}{2}\left(3.4646439795290000+\sqrt[6]{\frac{11}{2}}\left(\sqrt[3]{3+\frac{1}{3\sqrt{3}}}+\sqrt[3]{3-\frac{1}{3\sqrt{3}}}\right)+\frac{\sqrt[3]{11-3\sqrt{11}}\left(\sqrt[3]{3\sqrt{11}+3\sqrt{3}-4}+\sqrt[3]{3\sqrt{11}-3\sqrt{3}-4}\right)-2}{3\sqrt{2}}\right)-$$

$$\frac{\log(34)}{\log(233)}=-\frac{\text{Li}_1(-33)}{\text{Li}_1(-232)}+$$
$$\frac{1}{2}\left(3.4646439795290000+\sqrt[6]{\frac{11}{2}}\left(\sqrt[3]{3-\frac{1}{3\sqrt{3}}}+\sqrt[3]{3+\frac{1}{3\sqrt{3}}}\right)+\frac{-2+\sqrt[3]{11-3\sqrt{11}}\left(\sqrt[3]{-4-3\sqrt{3}+3\sqrt{11}}+\sqrt[3]{-4+3\sqrt{3}+3\sqrt{11}}\right)}{3\sqrt{2}}\right)$$

Series representations

$$\frac{1}{2}\left(3.4646439795290000+\sqrt[6]{\frac{11}{2}}\left(\sqrt[3]{3+\frac{1}{3\sqrt{3}}}+\sqrt[3]{3-\frac{1}{3\sqrt{3}}}\right)+\frac{\sqrt[3]{11-3\sqrt{11}}\left(\sqrt[3]{3\sqrt{11}+3\sqrt{3}-4}+\sqrt[3]{3\sqrt{11}-3\sqrt{3}-4}\right)-2}{3\sqrt{2}}\right)-$$

$$\frac{\log(34)}{\log(233)}=\left(0.1666666666666667\right.$$

$$\left(-2.000000000000000\log(233)-6.000000000000000\right.$$

$$\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\log(34)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+$$
$$10.393931938587000\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\log(233)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+2.763596398624306$$
$$\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\log(233)\sqrt{x}\left(\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\sqrt[3]{\frac{-1+9\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}{\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}+$$
$$2.763596398624306\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\log(233)\sqrt{x}\left(\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\sqrt[3]{\frac{1+9\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}{\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}+$$
$$1.0000000000000000\log(233)\sqrt[3]{11-3\exp\left(i\pi\left\lfloor\frac{\arg(11-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(11-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$
$$\left(-4+\sum_{k=0}^{\infty}-\frac{1}{k!}3(-1)^k x^{-k}\left((3-x)^k\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)-(11-x)^k\exp\left(i\pi\left\lfloor\frac{\arg(11-x)}{2\pi}\right\rfloor\right)\right)\left(-\frac{1}{2}\right)_k\sqrt{x}\right)\hat{}$$
$$(1/3)+1.0000000000000000\log(233)\sqrt[3]{11-3\exp\left(i\pi\left\lfloor\frac{\arg(11-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(11-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$
$$\left(-4+\sum_{k=0}^{\infty}\frac{1}{k!}3(-1)^k x^{-k}\left((3-x)^k\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)+(11-x)^k\exp\left(i\pi\left\lfloor\frac{\arg(11-x)}{2\pi}\right\rfloor\right)\right)\left(-\frac{1}{2}\right)_k\sqrt{x}\right)\hat{}(1/3)\Bigg)\Bigg)\Big/$$
$$\left(\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\log(233)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

$$\frac{1}{2}\left(3.4646439795290000+\sqrt[6]{\frac{11}{2}}\left(\sqrt[3]{3+\frac{1}{3\sqrt{3}}}+\sqrt[3]{3-\frac{1}{3\sqrt{3}}}\right)+\frac{\sqrt[3]{11-3\sqrt{11}}\left(\sqrt[3]{3\sqrt{11}+3\sqrt{3}-4}+\sqrt[3]{3\sqrt{11}-3\sqrt{3}-4}\right)-2}{3\sqrt{2}}\right)-$$

$$\frac{\log(34)}{\log(233)}=1.7323219897645000-$$

$$\frac{2\,i\,\pi\left\lfloor\frac{\arg(34-x)}{2\pi}\right\rfloor}{2\,i\,\pi\left\lfloor\frac{\arg(233-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(233-x)^k x^{-k}}{k}}-$$

$$\frac{\log(x)}{2\,i\,\pi\left\lfloor\frac{\arg(233-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(233-x)^k x^{-k}}{k}}+$$

$$\frac{\sum_{k=1}^{\infty}\frac{(-1)^k(34-x)^k x^{-k}}{k}}{2\,i\,\pi\left\lfloor\frac{\arg(233-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(233-x)^k x^{-k}}{k}}-$$

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

$$\frac{1}{2}\sqrt[6]{\frac{11}{2}}\sqrt[3]{3-\frac{1}{3\exp\left(i\,\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}+$$

$$\frac{1}{2}\sqrt[6]{\frac{11}{2}}\sqrt[3]{3+\frac{1}{3\exp\left(i\,\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}+$$

$$\left(\sqrt[3]{11-3\exp\left(i\,\pi\left\lfloor\frac{\arg(11-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(11-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right.$$

$$\left(-4+\sum_{k=0}^{\infty}-\frac{1}{k!}3(-1)^k x^{-k}\left((3-x)^k\exp\left(i\,\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)-\right.\right.$$

$$\left.\left.\left.(11-x)^k\exp\left(i\,\pi\left\lfloor\frac{\arg(11-x)}{2\pi}\right\rfloor\right)\right)\left(-\frac{1}{2}\right)_k\sqrt{x}\right)\text{^}(1/3)\right)\Big/$$

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

$$\left(\sqrt[3]{11-3\exp\left(i\,\pi\left\lfloor\frac{\arg(11-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(11-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right.$$

$$\left(-4+\sum_{k=0}^{\infty}\frac{1}{k!}3(-1)^k x^{-k}\left((3-x)^k\exp\left(i\,\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)+\right.\right.$$

$$\left.\left.\left.(11-x)^k\exp\left(i\,\pi\left\lfloor\frac{\arg(11-x)}{2\pi}\right\rfloor\right)\right)\left(-\frac{1}{2}\right)_k\sqrt{x}\right)\text{^}(1/3)\right)\Big/$$

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

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

$$\frac{1}{2}\left(3.4646439795290000+\sqrt[6]{\frac{11}{2}}\left(\sqrt[3]{3+\frac{1}{3\sqrt{3}}}+\sqrt[3]{3-\frac{1}{3\sqrt{3}}}\right)+\frac{\sqrt[3]{11-3\sqrt{11}}\left(\sqrt[3]{3\sqrt{11}+3\sqrt{3}-4}+\sqrt[3]{3\sqrt{11}-3\sqrt{3}-4}\right)-2}{3\sqrt{2}}\right)-$$

$$\frac{\log(34)}{\log(233)}=1.7323219897645000-\frac{1}{3\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}+$$

$$\frac{1}{2}\sqrt[6]{\frac{11}{2}}\sqrt[3]{3-\frac{1}{3\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}+$$

$$\frac{1}{2}\sqrt[6]{\frac{11}{2}}\sqrt[3]{3+\frac{1}{3\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}}+$$

$$\left(\sqrt[3]{11-3\exp\left(i\pi\left\lfloor\frac{\arg(11-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(11-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\left(-4+\sum_{k=0}^{\infty}-\frac{1}{k!}3(-1)^k x^{-k}\left((3-x)^k\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)-(11-x)^k\exp\left(i\pi\left\lfloor\frac{\arg(11-x)}{2\pi}\right\rfloor\right)\right)\left(-\frac{1}{2}\right)_k\sqrt{x}\right)\hat{}\,(1/3)\right)\Big/$$

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

$$\left(\sqrt[3]{11-3\exp\left(i\pi\left\lfloor\frac{\arg(11-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(11-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\left(-4+\sum_{k=0}^{\infty}\frac{1}{k!}3(-1)^k x^{-k}\left((3-x)^k\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)+(11-x)^k\exp\left(i\pi\left\lfloor\frac{\arg(11-x)}{2\pi}\right\rfloor\right)\right)\left(-\frac{1}{2}\right)_k\sqrt{x}\right)\hat{}\,(1/3)\right)\Big/$$

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

$$\frac{\left\lfloor\frac{\arg(34-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)}{\log(z_0)+\left\lfloor\frac{\arg(233-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(233-z_0)^k z_0^{-k}}{k}}-$$

$$\frac{\log(z_0)}{\log(z_0)+\left\lfloor\frac{\arg(233-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(233-z_0)^k z_0^{-k}}{k}}-$$

$$\frac{\left\lfloor\frac{\arg(34-z_0)}{2\pi}\right\rfloor\log(z_0)}{\log(z_0)+\left\lfloor\frac{\arg(233-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(233-z_0)^k z_0^{-k}}{k}}+$$

$$\frac{\sum_{k=1}^{\infty}\frac{(-1)^k(34-z_0)^k z_0^{-k}}{k}}{\log(z_0)+\left\lfloor\frac{\arg(233-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(233-z_0)^k z_0^{-k}}{k}}$$

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

Integral representations

$$\frac{1}{2}\left(3.4646439795290000+\sqrt[6]{\frac{11}{2}}\left(\sqrt[3]{3+\frac{1}{3\sqrt{3}}}+\sqrt[3]{3-\frac{1}{3\sqrt{3}}}\right)+\frac{\sqrt[3]{11-3\sqrt{11}}\left(\sqrt[3]{3\sqrt{11}+3\sqrt{3}-4}+\sqrt[3]{3\sqrt{11}-3\sqrt{3}-4}\right)-2}{3\sqrt{2}}\right)-$$

$$\frac{\log(34)}{\log(233)}=\frac{1}{\sqrt{2}\int_1^{233}\frac{1}{t}\,dt}0.1666666666666667$$

$$\left(-2.000000000000000\int_1^{233}\frac{1}{t}\,dt-6.000000000000000\sqrt{2}\int_1^{34}\frac{1}{t}\,dt+\right.$$
$$10.393931938587000\sqrt{2}\int_1^{233}\frac{1}{t}\,dt+$$
$$2.763596398624306\sqrt{2}\sqrt[3]{\frac{-1+9\sqrt{3}}{\sqrt{3}}}\int_1^{233}\frac{1}{t}\,dt+$$
$$2.763596398624306\sqrt{2}\sqrt[3]{\frac{1+9\sqrt{3}}{\sqrt{3}}}\int_1^{233}\frac{1}{t}\,dt+$$
$$1.0000000000000000\sqrt[3]{11-3\sqrt{11}}\sqrt[3]{-4-3\sqrt{3}+3\sqrt{11}}\int_1^{233}\frac{1}{t}\,dt+$$
$$\left.1.0000000000000000\sqrt[3]{11-3\sqrt{11}}\sqrt[3]{-4+3\sqrt{3}+3\sqrt{11}}\int_1^{233}\frac{1}{t}\,dt\right)$$

$$\frac{1}{2}\left(3.4646439795290000+\sqrt[6]{\frac{11}{2}}\left(\sqrt[3]{3+\frac{1}{3\sqrt{3}}}+\sqrt[3]{3-\frac{1}{3\sqrt{3}}}\right)+\frac{\sqrt[3]{11-3\sqrt{11}}\left(\sqrt[3]{3\sqrt{11}+3\sqrt{3}-4}+\sqrt[3]{3\sqrt{11}-3\sqrt{3}-4}\right)-2}{3\sqrt{2}}\right)-$$

$$\frac{\log(34)}{\log(233)}=\left(0.1666666666666667\left(-2.000000000000000\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{232^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds-\right.\right.$$

$$6.000000000000000\sqrt{2}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{33^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds+$$

$$10.393931938587000\sqrt{2}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{232^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds+$$

$$2.763596398624306\sqrt{2}\sqrt[3]{\frac{-1+9\sqrt{3}}{\sqrt{3}}}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{232^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds+2.763596398624306$$

$$\sqrt{2}\sqrt[3]{\frac{1+9\sqrt{3}}{\sqrt{3}}}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{232^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds+$$

$$1.0000000000000000\sqrt[3]{11-3\sqrt{11}}\sqrt[3]{-4-3\sqrt{3}+3\sqrt{11}}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{232^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds+$$

$$\left.\left.1.0000000000000000\sqrt[3]{11-3\sqrt{11}}\sqrt[3]{-4+3\sqrt{3}+3\sqrt{11}}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{232^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)\right)\Big/$$

$$\left(\sqrt{2}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{232^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)\quad\text{for } -1<\gamma<0$$

We have:

$$g_{126} = \sqrt{\left(\frac{\sqrt{3}+\sqrt{7}}{2}\right)}(\sqrt{6}+\sqrt{7})^{\frac{1}{6}}\left\{\sqrt{\left(\frac{3+\sqrt{2}}{4}\right)}+\sqrt{\left(\frac{\sqrt{2}-1}{4}\right)}\right\}^2,$$

$$g_{138}^2 = \sqrt{\left(\frac{3\sqrt{3}+\sqrt{23}}{2}\right)}(78\sqrt{2}+23\sqrt{23})^{\frac{1}{6}} \times \left\{\sqrt{\left(\frac{5+2\sqrt{6}}{4}\right)}+\sqrt{\left(\frac{1+2\sqrt{6}}{4}\right)}\right\},$$

$$G_{141}^2 = (4\sqrt{3}+\sqrt{47})^{\frac{1}{4}}\left(\frac{7+\sqrt{47}}{\sqrt{2}}\right)^{\frac{1}{6}}\left\{\sqrt{\left(\frac{18+9\sqrt{3}}{4}\right)}+\sqrt{\left(\frac{14+9\sqrt{3}}{4}\right)}\right\},$$

From:

$$\sqrt{\left(\frac{\sqrt{3}+\sqrt{7}}{2}\right)}(\sqrt{6}+\sqrt{7})^{\frac{1}{6}}\left\{\sqrt{\left(\frac{3+\sqrt{2}}{4}\right)}+\sqrt{\left(\frac{\sqrt{2}-1}{4}\right)}\right\}^2,$$

[(1/2*(sqrt3+sqrt7))]^0.5 (sqrt6+sqrt7)^(1/6) [(1/4*(3+sqrt2))^0.5+(1/4(sqrt2 – 1))^0.5]^2

Input

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

Exact result

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

Decimal approximation

3.6548630551090639866346902876604774336644477160510791945069930158…

3.6548630551090639….

Alternate forms

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

$$\sqrt[6]{\text{root of } x^8-2384x^7+1044x^6-6256x^5+15974x^4-6256x^3+1044x^2-2384x+1 \text{ near } x=2383.56}$$

Minimal polynomial

$$x^{48}-2384x^{42}+1044x^{36}-6256x^{30}+15974x^{24}-6256x^{18}+1044x^{12}-2384x^6+1$$

Expanded forms

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

$$\frac{1}{4}\sqrt[6]{\sqrt{6}+\sqrt{7}}\ \sqrt{2\sqrt{3}+2\sqrt{7}}+\frac{1}{4}\sqrt[6]{\sqrt{6}+\sqrt{7}}\ \sqrt{4\sqrt{3}+4\sqrt{7}}+\frac{1}{4}\sqrt[6]{\sqrt{6}+\sqrt{7}}\ \sqrt{-2\sqrt{3}+4\sqrt{6}-2\sqrt{7}+4\sqrt{14}}$$

From:

$$\sqrt{\left(\frac{3\sqrt{3}+\sqrt{23}}{2}\right)}(78\sqrt{2}+23\sqrt{23})^{\frac{1}{6}}\times\left\{\sqrt{\left(\frac{5+2\sqrt{6}}{4}\right)}+\sqrt{\left(\frac{1+2\sqrt{6}}{4}\right)}\right\},$$

we obtain:

[(1/2*(3sqrt3+sqrt23))]^0.5 (78sqrt2+23sqrt23)^(1/6) [(1/4*(5+2sqrt6))^0.5+(1/4(1+2sqrt6))^0.5]

Input

$$\sqrt{\frac{1}{2}\left(3\sqrt{3}+\sqrt{23}\right)}\sqrt[6]{78\sqrt{2}+23\sqrt{23}}\left(\sqrt{\frac{1}{4}\left(5+2\sqrt{6}\right)}+\sqrt{\frac{1}{4}\left(1+2\sqrt{6}\right)}\right)$$

Exact result

$$\sqrt{\frac{1}{2}\left(3\sqrt{3}+\sqrt{23}\right)}\sqrt[6]{78\sqrt{2}+23\sqrt{23}}\left(\frac{1}{2}\sqrt{1+2\sqrt{6}}+\frac{1}{2}\sqrt{5+2\sqrt{6}}\right)$$

Decimal approximation

15.315614485200225835806318595854580375614238222494746288654476828...

15.3156144852002258……

Alternate forms

$$\sqrt[3]{\text{root of } x^8-3584x^7-30724x^6-21248x^5+29446x^4+21248x^3-30724x^2+3584x+1 \text{ near } x=3592.55}$$

$$\frac{1}{4}\sqrt{3\sqrt{3}+\sqrt{23}}\sqrt[6]{78\sqrt{2}+23\sqrt{23}}\left(\sqrt{1-i\sqrt{23}}+\sqrt{2}\left(\sqrt{2}+\sqrt{3}+\sqrt{\frac{1}{2}i\left(\sqrt{23}+-i\right)}\right)\right)$$

$$\frac{1}{2\sqrt{2}}\sqrt[6]{78\sqrt{2}+23\sqrt{23}}\left(\sqrt{18\sqrt{2}+3\sqrt{3}+\sqrt{23}+2\sqrt{138}}+\sqrt{18\sqrt{2}+15\sqrt{3}+5\sqrt{23}+2\sqrt{138}}\right)$$

Minimal polynomial

$x^{24} - 3584\,x^{21} - 30\,724\,x^{18} - 21\,248\,x^{15} + 29\,446\,x^{12} + 21\,248\,x^9 - 30\,724\,x^6 + 3584\,x^3 + 1$

Expanded forms

$$\frac{1}{2}\sqrt[6]{78\sqrt{2} + 23\sqrt{23}}\left(\sqrt{9\sqrt{2} + \frac{3\sqrt{3}}{2} + \frac{\sqrt{23}}{2} + \sqrt{138}} + \sqrt{9\sqrt{2} + \frac{15\sqrt{3}}{2} + \frac{5\sqrt{23}}{2} + \sqrt{138}}\right)$$

$$\frac{\sqrt{\left(1 + 2\sqrt{6}\right)\left(3\sqrt{3} + \sqrt{23}\right)}\,\sqrt[6]{78\sqrt{2} + 23\sqrt{23}}}{2\sqrt{2}} + \frac{\sqrt{\left(5 + 2\sqrt{6}\right)\left(3\sqrt{3} + \sqrt{23}\right)}\,\sqrt[6]{78\sqrt{2} + 23\sqrt{23}}}{2\sqrt{2}}$$

From:

$$(4\sqrt{3} + \sqrt{47})^{\frac{1}{4}}\left(\frac{7 + \sqrt{47}}{\sqrt{2}}\right)^{\frac{1}{6}}\left\{\sqrt{\left(\frac{18 + 9\sqrt{3}}{4}\right)} + \sqrt{\left(\frac{14 + 9\sqrt{3}}{4}\right)}\right\},$$

[(4sqrt3+sqrt47))]^0.25 ((7+sqrt47)/(sqrt2))^(1/6)
[(1/4*(18+9sqrt3))^0.5+(1/4(14+9sqrt3))^0.5]

Input

$$(4\sqrt{3}+\sqrt{47})^{0.25}\sqrt[6]{\frac{7+\sqrt{47}}{\sqrt{2}}}\left(\sqrt{\frac{1}{4}(18+9\sqrt{3})}+\sqrt{\frac{1}{4}(14+9\sqrt{3})}\right)$$

Result

15.833404207477886190304510217011509695032073020671272071483322463
…

15.833404207477….

From the sum of the last three results, we obtain, after some calculations:

(3.6548630551090639+15.3156144852002258+15.833404207477)^1/3-(((2^(3/5) log^(7/5)(2))/(3 3^(1/5) log^(36/5)(3))))

where

$$\frac{2^{3/5}\log^{7/5}(2)}{3\sqrt[5]{3}\log^{36/5}(3)}\approx 0.12335253490387 9$$

Input interpretation

$$\sqrt[3]{3.6548630551090639+15.3156144852002258+15.833404207477}-\frac{2^{3/5}\log^{7/5}(2)}{3\sqrt[5]{3}\log^{36/5}(3)}$$

Result

3.14159265366263…

3.14159265366263….. ≈ π

Alternative representations

$$(3.65486305510906390000 + 15.31561448520022580000 + 15.8334042074770000)\ ^\wedge\ (1/3) - \frac{2^{3/5} \log^{7/5}(2)}{3 \sqrt[5]{3} \log^{36/5}(3)} = \sqrt[3]{34.8038817477862897} - \frac{2^{3/5} \log_e^{7/5}(2)}{3 \sqrt[5]{3} \log_e^{36/5}(3)}$$

$$(3.65486305510906390000 + 15.31561448520022580000 + 15.8334042074770000)\ ^\wedge\ (1/3) - \frac{2^{3/5} \log^{7/5}(2)}{3 \sqrt[5]{3} \log^{36/5}(3)} = \sqrt[3]{34.8038817477862897} - \frac{2^{3/5} (\log(a) \log_a(2))^{7/5}}{3 \sqrt[5]{3} (\log(a) \log_a(3))^{36/5}}$$

$$(3.65486305510906390000 + 15.31561448520022580000 + 15.8334042074770000)\ ^\wedge\ (1/3) - \frac{2^{3/5} \log^{7/5}(2)}{3 \sqrt[5]{3} \log^{36/5}(3)} = \sqrt[3]{34.8038817477862897} - \frac{2^{3/5} \left(2 \coth^{-1}(3)\right)^{7/5}}{3 \sqrt[5]{3} \left(2 \coth^{-1}(2)\right)^{36/5}}$$

Series representations

$$(3.65486305510906390000 + 15.31561448520022580000 + 15.8334042074770000)\ ^\wedge\ (1/3) - \frac{2^{3/5} \log^{7/5}(2)}{3 \sqrt[5]{3} \log^{36/5}(3)} = 3.264945188566514061 - \frac{2^{3/5} \left(2 i \pi \left\lfloor \frac{\arg(2-x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (2-x)^k x^{-k}}{k}\right)^{7/5}}{3 \sqrt[5]{3} \left(2 i \pi \left\lfloor \frac{\arg(3-x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (3-x)^k x^{-k}}{k}\right)^{36/5}} \quad \text{for } x < 0$$

(3.65486305510906390000 +
15.3156144852002258000 + 15.8334042074770000) ^ (1 / 3) −

$$\frac{2^{3/5}\log^{7/5}(2)}{3\sqrt[5]{3}\log^{36/5}(3)} = 3.264945188566514061 - \frac{2^{3/5}\left(\log(z_0)+\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^{7/5}}{3\sqrt[5]{3}\left(\log(z_0)+\left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}\right)^{36/5}}$$

(3.65486305510906390000 +
15.3156144852002258000 + 15.8334042074770000) ^ (1 / 3) −

$$\frac{2^{3/5}\log^{7/5}(2)}{3\sqrt[5]{3}\log^{36/5}(3)} = 3.264945188566514061 - \frac{2^{3/5}\left(2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{2}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^{7/5}}{3\sqrt[5]{3}\left(2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{3}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}\right)^{36/5}}$$

Now, we have:

$$G_{145}^2 = \sqrt{\left\{\frac{(2+\sqrt{5})(5+\sqrt{29})}{2}\right\}}\left\{\sqrt{\left(\frac{17+\sqrt{145}}{8}\right)}+\sqrt{\left(\frac{9+\sqrt{145}}{8}\right)}\right\},$$

$$\frac{1}{G_{147}} = 2^{-\frac{1}{12}}\left[\frac{1}{2}+\frac{1}{\sqrt{3}}\left\{\sqrt{\left(\frac{7}{4}\right)}-(28)^{\frac{1}{6}}\right\}\right],$$

$$G_{153} = \left\{\sqrt{\left(\frac{5+\sqrt{17}}{8}\right)}+\sqrt{\left(\frac{\sqrt{17}-3}{8}\right)}\right\}^2 \times\left\{\sqrt{\left(\frac{37+9\sqrt{17}}{4}\right)}+\sqrt{\left(\frac{33+9\sqrt{17}}{4}\right)}\right\}^{\frac{1}{3}},$$

From:

$$\sqrt{\left\{\frac{(2+\sqrt{5})(5+\sqrt{29})}{2}\right\}}\left\{\sqrt{\left(\frac{17+\sqrt{145}}{8}\right)}+\sqrt{\left(\frac{9+\sqrt{145}}{8}\right)}\right\},$$

[(1/2*(2+sqrt5)(5+sqrt29))]^0.5 [(1/8*(17+sqrt145))^0.5+(1/8(9+sqrt145))^0.5]

Input

$$\sqrt{\frac{1}{2}\left(2+\sqrt{5}\right)\left(5+\sqrt{29}\right)}\left(\sqrt{\frac{1}{8}\left(17+\sqrt{145}\right)}+\sqrt{\frac{1}{8}\left(9+\sqrt{145}\right)}\right)$$

Exact result

$$\sqrt{\frac{1}{2}\left(2+\sqrt{5}\right)\left(5+\sqrt{29}\right)}\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(9+\sqrt{145}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(17+\sqrt{145}\right)}\right)$$

Decimal approximation

16.542097553485330822915990352914694829810037886057345799143360740
...

16.542097553485……

Alternate forms

$$\frac{1}{4}\sqrt{\left(2+\sqrt{5}\right)\left(5+\sqrt{29}\right)}\left(\sqrt{9+\sqrt{145}}+\sqrt{17+\sqrt{145}}\right)$$

---

root of $x^8 - 17x^7 + 7x^6 + 12x^5 - 42x^4 + 12x^3 + 7x^2 - 17x + 1$ near $x = 16.5421$

$$\left(\frac{\sqrt{5}}{4} + \frac{1}{4}\sqrt{9-8i} + \frac{1}{4}\sqrt{9+8i} + \frac{\sqrt{29}}{4}\right)\sqrt{\frac{1}{2}(2+\sqrt{5})(5+\sqrt{29})}$$

Minimal polynomial

$$x^8 - 17x^7 + 7x^6 + 12x^5 - 42x^4 + 12x^3 + 7x^2 - 17x + 1$$

Expanded forms

$$\frac{1}{4}\left(\sqrt{235 + 103\sqrt{5} + 43\sqrt{29} + 19\sqrt{145}} + \sqrt{315 + 143\sqrt{5} + 59\sqrt{29} + 27\sqrt{145}}\right)$$

$$\frac{1}{4}\sqrt{(2+\sqrt{5})(5+\sqrt{29})(9+\sqrt{145})} + \frac{1}{4}\sqrt{(2+\sqrt{5})(5+\sqrt{29})(17+\sqrt{145})}$$

From:

$$2^{-\frac{1}{12}}\left[\frac{1}{2} + \frac{1}{\sqrt{3}}\left\{\sqrt{\left(\frac{7}{4}\right) - (28)^{\frac{1}{6}}}\right\}\right],$$

2^(-1/12) [1/2+1/(sqrt3)*((((((7/4)-(28)^(1/6))))^0.5))]

Input

$$2^{-1/12}\left(\frac{1}{2} + \frac{1}{\sqrt{3}}\sqrt{\frac{7}{4} - \sqrt[6]{28}}\right)$$

Exact result

$$\frac{\frac{1}{2}+\sqrt{\frac{1}{3}\left(\frac{7}{4}-\sqrt[3]{2}\,\sqrt[6]{7}\right)}}{\sqrt[12]{2}}$$

Decimal approximation

0.5188749434999687959010657336945004482607030768726858739422437444

…

0.518874943499968……

Alternate forms

$$\frac{3+\sqrt{3\left(7-4\sqrt[3]{2}\,\sqrt[6]{7}\right)}}{6\sqrt[12]{2}}$$

$$\frac{1+\sqrt{\frac{1}{3}\left(7-4\sqrt[3]{2}\,\sqrt[6]{7}\right)}}{2\sqrt[12]{2}}$$

$$\frac{1}{2\sqrt[12]{2}}+\frac{\sqrt{\frac{1}{3}\left(7-4\sqrt[3]{2}\,\sqrt[6]{7}\right)}}{2\sqrt[12]{2}}$$

Minimal polynomial

$$326723350842869800400326656 x^{144} - 16341545704297282115496173568 x^{132} - 1338957944346231244113023121408 x^{120} - 157939659405791447429667759151104 x^{108} - 1329450825053077093196513802641664 x^{96} - 4524230361502210749330592606288896 x^{84} + 7624332260767144585977660460800 x^{72} - 4622475386147111255592048384 x^{60} + 1249894205071086146543856 x^{48} - 141913350866464274016 x^{36} + 4030122393011272 x^{24} - 30115950392 x^{12} + 531441$$

Expanded forms

$$\frac{1}{2\sqrt[12]{2}} + \frac{\sqrt{\frac{7}{12} - \frac{1}{3}\sqrt[3]{2}\sqrt[6]{7}}}{\sqrt[12]{2}}$$

$$\frac{1}{2\sqrt[12]{2}} + \frac{\sqrt{\frac{7}{4} - \sqrt[3]{2}\sqrt[6]{7}}}{\sqrt[12]{2}\sqrt{3}}$$

From:

$$\left\{\sqrt{\left(\frac{5+\sqrt{17}}{8}\right)} + \sqrt{\left(\frac{\sqrt{17}-3}{8}\right)}\right\}^2 \times \left\{\sqrt{\left(\frac{37+9\sqrt{17}}{4}\right)} + \sqrt{\left(\frac{33+9\sqrt{17}}{4}\right)}\right\}^{\frac{1}{3}},$$

[(1/8*(5+sqrt17))^0.5+(1/8(sqrt17 - 3))^0.5]^2
[(1/4*(37+9sqrt17))^0.5+(1/4(33+9sqrt17))^0.5]^(1/3)

Input

$$\left(\sqrt{\frac{1}{8}\left(5+\sqrt{17}\right)}+\sqrt{\frac{1}{8}\left(\sqrt{17}-3\right)}\right)^2 \sqrt[3]{\sqrt{\frac{1}{4}\left(37+9\sqrt{17}\right)}+\sqrt{\frac{1}{4}\left(33+9\sqrt{17}\right)}}$$

Exact result

$$\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(\sqrt{17}-3\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(5+\sqrt{17}\right)}\right)^2 \sqrt[3]{\frac{1}{2}\sqrt{33+9\sqrt{17}}+\frac{1}{2}\sqrt{37+9\sqrt{17}}}$$

Decimal approximation

4.245471976946435936050594694185796143577142224325844000071288035 4
...

4.245471976946……

Alternate forms

$$\frac{1}{4}\left(1+\sqrt{17}+\sqrt{2\left(1+\sqrt{17}\right)}\right)$$

$\text{root of } x^{24}-70x^{18}-150x^{12}-70x^6+1 \text{ near } x=2.04009$

$$\sqrt[6]{\text{root of } x^8-5860x^7+27000x^6-59660x^5+77102x^4-59660x^3+27000x^2-5860x+1 \text{ near } x=5855.39}$$

$$\frac{\left(\sqrt{\sqrt{17}-3}+\sqrt{5+\sqrt{17}}\right)^2}{8\sqrt[3]{\frac{2}{\sqrt{3\left(11+3\sqrt{17}\right)}+\sqrt{37+9\sqrt{17}}}}}$$

Minimal polynomial

$$x^{48} - 5860\,x^{42} + 27000\,x^{36} - 59660\,x^{30} + 77102\,x^{24} - 59660\,x^{18} + 27000\,x^{12} - 5860\,x^{6} + 1$$

Expanded forms

$$\frac{1+\sqrt{17}}{4\sqrt[3]{\frac{2}{\sqrt{33+9\sqrt{17}}+\sqrt{37+9\sqrt{17}}}}} + \frac{\sqrt{8+8\sqrt{17}}}{8\sqrt[3]{\frac{2}{\sqrt{33+9\sqrt{17}}+\sqrt{37+9\sqrt{17}}}}}$$

$$\frac{1}{4}\sqrt[3]{\frac{1}{2}\sqrt{33+9\sqrt{17}}+\frac{1}{2}\sqrt{37+9\sqrt{17}}} + \frac{1}{4}\sqrt{17}\sqrt[3]{\frac{1}{2}\sqrt{33+9\sqrt{17}}+\frac{1}{2}\sqrt{37+9\sqrt{17}}} + \frac{1}{4}\sqrt{\left(\sqrt{17}-3\right)\left(5+\sqrt{17}\right)}\sqrt[3]{\frac{1}{2}\sqrt{33+9\sqrt{17}}+\frac{1}{2}\sqrt{37+9\sqrt{17}}}$$

From the results of the above expressions, we obtain, after some calculations:

(16.542097553485+0.518874943499968+4.245471976946)^(1/e) + (((e^(1/4) log^(13/16)(2))/(9 2^(1/8) 3^(3/8) log^(11/16)(3))))

where

$$\frac{\sqrt[4]{e}\,\log^{13/16}(2)}{9\sqrt[8]{2}\;3^{3/8}\log^{11/16}(3)} \approx 0.06030759602551772$$

Input interpretation

$$\sqrt[e]{16.542097553485+0.518874943499968+4.245471976946} + \frac{\sqrt[4]{e}\,\log^{13/16}(2)}{9\sqrt[8]{2}\times 3^{3/8}\log^{11/16}(3)}$$

log(x) is the natural logarithm

Result

3.1415926535903…

3.1415926535903…..≈ π

Alternative representations

$$\sqrt[e]{16.5420975534850000+0.5188749434999680000+4.2454719769460000}+\frac{\sqrt[4]{e}\ \log^{13/16}(2)}{9\sqrt[8]{2}\ 3^{3/8}\log^{11/16}(3)}=\sqrt[e]{21.3064444739309680}+\frac{\sqrt[4]{e}\ \log_e^{13/16}(2)}{9\sqrt[8]{2}\ 3^{3/8}\log_e^{11/16}(3)}$$

$$\sqrt[e]{16.5420975534850000+0.5188749434999680000+4.2454719769460000}+\frac{\sqrt[4]{e}\ \log^{13/16}(2)}{9\sqrt[8]{2}\ 3^{3/8}\log^{11/16}(3)}=\sqrt[e]{21.3064444739309680}+\frac{\sqrt[4]{e}\ (\log(a)\log_a(2))^{13/16}}{9\sqrt[8]{2}\ 3^{3/8}(\log(a)\log_a(3))^{11/16}}$$

$$\sqrt[e]{16.5420975534850000+0.5188749434999680000+4.2454719769460000}+\frac{\sqrt[4]{e}\ \log^{13/16}(2)}{9\sqrt[8]{2}\ 3^{3/8}\log^{11/16}(3)}=\sqrt[e]{21.3064444739309680}+\frac{\sqrt[4]{e}\ \left(2\coth^{-1}(3)\right)^{13/16}}{9\sqrt[8]{2}\ 3^{3/8}\left(2\coth^{-1}(2)\right)^{11/16}}$$

Integral representations

$$\sqrt[e]{16.5420975534850000+0.5188749434999680000+4.2454719769460000}+\frac{\sqrt[4]{e}\ \log^{13/16}(2)}{9\sqrt[8]{2}\ 3^{3/8}\log^{11/16}(3)}=\frac{2^{7/8}\times 3^{5/8}\sqrt[4]{e}\left(\int_1^2\frac{1}{t}\,dt\right)^{13/16}+54\sqrt[e]{21.3064444739309680}\left(\int_1^3\frac{1}{t}\,dt\right)^{11/16}}{54\left(\int_1^3\frac{1}{t}\,dt\right)^{11/16}}$$

$$\sqrt[e]{16.5420975534850000 + 0.5188749434999680000 + 4.2454719769460000} + \frac{\sqrt[4]{e}\,\log^{13/16}(2)}{9\sqrt[8]{2}\;3^{3/8}\log^{11/16}(3)} =$$

$$\left(54\sqrt[e]{21.3064444739309680}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{2^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds + 2^{3/4}\times 3^{5/8}\sqrt[4]{e}\;i\pi\left(\frac{1}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^{13/16}\left(\frac{1}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{2^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^{5/16}\right) \Big/ \left(54\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{2^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right) \text{ for } -1<\gamma<0$$

We have:

$$g_{154}^2 = \sqrt{\left\{(2\sqrt{2}+\sqrt{7})\left(\frac{\sqrt{7}+\sqrt{11}}{2}\right)\right\}} \times \left\{\sqrt{\left(\frac{13+2\sqrt{22}}{4}\right)} + \sqrt{\left(\frac{9+2\sqrt{22}}{4}\right)}\right\},$$

$$g_{158} + \frac{1}{g_{158}} = \frac{1}{2}\{\sqrt{(9+\sqrt{2})} + \sqrt{(17+13\sqrt{2})}\},$$

From:

$$\sqrt{\left\{(2\sqrt{2}+\sqrt{7})\left(\frac{\sqrt{7}+\sqrt{11}}{2}\right)\right\}} \times \left\{\sqrt{\left(\frac{13+2\sqrt{22}}{4}\right)} + \sqrt{\left(\frac{9+2\sqrt{22}}{4}\right)}\right\},$$

we obtain:

sqrt[((((2sqrt2+sqrt7))*(1/2(sqrt7+sqrt11))))]*[(1/4*(13+2sqrt22))^0.5+(1/4*(9+2sqrt 22))^0.5]

Input

$$\sqrt{\left(2\sqrt{2}+\sqrt{7}\right)\left(\frac{1}{2}\left(\sqrt{7}+\sqrt{11}\right)\right)}\left(\sqrt{\frac{1}{4}\left(13+2\sqrt{22}\right)}+\sqrt{\frac{1}{4}\left(9+2\sqrt{22}\right)}\right)$$

Exact result

$$\sqrt{\frac{1}{2}\left(2\sqrt{2}+\sqrt{7}\right)\left(\sqrt{7}+\sqrt{11}\right)}\left(\frac{1}{2}\sqrt{9+2\sqrt{22}}+\frac{1}{2}\sqrt{13+2\sqrt{22}}\right)$$

Decimal approximation

18.215472549990102680612133470937714740862729392434624039434624861 ...

18.21547254999….

Alternate forms

$$\frac{1}{2}\sqrt{\frac{7}{2}+\sqrt{14}+\sqrt{22}+\frac{\sqrt{77}}{2}}\left(\sqrt{9+2\sqrt{22}}+\sqrt{13+2\sqrt{22}}\right)$$

---

root of $x^8-18x^7-3x^6-18x^5+20x^4+18x^3-3x^2+18x+1$ near $x=18.2155$

$$\frac{1}{4}\sqrt{(2\sqrt{2}+\sqrt{7})(\sqrt{7}+\sqrt{11})}\left(\sqrt{9-i\sqrt{7}}+\sqrt{2}\left(\sqrt{2}+\sqrt{11}+\sqrt{\frac{1}{2}i(\sqrt{7}+-9i)}\right)\right)$$

$$\frac{1}{4}\left(\sqrt{302+80\sqrt{14}+64\sqrt{22}+34\sqrt{77}}+\sqrt{358+96\sqrt{14}+80\sqrt{22}+42\sqrt{77}}\right)$$

Minimal polynomial

$$x^8-18x^7-3x^6-18x^5+20x^4+18x^3-3x^2+18x+1$$

Expanded forms

$$\frac{1}{2}\left(\sqrt{\frac{151}{2}+20\sqrt{14}+16\sqrt{22}+\frac{17\sqrt{77}}{2}}+\sqrt{\frac{179}{2}+24\sqrt{14}+20\sqrt{22}+\frac{21\sqrt{77}}{2}}\right)$$

$$\frac{1}{2}\sqrt{\frac{1}{2}(2\sqrt{2}+\sqrt{7})(\sqrt{7}+\sqrt{11})(9+2\sqrt{22})}+\frac{1}{2}\sqrt{\frac{1}{2}(2\sqrt{2}+\sqrt{7})(\sqrt{7}+\sqrt{11})(13+2\sqrt{22})}$$

and:

$$\frac{1}{2}\{\sqrt{(9+\sqrt{2})}+\sqrt{(17+13\sqrt{2})}\},$$

1/2 [((9+sqrt2)^0.5)+((17+13sqrt2)^0.5)]

Input

$$\frac{1}{2}\left(\sqrt{9+\sqrt{2}}+\sqrt{17+13\sqrt{2}}\right)$$

Decimal approximation

4.5878082470404325582043862534461921013553428662511752760599755784
…

4.587808247….

Alternate forms

$$\sqrt{\frac{1}{2}\left(13+7\sqrt{2}+\sqrt{179+134\sqrt{2}}\right)}$$

$$\frac{1}{2}\left(\sqrt{\frac{17}{2}-\frac{7i}{2}}+\sqrt{\frac{17}{2}+\frac{7i}{2}}+\sqrt{9+\sqrt{2}}\right)$$

$$\frac{1}{2}\sqrt{\frac{17}{2}-\frac{7i}{2}}+\frac{1}{2}\sqrt{\frac{17}{2}+\frac{7i}{2}}+\frac{\sqrt{9+\sqrt{2}}}{2}$$

Minimal polynomial

$$x^8-26x^6+115x^4-236x^2+196$$

Expanded form

$$\frac{\sqrt{9+\sqrt{2}}}{2}+\frac{1}{2}\sqrt{17+13\sqrt{2}}$$

From which:

(18.215472549990102 68+4.5878082470404325582)^1/3+((1/13 (-e^π + 21 π - log(4096) + 2 log(π) - 26 tan^(-1)(π))))

Input interpretation

$$\sqrt[3]{18.215472549990102 68 + 4.5878082470404325582} + \frac{1}{13}\left(-e^{\pi} + 21\,\pi - \log(4096) + 2\log(\pi) - 26\tan^{-1}(\pi)\right)$$

log(x) is the natural logarithm

$\tan^{-1}(x)$ is the inverse tangent function

Result

3.1415926537604090956…

(result in radians)

3.14159265376…. ≈ π

Alternative representations

$$\sqrt[3]{18.215472549990102680000 + 4.5878082470404325582 0000} + \frac{1}{13}\left(-e^{\pi} + 21\,\pi - \log(4096) + 2\log(\pi) - 26\tan^{-1}(\pi)\right) = \sqrt[3]{22.803280797030535238200} + \frac{1}{13}\left(21\,\pi - 26\tan^{-1}(1,\pi) - \log(4096) + 2\log(\pi) - e^{\pi}\right)$$

$$\sqrt[3]{18.215472549990102680000 + 4.5878082470404325582 0000} + \frac{1}{13}\left(-e^{\pi} + 21\,\pi - \log(4096) + 2\log(\pi) - 26\tan^{-1}(\pi)\right) = \sqrt[3]{22.803280797030535238200} + \frac{1}{13}\left(21\,\pi - 26\tan^{-1}(\pi) - \log(a)\log_a(4096) + 2\log(a)\log_a(\pi) - e^{\pi}\right)$$

$$\sqrt[3]{18.215472549990102680000+4.5878082470404325582000} + \frac{1}{13}\left(-e^{\pi}+21\pi-\log(4096)+2\log(\pi)-26\tan^{-1}(\pi)\right) = \sqrt[3]{22.8032807970305352382} + \frac{1}{13}\left(21\pi-26\tan^{-1}(\pi)-\log_e(4096)+2\log_e(\pi)-e^{\pi}\right)$$

Series representations

$$\sqrt[3]{18.215472549990102680000+4.5878082470404325582000} + \frac{1}{13}\left(-e^{\pi}+21\pi-\log(4096)+2\log(\pi)-26\tan^{-1}(\pi)\right) = 2.8357358806885520288858 - 0.0769230769230769230769 23\, e^{\pi} + 1.6153846153846153846153 8\,\pi - 2.0000000000000000000000\tan^{-1}(\pi) - 0.0769230769230769230769 23\log(4095) + 0.1538461538461538461538 46\log(-1+\pi) + \sum_{k=1}^{\infty}\frac{1}{k}\left(0.07692307692307692308\left(-\frac{1}{4095}\right)^k - 0.15384615384615384615\,(-1)^k\,(-1+\pi)^{-k}\right)$$

$$\sqrt[3]{18.215472549990102680000+4.5878082470404325582000} + \frac{1}{13}\left(-e^{\pi}+21\pi-\log(4096)+2\log(\pi)-26\tan^{-1}(\pi)\right) = 2.8357358806885520288858 - 0.0769230769230769230769 23\, e^{\pi} + 1.6153846153846153846153 8\,\pi - 0.0769230769230769230769 23\log(4096) + 0.1538461538461538461538 46\log(\pi) - 2.0000000000000000000000\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{5}\right)^k 2^{1+2k} F_{1+2k}\left(\frac{\pi}{1+\sqrt{1+\frac{4\pi^2}{5}}}\right)^{1+2k}}{1+2k}$$

$$\sqrt[3]{18.215472549990102680000 + 4.587808247040432558200000} + \frac{1}{13}\left(-e^{\pi} + 21\pi - \log(4096) + 2\log(\pi) - 26\tan^{-1}(\pi)\right) = 2.83573588068855202888858 - 0.076923076923076923076923\, e^{\pi} + 1.6153846153846153846153 8\,\pi - 2.0000000000000000000000\tan^{-1}(x) - 2.0000000000000000000000\,\pi \left\lfloor \frac{\arg(i(\pi - x))}{2\pi} \right\rfloor - 0.076923076923076923076923\log(4096) + 0.15384615384615384615384 6\log(\pi) - 1.0000000000000000000000\, i \sum_{k=1}^{\infty} \frac{\left(-(-i-x)^{-k} + (i-x)^{-k}\right)(\pi - x)^k}{k}$$

for ($i\,x \in \mathbb{R}$ and $i\,x < -1$)

F_n is the n^{th} Fibonacci number

Integral representations

$$\sqrt[3]{18.215472549990102680000 + 4.587808247040432558200000} + \frac{1}{13}\left(-e^{\pi} + 21\pi - \log(4096) + 2\log(\pi) - 26\tan^{-1}(\pi)\right) = 2.83573588068855202888858 - 0.076923076923076923076923\, e^{\pi} + 1.6153846153846153846153 8\,\pi - 2.0000000000000000000000\,\pi \int_0^1 \frac{1}{1+\pi^2 t^2}\, dt - 0.076923076923076923076923\log(4096) + 0.15384615384615384615384 6\log(\pi)$$

$$\sqrt[3]{18.215472549990102680000 + 4.587808247040432558200000} + \frac{1}{13}\left(-e^{\pi} + 21\pi - \log(4096) + 2\log(\pi) - 26\tan^{-1}(\pi)\right) = 2.83573588068855202888858 - 0.076923076923076923076923\, e^{\pi} + 1.6153846153846153846153 8\,\pi + \int_0^1 \left(-\frac{0.0769230769230769230769 2}{0.00024420024420024420024 42 + 1.0000000000000000000000\, t} + (-0.15384615384615384615384 + 0.15384615384615384615384\,\pi) / (1.0000000000000000000000 + (-1.0000000000000000000000 + \pi)\, t) - \frac{2.0000000000000000000000\,\pi}{1+\pi^2 t^2}\right) dt$$

$$\sqrt[3]{18.215472549990102680000 + 4.58780824704043255820000} + \frac{1}{13}\left(-e^{\pi} + 21\pi - \log(4096) + 2\log(\pi) - 26\tan^{-1}(\pi)\right) = 2.835735880688552028885\,78 - 0.076923076923076923076923\,e^{\pi} + 1.615384615384615384615\,38\,\pi + \frac{i}{2\sqrt{\pi}}\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(1+\pi^2\right)^{-s}\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)^2\,ds - 0.076923076923076923076923\log(4096) + \frac{2\log(\pi)}{13} \quad \text{for } 0 < \gamma < \frac{1}{2}$$

Continued fraction representations

$$\sqrt[3]{18.215472549990102680000 + 4.58780824704043255820000} + \frac{1}{13}\left(-e^{\pi} + 21\pi - \log(4096) + 2\log(\pi) - 26\tan^{-1}(\pi)\right) = \frac{1}{13}\left(36.864566448951176375515 - e^{\pi} + 21\pi - \log(4096) + 2\log(\pi) - \frac{26\pi}{1 + \mathop{K}_{k=1}^{\infty}\frac{k^2\pi^2}{1+2k}}\right) = \frac{1}{13}\left(73.669013146537022012782 - \frac{26\pi}{1+\frac{\pi^2}{3+\frac{4\pi^2}{5+\frac{9\pi^2}{7+\frac{16\pi^2}{9+\dots}}}}}\right)$$

$$\sqrt[3]{18.215472549990102680000 + 4.5878082470404325582000} + \frac{1}{13}\left(-e^{\pi} + 21\pi - \log(4096) + 2\log(\pi) - 26\tan^{-1}(\pi)\right) =$$

$$\frac{1}{13}\left(36.864566448951176375515 - e^{\pi} - 5\pi - \log(4096) + 2\log(\pi) + \frac{26\pi^3}{3 + \underset{k=1}{\overset{\infty}{\mathrm{K}}} \frac{\left(1+(-1)^{1+k}+k\right)^2 \pi^2}{3+2k}}\right) =$$

$$\frac{1}{13}\left(-8.0123958467976021872 47 + \frac{26\pi^3}{3 + \frac{9\pi^2}{5+\frac{4\pi^2}{7+\frac{25\pi^2}{9+\frac{16\pi^2}{11+\ldots}}}}}\right)$$

$$\sqrt[3]{18.215472549990102680000 + 4.587808247040432558200000} + \frac{1}{13}\left(-e^{\pi} + 21\pi - \log(4096) + 2\log(\pi) - 26\tan^{-1}(\pi)\right) =$$

$$\frac{1}{13}\left(36.864566448951176375515 - e^{\pi} + 21\pi - \frac{26\pi}{1 + \underset{k=1}{\overset{\infty}{\mathrm{K}}} \frac{k^2\pi^2}{1+2k}} - \frac{4095}{1 + \underset{k=1}{\overset{\infty}{\mathrm{K}}} \frac{4095 \left\lfloor \frac{1+k}{2} \right\rfloor^2}{1+k}} + \frac{2(-1+\pi)}{1 + \underset{k=1}{\overset{\infty}{\mathrm{K}}} \frac{(-1+\pi)\left\lfloor \frac{1+k}{2} \right\rfloor^2}{1+k}}\right) =$$

$$\frac{1}{13}\left(79.697319541557565377502 - \frac{26\pi}{1 + \frac{\pi^2}{3 + \frac{4\pi^2}{5 + \frac{9\pi^2}{7 + \frac{16\pi^2}{9 + \dots}}}}} - \frac{4095}{1 + \frac{4095}{2 + \frac{4095}{3 + \frac{16380}{4 + \frac{16380}{5 + \dots}}}}} + \frac{2(-1+\pi)}{1 + \frac{-1+\pi}{2 + \frac{-1+\pi}{3 + \frac{4(-1+\pi)}{4 + \frac{4(-1+\pi)}{5 + \dots}}}}}\right)$$

$\underset{k=k_1}{\overset{k_2}{\mathrm{K}}} a_k / b_k$ is a continued fraction

From the results of the following expressions:

$$g_{62} + \frac{1}{g_{62}} = \frac{1}{2}\{\sqrt{(1+\sqrt{2})} + \sqrt{(9+5\sqrt{2})}\},$$

$$G_{65}^2 = \sqrt{\left\{\left(\frac{1+\sqrt{5}}{2}\right)\left(\frac{3+\sqrt{13}}{2}\right)\right\}}\left\{\sqrt{\left(\frac{1+\sqrt{65}}{8}\right)} + \sqrt{\left(\frac{9+\sqrt{65}}{8}\right)}\right\},$$

$$g_{66}^2 = \sqrt{(\sqrt{2}+\sqrt{3})(7\sqrt{2}+3\sqrt{11})^{\frac{1}{6}}}\left\{\sqrt{\left(\frac{7+\sqrt{33}}{8}\right)} + \sqrt{\left(\frac{\sqrt{33}-1}{8}\right)}\right\},$$

$$G_{69}^2 = (3\sqrt{3}+\sqrt{23})^{\frac{1}{4}}\left(\frac{5+\sqrt{23}}{4}\right)^{\frac{1}{6}}\left\{\sqrt{\left(\frac{6+3\sqrt{3}}{4}\right)} + \sqrt{\left(\frac{2+3\sqrt{3}}{4}\right)}\right\},$$

$$G_{77}^2 = \{\frac{1}{2}(\sqrt{7}+\sqrt{11})(8+3\sqrt{7})\}^{\frac{1}{4}}\left\{\sqrt{\left(\frac{6+\sqrt{11}}{4}\right)} + \sqrt{\left(\frac{2+\sqrt{11}}{4}\right)}\right\},$$

$$G_{81}^3 = \frac{(2\sqrt{3}+2)^{\frac{1}{3}}+1}{(2\sqrt{3}-2)^{\frac{1}{3}}-1},$$

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

$$g_{94} + \frac{1}{g_{94}} = \frac{1}{2}\{\sqrt{(7+\sqrt{2})} + \sqrt{(7+5\sqrt{2})}\},$$

$$g_{98} + \frac{1}{g_{98}} = \frac{1}{2}\{\sqrt{2} + \sqrt{(14+4\sqrt{14})}\},$$

$$g_{114}^2 = \sqrt{(\sqrt{2}+\sqrt{3})(3\sqrt{2}+\sqrt{19})^{\frac{1}{6}}}\left\{\sqrt{\left(\frac{23+3\sqrt{57}}{8}\right)} + \sqrt{\left(\frac{15+3\sqrt{57}}{8}\right)}\right\},$$

$$G_{117} = \frac{1}{2}\left(\frac{3+\sqrt{13}}{2}\right)^{\frac{1}{4}}(2\sqrt{3}+\sqrt{13})^{\frac{1}{6}}\{3^{\frac{1}{4}} + \sqrt{(4+\sqrt{3})}\},$$

$$\left.\begin{aligned} G_{121} + \frac{1}{G_{121}} &= \left(\frac{11}{2}\right)^{\frac{1}{6}}\left\{\left(3+\frac{1}{3\sqrt{3}}\right)^{\frac{1}{3}} + \left(3-\frac{1}{3\sqrt{3}}\right)^{\frac{1}{3}}\right\} \\ \frac{1}{G_{121}} &= \frac{1}{3\sqrt{2}}[(11-3\sqrt{11})^{\frac{1}{3}}\{(3\sqrt{11}+3\sqrt{3}-4)^{\frac{1}{3}} + (3\sqrt{11}-3\sqrt{3}-4)^{\frac{1}{3}}\} - 2] \end{aligned}\right\},$$

$$g_{126} = \sqrt{\left(\frac{\sqrt{3}+\sqrt{7}}{2}\right)(\sqrt{6}+\sqrt{7})^{\frac{1}{6}}}\left\{\sqrt{\left(\frac{3+\sqrt{2}}{4}\right)} + \sqrt{\left(\frac{\sqrt{2}-1}{4}\right)}\right\}^2,$$

$$g_{138}^2 = \sqrt{\left(\frac{3\sqrt{3}+\sqrt{23}}{2}\right)(78\sqrt{2}+23\sqrt{23})^{\frac{1}{6}}} \times \left\{\sqrt{\left(\frac{5+2\sqrt{6}}{4}\right)} + \sqrt{\left(\frac{1+2\sqrt{6}}{4}\right)}\right\},$$

$$G_{141}^2 = (4\sqrt{3}+\sqrt{47})^{\frac{1}{4}}\left(\frac{7+\sqrt{47}}{\sqrt{2}}\right)^{\frac{1}{6}}\left\{\sqrt{\left(\frac{18+9\sqrt{3}}{4}\right)} + \sqrt{\left(\frac{14+9\sqrt{3}}{4}\right)}\right\},$$

$$G_{145}^2 = \sqrt{\left\{\frac{(2+\sqrt{5})(5+\sqrt{29})}{2}\right\}}\left\{\sqrt{\left(\frac{17+\sqrt{145}}{8}\right)}+\sqrt{\left(\frac{9+\sqrt{145}}{8}\right)}\right\},$$

$$\frac{1}{G_{147}} = 2^{-\frac{1}{12}}\left[\frac{1}{2}+\frac{1}{\sqrt{3}}\left\{\sqrt{\left(\frac{7}{4}\right)}-(28)^{\frac{1}{6}}\right\}\right],$$

$$G_{153} = \left\{\sqrt{\left(\frac{5+\sqrt{17}}{8}\right)}+\sqrt{\left(\frac{\sqrt{17}-3}{8}\right)}\right\}^2 \times\left\{\sqrt{\left(\frac{37+9\sqrt{17}}{4}\right)}+\sqrt{\left(\frac{33+9\sqrt{17}}{4}\right)}\right\}^{\frac{1}{3}},$$

$$g_{154}^2 = \sqrt{\left\{(2\sqrt{2}+\sqrt{7})\left(\frac{\sqrt{7}+\sqrt{11}}{2}\right)\right\}} \times\left\{\sqrt{\left(\frac{13+2\sqrt{22}}{4}\right)}+\sqrt{\left(\frac{9+2\sqrt{22}}{4}\right)}\right\},$$

$$g_{158} + \frac{1}{g_{158}} = \frac{1}{2}\{\sqrt{(9+\sqrt{2})}+\sqrt{(17+13\sqrt{2})}\},$$

where the g_n are highlighted in black and the G_m are highlighted in red

2.781323803920547….

5.8364372603724….

5.93160414841568….

6.2220252193329….

7.033656610253….

20.37749997725….

2.911116655774….

3.32593429313….

3.39813955444….

11.5730481521….

3.464643979529….

3.830586436322…..

0.2817853021….

3.6548630551090639….

15.3156144852002258……

15.833404207477….

16.542097553485……

0.518874943499968……

4.245471976946……

18.21547254999….

4.587808247….   FIRST TWENTY-ONE RESULTS

We obtain:

(2.781323803920547+5.93160414841568+2.911116655774+ 3.32593429313 + 3.39813955444+ 11.5730481521 + 3.6548630551090639 + 15.3156144852002258 + 18.21547254999 + 4.587808247)

Input interpretation

2.781323803920547 + 5.93160414841568 + 2.911116655774 + 3.32593429313 + 3.39813955444 + 11.5730481521 + 3.6548630551090639 + 15.3156144852002258 + 18.21547254999 + 4.587808247

Result

71.6949249450795167

71.6949249450795167

And:

(5.8364372603724 + 6.2220252193329 + 7.033656610253 + 20.37749997725 + 3.464643979529 + 3.830586436322 + 0.2817853021 + 15.833404207477 +16.542097553485 + 0.518874943499968 + 4.245471976946)

Input interpretation

5.8364372603724 + 6.2220252193329 + 7.033656610253 + 20.37749997725 + 3.464643979529 + 3.830586436322 + 0.2817853021 + 15.833404207477 + 16.542097553485 + 0.518874943499968 + 4.245471976946

Result

84.186483466567268

84.186483466567268

From these two results, we obtain:

((84.186483466567268)/(71.6949249450795167))+2*(1/3(1/(1.0018674362)+0.9568666373+0.9991104684)) where

$$\frac{e^{-\frac{2\pi}{5}}}{\sqrt{\varphi\sqrt{5}-\varphi}}=1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-4\pi}}{1+\cfrac{e^{-6\pi}}{1+\cfrac{e^{-8\pi}}{1+\ldots}}}}\approx 1.0018674362$$

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

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

are Rogers-Ramanujan continued fractions

Input interpretation

$$\frac{84.186483466567268}{71.6949249450795167}+2\left(\frac{1}{3}\left(\frac{1}{1.0018674362}+0.9568666373+0.9991104684\right)\right)$$

Result

3.1436408834621626444919482719365045063068112499917305679005298665
...

3.1436408834…. ≈ π

and also:

1.0018674362+(1/(((84.186483466567268)*(71.6949249450795167)))^1/18)

Input interpretation

$$1.0018674362 + \frac{1}{\sqrt[18]{84.186483466567268 \times 71.6949249450795167}}$$

Result

1.618404799699389898028122826715989741080124211482924565469561015 1 ...

1.618404799699…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Observe that we can to obtain approximations to π also as follows:

1/11(4ln(((84.186483466567268)*(71.6949249450795167))))

Input interpretation

$$\frac{1}{11}\,(4 \log(84.186483466567268 \times 71.6949249450795167))$$

log(x) is the natural logarithm

Result

3.16561976100504820...

3.165619761….

Alternative representations

$$\frac{4}{11}\log(84.1864834665672680000 \times 71.69492494507951670000) = \frac{4 \log_e(6035.74361352571792740)}{11}$$

$$\frac{4}{11}\log(84.1864834665672680000\times 71.6949249450795167000) = \frac{4}{11}\log(a)\log_a(6035.74361352571792740)$$

$$\frac{4}{11}\log(84.1864834665672680000\times 71.6949249450795167000) = -\frac{4\,\text{Li}_1(-6034.74361352571792740)}{11}$$

Series representations

$$\frac{4}{11}\log(84.1864834665672680000\times 71.6949249450795167000) = \frac{4\log(6034.74361352571792740)}{11} - \frac{4}{11}\sum_{k=1}^{\infty}\frac{(-1)^k e^{-8.70528864936916245621\,k}}{k}$$

$$\frac{4}{11}\log(84.1864834665672680000\times 71.6949249450795167000) = \frac{8}{11}i\pi\left\lfloor\frac{\arg(6035.74361352571792740-x)}{2\pi}\right\rfloor + \frac{4\log(x)}{11} - \frac{4}{11}\sum_{k=1}^{\infty}\frac{(-1)^k (6035.74361352571792740-x)^k x^{-k}}{k} \quad \text{for } x<0$$

$$\frac{4}{11}\log(84.1864834665672680000\times 71.6949249450795167000) = \frac{4}{11}\left\lfloor\frac{\arg(6035.74361352571792740-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right) + \frac{4\log(z_0)}{11} + \frac{4}{11}\left\lfloor\frac{\arg(6035.74361352571792740-z_0)}{2\pi}\right\rfloor\log(z_0) - \frac{4}{11}\sum_{k=1}^{\infty}\frac{(-1)^k (6035.74361352571792740-z_0)^k z_0^{-k}}{k}$$

Integral representations

$$\frac{4}{11}\log(84.1864834665672680000\times 71.6949249450795167000) = \frac{4}{11}\int_1^{6035.74361352571792740}\frac{1}{t}\,dt$$

$$\frac{4}{11}\log(84.1864834665672680000\times 71.6949249450795167000) = \frac{2}{11\,i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-8.70528864936916245621\,s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

1/22(8ln(((84.186483466567268)*(71.6949249450795167))))

Input interpretation

$$\frac{1}{22}(8\log(84.186483466567268\times 71.6949249450795167))$$

log(x) is the natural logarithm

Result

3.16561976100504820…

3.165619761…. result equal to previous one

Alternative representations

$$\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000) = \frac{8\log_e(6035.74361352571792740)}{22}$$

$$\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000) = \frac{8}{22}\log(a)\log_a(6035.74361352571792740)$$

$$\frac{8}{22}\log(84.1864834665672680000 \times 71.6949249450795167000) = -\frac{8\,\mathrm{Li}_1(-6034.74361352571792740)}{22}$$

Series representations

$$\frac{8}{22}\log(84.1864834665672680000 \times 71.6949249450795167000) = \frac{4\log(6034.74361352571792740)}{11} - \frac{4}{11}\sum_{k=1}^{\infty}\frac{(-1)^k e^{-8.70528864936916245621\,k}}{k}$$

$$\frac{8}{22}\log(84.1864834665672680000 \times 71.6949249450795167000) = \frac{8}{11} i\pi \left\lfloor \frac{\arg(6035.74361352571792740 - x)}{2\pi} \right\rfloor + \frac{4\log(x)}{11} - \frac{4}{11}\sum_{k=1}^{\infty}\frac{(-1)^k (6035.74361352571792740 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\frac{8}{22}\log(84.1864834665672680000 \times 71.6949249450795167000) = \frac{4}{11}\left\lfloor \frac{\arg(6035.74361352571792740 - z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \frac{4\log(z_0)}{11} + \frac{4}{11}\left\lfloor \frac{\arg(6035.74361352571792740 - z_0)}{2\pi} \right\rfloor \log(z_0) - \frac{4}{11}\sum_{k=1}^{\infty}\frac{(-1)^k (6035.74361352571792740 - z_0)^k z_0^{-k}}{k}$$

Integral representations

$$\frac{8}{22}\log(84.1864834665672680000 \times 71.6949249450795167000) = \frac{4}{11}\int_1^{6035.74361352571792740}\frac{1}{t}\,dt$$

$$\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000) = \frac{2}{11\,i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-8.70528864936916245621\,s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

From which:

1/22(8ln(((84.186483466567268)*(71.6949249450795167))))-((2^5*3^5)/(e^12 log^3(2) log^19(3)))

where

$$\frac{7776}{e^{12}\log^3(2)\log^{19}(3)} \approx 0.02402710726014$$

$(7776 = 2^5 * 3^5)$

Input interpretation

$$\frac{1}{22}(8\log(84.186483466567268\times 71.6949249450795167)) - \frac{2^5\times 3^5}{e^{12}\log^3(2)\log^{19}(3)}$$

log(x) is the natural logarithm

Result

3.14159265374490574...

3.141592653…. ≈ π

Alternative representations

$$\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000) - \frac{2^5\times 3^5}{e^{12}\log^3(2)\log^{19}(3)} = \frac{8\log_e(6035.74361352571792740)}{22} - \frac{2^5\times 3^5}{e^{12}\log_e^3(2)\log_e^{19}(3)}$$

$$\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000) - \frac{2^5\times 3^5}{e^{12}\log^3(2)\log^{19}(3)} = \frac{8}{22}\log(a)\log_a(6035.74361352571792740) - \frac{2^5\times 3^5}{e^{12}(\log(a)\log_a(2))^3(\log(a)\log_a(3))^{19}}$$

$$\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000) - \frac{2^5\times 3^5}{e^{12}\log^3(2)\log^{19}(3)} = \frac{16}{22}\coth^{-1}\left(\frac{6036.74361352571792740}{6034.74361352571792740}\right) - \frac{2^5\times 3^5}{e^{12}\left(2\coth^{-1}(2)\right)^{19}\left(2\coth^{-1}(3)\right)^3}$$

Series representations

$$\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000) - \frac{2^5\times 3^5}{e^{12}\log^3(2)\log^{19}(3)} = \frac{8}{11}i\pi\left\lfloor\frac{\arg(6035.74361352571792740-x)}{2\pi}\right\rfloor + \frac{4\log(x)}{11} - 7776\Bigg/\left(e^{12}\left(2i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}}{k}\right)^3\left(2i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}}{k}\right)^{19}\right) - \frac{4}{11}\sum_{k=1}^{\infty}\frac{(-1)^k(6035.74361352571792740-x)^k x^{-k}}{k} \quad \text{for } x<0$$

$$\frac{8}{22}\log(84.1864834665672680000 \times 71.6949249450795167000) - \frac{2^5 \times 3^5}{e^{12}\log^3(2)\log^{19}(3)} = \frac{4}{11}\left\lfloor \frac{\arg(6035.74361352571792740 - z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \frac{4\log(z_0)}{11} + \frac{4}{11}\left\lfloor \frac{\arg(6035.74361352571792740 - z_0)}{2\pi} \right\rfloor \log(z_0) - 7776 \Bigg/ \left(e^{12}\left(\log(z_0) + \left\lfloor \frac{\arg(2 - z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k (2 - z_0)^k z_0^{-k}}{k}\right)^3 \left(\log(z_0) + \left\lfloor \frac{\arg(3 - z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k (3 - z_0)^k z_0^{-k}}{k}\right)^{19}\right) - \frac{4}{11}\sum_{k=1}^{\infty} \frac{(-1)^k (6035.74361352571792740 - z_0)^k z_0^{-k}}{k}$$

$$\frac{8}{22}\log(84.1864834665672680000 \times 71.6949249450795167000) - \frac{2^5 \times 3^5}{e^{12}\log^3(2)\log^{19}(3)} = \frac{8}{11} i\pi \left\lfloor \frac{\pi - \arg\left(\frac{6035.74361352571792740}{z_0}\right) - \arg(z_0)}{2\pi} \right\rfloor + \frac{4\log(z_0)}{11} - 7776 \Bigg/ \left(e^{12}\left(2 i\pi \left\lfloor \frac{\pi - \arg\left(\frac{2}{z_0}\right) - \arg(z_0)}{2\pi} \right\rfloor + \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (2 - z_0)^k z_0^{-k}}{k}\right)^3 \left(2 i\pi \left\lfloor \frac{\pi - \arg\left(\frac{3}{z_0}\right) - \arg(z_0)}{2\pi} \right\rfloor + \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (3 - z_0)^k z_0^{-k}}{k}\right)^{19}\right) - \frac{4}{11}\sum_{k=1}^{\infty} \frac{(-1)^k (6035.74361352571792740 - z_0)^k z_0^{-k}}{k}$$

Integral representations

$$\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000)-\frac{2^5\times 3^5}{e^{12}\log^3(2)\log^{19}(3)}=\frac{4\left(-21384+e^{12}\left(\int_1^2\frac{1}{t}\,dt\right)^3\left(\int_1^3\frac{1}{t}\,dt\right)^{19}\int_1^{6035.74361352571792740}\frac{1}{t}\,dt\right)}{11\,e^{12}\left(\int_1^2\frac{1}{t}\,dt\right)^3\left(\int_1^3\frac{1}{t}\,dt\right)^{19}}$$

$$\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000)-\frac{2^5\times 3^5}{e^{12}\log^3(2)\log^{19}(3)}=\left(2\left(-179381993472\,i^{23}\,\pi^{23}+e^{12}\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^3\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{2^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^{19}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{-8.70528864936916245621\,s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)\right)\Big/\left(11\,e^{12}\,i\,\pi\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^3\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{2^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^{19}\right)$$

for $-1<\gamma<0$

Or:

1/22(8ln(((84.186483466567268)*(71.6949249450795167))))-(24/10^3)

Input interpretation

$$\frac{1}{22}(8\log(84.186483466567268\times 71.6949249450795167))-\frac{24}{10^3}$$

$\log(x)$ is the natural logarithm

Result

3.14161976100504820…

3.141619761…. ≈ π

Alternative representations

$$\frac{8}{22}\log(84.1864834665672680000 \times 71.6949249450795167000) - \frac{24}{10^3} = \frac{8\log_e(6035.74361352571792740)}{22} - \frac{24}{10^3}$$

$$\frac{8}{22}\log(84.1864834665672680000 \times 71.6949249450795167000) - \frac{24}{10^3} = \frac{8}{22}\log(a)\log_a(6035.74361352571792740) - \frac{24}{10^3}$$

$$\frac{8}{22}\log(84.1864834665672680000 \times 71.6949249450795167000) - \frac{24}{10^3} = -\frac{8\,\mathrm{Li}_1(-6034.74361352571792740)}{22} - \frac{24}{10^3}$$

Series representations

$$\frac{8}{22}\log(84.1864834665672680000 \times 71.6949249450795167000) - \frac{24}{10^3} = -\frac{3}{125} + \frac{4\log(6034.74361352571792740)}{11} - \frac{4}{11}\sum_{k=1}^{\infty}\frac{(-1)^k e^{-8.70528864936916245621\,k}}{k}$$

$$\frac{8}{22}\log(84.1864834665672680000 \times 71.6949249450795167000) - \frac{24}{10^3} = -\frac{3}{125} + \frac{8}{11} i\pi \left\lfloor \frac{\arg(6035.74361352571792740 - x)}{2\pi} \right\rfloor + \frac{4\log(x)}{11} - \frac{4}{11}\sum_{k=1}^{\infty}\frac{(-1)^k (6035.74361352571792740 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\frac{8}{22}\log(84.1864834665672680000 \times 71.6949249450795167000) - \frac{24}{10^3} = -\frac{3}{125} + \frac{4}{11}\left\lfloor\frac{\arg(6035.74361352571792740 - z_0)}{2\pi}\right\rfloor \log\left(\frac{1}{z_0}\right) + \frac{4\log(z_0)}{11} + \frac{4}{11}\left\lfloor\frac{\arg(6035.74361352571792740 - z_0)}{2\pi}\right\rfloor \log(z_0) - \frac{4}{11}\sum_{k=1}^{\infty}\frac{(-1)^k (6035.74361352571792740 - z_0)^k z_0^{-k}}{k}$$

Integral representations

$$\frac{8}{22}\log(84.1864834665672680000 \times 71.6949249450795167000) - \frac{24}{10^3} = -\frac{3}{125} + \frac{4}{11}\int_1^{6035.74361352571792740}\frac{1}{t}\,dt$$

$$\frac{8}{22}\log(84.1864834665672680000 \times 71.6949249450795167000) - \frac{24}{10^3} = -\frac{3}{125} + \frac{2}{11 i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{-8.70528864936916245621 s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1 < \gamma < 0$$

Or again, utilizing the Ramanujan taxicab numbers:

1/22(8ln(((84.186483466567268)*(71.6949249450795167))))-(24/(791^3+812^3+1)^1/3)

where we obtain easily $(791^3+812^3+1)^{1/3}$ from the following identity:

$$791^3 + 812^3 = 1010^3 - 1$$

Input interpretation

$$\frac{1}{22}(8\log(84.186483466567268 \times 71.6949249450795167)) - \frac{24}{\sqrt[3]{791^3 + 812^3 + 1}}$$

log(x) is the natural logarithm

Result

3.141857384767424444…

3.141857384…. ≈ π

Alternative representations

$$\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000 0) - \frac{24}{\sqrt[3]{791^3+812^3+1}} = \frac{8\log_e(6035.74361352571792740)}{22} - \frac{24}{\sqrt[3]{1+791^3+812^3}}$$

$$\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000 0) - \frac{24}{\sqrt[3]{791^3+812^3+1}} = \frac{8}{22}\log(a)\log_a(6035.74361352571792740) - \frac{24}{\sqrt[3]{1+791^3+812^3}}$$

$$\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000 0) - \frac{24}{\sqrt[3]{791^3+812^3+1}} = -\frac{8\operatorname{Li}_1(-6034.74361352571792740)}{22} - \frac{24}{\sqrt[3]{1+791^3+812^3}}$$

Series representations

$$\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000\text{0}) - \frac{24}{\sqrt[3]{791^3+812^3+1}} = -\frac{12}{505} + \frac{4\log(6034.74361352571792740)}{11} - \frac{4}{11}\sum_{k=1}^{\infty}\frac{(-1)^k e^{-8.70528864936916245621\,k}}{k}$$

$$\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000\text{0}) - \frac{24}{\sqrt[3]{791^3+812^3+1}} = -\frac{12}{505} + \frac{8}{11}\,i\,\pi\left\lfloor\frac{\arg(6035.74361352571792740-x)}{2\pi}\right\rfloor + \frac{4\log(x)}{11} - \frac{4}{11}\sum_{k=1}^{\infty}\frac{(-1)^k(6035.74361352571792740-x)^k x^{-k}}{k} \quad \text{for } x<0$$

$$\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000\text{0}) - \frac{24}{\sqrt[3]{791^3+812^3+1}} = -\frac{12}{505} + \frac{4}{11}\left\lfloor\frac{\arg(6035.74361352571792740-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right) + \frac{4\log(z_0)}{11} + \frac{4}{11}\left\lfloor\frac{\arg(6035.74361352571792740-z_0)}{2\pi}\right\rfloor\log(z_0) - \frac{4}{11}\sum_{k=1}^{\infty}\frac{(-1)^k(6035.74361352571792740-z_0)^k z_0^{-k}}{k}$$

Integral representations

$$\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000\text{0}) - \frac{24}{\sqrt[3]{791^3+812^3+1}} = -\frac{12}{505} + \frac{4}{11}\int_1^{6035.74361352571792740}\frac{1}{t}\,dt$$

$$\frac{8}{22}\log(84.18648346656726800000 \times 71.69492494507951670000) - \frac{24}{\sqrt[3]{791^3+812^3+1}} = -\frac{12}{505} + \frac{2}{11 i \pi}\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{e^{-8.70528864936916245621 s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

From which:

((1/6((1/22(8ln(((84.186483466567268)*(71.6949249450795167))))-(24/(791^3+812^3+1)^1/3)))^2))^15-21-2

Input interpretation

$$\left(\frac{1}{6}\left(\frac{1}{22}(8\log(84.186483466567268 \times 71.6949249450795167)) - \frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15} - 21 - 2$$

log(x) is the natural logarithm

Result

1728.157763100057…

1728.157763…..

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. (1728 = $8^2 * 3^3$) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Alternative representations

$$\left(\frac{1}{6}\left(\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000)-\frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15}-21-2=$$
$$-23+\left(\frac{1}{6}\left(\frac{8\log_e(6035.74361352571792740)}{22}-\frac{24}{\sqrt[3]{1+791^3+812^3}}\right)^2\right)^{15}$$

$$\left(\frac{1}{6}\left(\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000)-\frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15}-21-2=$$
$$-23+\left(\frac{1}{6}\left(-\frac{8\,\mathrm{Li}_1(-6034.74361352571792740)}{22}-\frac{24}{\sqrt[3]{1+791^3+812^3}}\right)^2\right)^{15}$$

$$\left(\frac{1}{6}\left(\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000)-\frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15}-21-2=$$
$$-23+\left(\frac{1}{6}\left(\frac{8}{22}\log(a)\log_a(6035.74361352571792740)-\frac{24}{\sqrt[3]{1+791^3+812^3}}\right)^2\right)^{15}$$

Series representations

$$\left(\frac{1}{6}\left(\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000) - \frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15} - 21 - 2 = -23 + \frac{1}{470184984576}\left(-\frac{12}{505} + \frac{4}{11}\left(\log(6034.74361352571792740) - \sum_{k=1}^{\infty}\frac{(-0.000165707122628820916395)^k}{k}\right)\right)^{30}$$

$$\left(\frac{1}{6}\left(\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000) - \frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15} - 21 - 2 = -23 + \frac{1}{470184984576}\left(-\frac{12}{505} + \frac{4}{11}\left(2 i \pi \left\lfloor\frac{\arg(6035.74361352571792740 - x)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k (6035.74361352571792740 - x)^k x^{-k}}{k}\right)\right)^{30} \quad \text{for } x < 0$$

$$\left(\frac{1}{6}\left(\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000) - \frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15} - 21 - 2 = -23 + \frac{1}{470184984576}\left(-\frac{12}{505} + \frac{4}{11}\left(\log(z_0) + \left\lfloor\frac{\arg(6035.74361352571792740 - z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty}\frac{(-1)^k (6035.74361352571792740 - z_0)^k z_0^{-k}}{k}\right)\right)^{30}$$

Integral representations

$$\left(\frac{1}{6}\left(\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000)-\frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15}-21-2=-23+\frac{\left(\frac{12}{505}-\frac{4}{11}\int_1^{6035.74361352571792740}\frac{1}{t}\,dt\right)^{30}}{470\,184\,984\,576}$$

$$\left(\frac{1}{6}\left(\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000)-\frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15}-21-2=-23+\frac{\left(\frac{12}{505}-\frac{2}{11\,i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-8.70528864936916245621\,s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^{30}}{470\,184\,984\,576}$$

for $-1<\gamma<0$

$\Gamma(x)$ is the gamma function

(1/27((((1/6((1/22(8ln(((84.186483466567268)*(71.6949249450795167))))-(24/(791^3+812^3+1)^1/3)))^2))^15-21-2)))^2-1/sqrt2

Input interpretation

$$\left(\frac{1}{27}\left(\left(\frac{1}{6}\left(\frac{1}{22}(8\log(84.186483466567268\times 71.6949249450795167))-\frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15}-21-2\right)\right)^2-\frac{1}{\sqrt{2}}$$

log(x) is the natural logarithm

Result

4096.040841316199…

4096.0408…. ≈ 4096 = 64^2

Alternative representations

$$\left(\frac{1}{27}\left(\left(\frac{1}{6}\left(\frac{8}{22}\log(84.18648346656726800000\times 71.69492494507951670000)-\frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15}-21-2\right)\right)^2-\frac{1}{\sqrt{2}}=\left(\frac{1}{27}\left(-23+\left(\frac{1}{6}\left(\frac{8\log_e(6035.74361352571792740)}{22}-\frac{24}{\sqrt[3]{1+791^3+812^3}}\right)^2\right)^{15}\right)\right)^2-\frac{1}{\sqrt{2}}$$

$$\left(\frac{1}{27}\left(\left(\frac{1}{6}\left(\frac{8}{22}\log(84.18648346656726800000\times 71.69492494507951670000)-\frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15}-21-2\right)\right)^2-\frac{1}{\sqrt{2}}=\left(\frac{1}{27}\left(-23+\left(\frac{1}{6}\left(-\frac{8\,\mathrm{Li}_1(-6034.74361352571792740)}{22}-\frac{24}{\sqrt[3]{1+791^3+812^3}}\right)^2\right)^{15}\right)\right)^2-\frac{1}{\sqrt{2}}$$

$$\left(\frac{1}{27}\left(\left(\left(\frac{1}{6}\left(\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000 0)-\frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15}-21-2\right)\right)^2-\frac{1}{\sqrt{2}}=$$

$$\left(\frac{1}{27}\left(-23+\left(\frac{1}{6}\left(\frac{8}{22}\log(a)\log_a(6035.74361352571792740)-\frac{24}{\sqrt[3]{1+791^3+812^3}}\right)^2\right)^{15}\right)\right)^2-\frac{1}{\sqrt{2}}$$

Series representations

$$\left(\frac{1}{27}\left(\left(\left(\frac{1}{6}\left(\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000 0)-\frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15}-21-2\right)\right)^2-$$

$$\frac{1}{\sqrt{2}}=\frac{1}{729}\left(23-\frac{\left(\frac{12}{505}-\frac{4\log(6035.74361352571792740)}{11}\right)^{30}}{470\,184\,984\,576}\right)^2-$$

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

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

$$\left(\frac{1}{27}\left(\left(\left(\frac{1}{6}\left(\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000) - \frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15} - 21 - 2\right)\right)^2 - \frac{1}{\sqrt{2}} = \frac{1}{729}\left(-23 + \frac{\left(-\frac{12}{505} + \frac{4\log(6035.74361352571792740)}{11}\right)^{30}}{470\,184\,984\,576}\right)^2 - \frac{\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor} z_0^{1/2(-1-\lfloor\arg(2-z_0)/(2\pi)\rfloor)}}{\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}$$

$$\left(\frac{1}{27}\left(\left(\left(\frac{1}{6}\left(\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000) - \frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15} - 21 - 2\right)\right)^2 - \frac{1}{\sqrt{2}} = \frac{1}{729}\left(-23 + \frac{1}{470\,184\,984\,576}\left(-\frac{12}{505} + \frac{4}{11}\left(\log(6034.74361352571792740) - \sum_{k=1}^{\infty}\frac{(-0.000165707122628820916395)^k}{k}\right)\right)^{30}\right)^2 - \frac{1}{\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}} \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

Integral representations

$$\left(\frac{1}{27}\left(\left(\frac{1}{6}\left(\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000) - \frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15} - 21 - 2\right)\right)^2 - \frac{1}{\sqrt{2}} = \frac{1}{729}\left(23 - \frac{\left(\frac{12}{505} - \frac{4}{11}\int_1^{6035.74361352571792740}\frac{1}{t}\,dt\right)^{30}}{470184984576}\right)^2 - \frac{1}{\sqrt{2}}$$

$$\left(\frac{1}{27}\left(\left(\frac{1}{6}\left(\frac{8}{22}\log(84.1864834665672680000\times 71.6949249450795167000) - \frac{24}{\sqrt[3]{791^3+812^3+1}}\right)^2\right)^{15} - 21 - 2\right)\right)^2 - \frac{1}{\sqrt{2}} = \frac{1}{729}\left(-23 + \frac{\left(-\frac{12}{505} + \frac{2}{11\,i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{6034.74361352571792740^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^{30}}{470184984576}\right)^2 - \frac{1}{\sqrt{2}} \quad \text{for } -1 < \gamma < 0$$

$\Gamma(x)$ is the gamma function

We obtain an approximation to π, also:

1/36(13ln(((84.186483466567268)*(71.6949249450795167))))

Input interpretation

$$\frac{1}{36}(13\log(84.186483466567268\times71.6949249450795167))$$

log(x) is the natural logarithm

Result

3.14363629044251314...

3.14363629…. ≈ π

Alternative representations

$$\frac{13}{36}\log(84.18648346656726800000\times71.69492494507951670000)=\frac{13\log_e(6035.74361352571792740)}{36}$$

$$\frac{13}{36}\log(84.18648346656726800000\times71.69492494507951670000)=\frac{13}{36}\log(a)\log_a(6035.74361352571792740)$$

$$\frac{13}{36}\log(84.18648346656726800000\times71.69492494507951670000)=-\frac{13\,\text{Li}_1(-6034.74361352571792740)}{36}$$

Series representations

$$\frac{13}{36}\log(84.18648346656726800000\times71.69492494507951670000)=\frac{13\log(6034.74361352571792740)}{36}-\frac{13}{36}\sum_{k=1}^{\infty}\frac{(-1)^k e^{-8.70528864936916245621\,k}}{k}$$

$$\frac{13}{36}\log(84.1864834665672680000\times 71.6949249450795167000) = \frac{13}{18} i\pi \left\lfloor \frac{\arg(6035.74361352571792740 - x)}{2\pi} \right\rfloor + \frac{13\log(x)}{36} - \frac{13}{36}\sum_{k=1}^{\infty} \frac{(-1)^k (6035.74361352571792740 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\frac{13}{36}\log(84.1864834665672680000\times 71.6949249450795167000) = \frac{13}{36}\left\lfloor \frac{\arg(6035.74361352571792740 - z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \frac{13\log(z_0)}{36} + \frac{13}{36}\left\lfloor \frac{\arg(6035.74361352571792740 - z_0)}{2\pi} \right\rfloor \log(z_0) - \frac{13}{36}\sum_{k=1}^{\infty} \frac{(-1)^k (6035.74361352571792740 - z_0)^k z_0^{-k}}{k}$$

Integral representations

$$\frac{13}{36}\log(84.1864834665672680000\times 71.6949249450795167000) = \frac{13}{36}\int_1^{6035.74361352571792740} \frac{1}{t}\, dt$$

$$\frac{13}{36}\log(84.1864834665672680000\times 71.6949249450795167000) = \frac{13}{72 i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{e^{-8.70528864936916245621 s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\, ds \quad \text{for } -1 < \gamma < 0$$

We have these other expressions:

$$\left.\begin{aligned} G_{169} \quad + \quad \frac{1}{G_{169}} &= \left(\frac{13}{4}\right)^{\frac{1}{6}} \left\{\left(1+\frac{1}{3\sqrt{3}}\right)^{\frac{1}{3}} + \left(1-\frac{1}{3\sqrt{3}}\right)^{\frac{1}{3}}\right\}^2 \\ \frac{1}{G_{169}} &= \frac{1}{3}\left[(\sqrt{13}-2) + \left(\frac{13-3\sqrt{13}}{2}\right)^{\frac{1}{3}}\right. \\ &\qquad \left. \times \left\{\left(3\sqrt{3}-\frac{11-\sqrt{13}}{2}\right)^{\frac{1}{3}} - \left(3\sqrt{3}+\frac{11-\sqrt{13}}{2}\right)^{\frac{1}{3}}\right\}\right] \end{aligned}\right\},$$

From:

$$G_{169} \quad + \quad \frac{1}{G_{169}} = \left(\frac{13}{4}\right)^{\frac{1}{6}} \left\{\left(1+\frac{1}{3\sqrt{3}}\right)^{\frac{1}{3}} + \left(1-\frac{1}{3\sqrt{3}}\right)^{\frac{1}{3}}\right\}^2$$

(13/4)^(1/6) [(1+1/(3sqrt3))^(1/3)+(1-1/(3sqrt3))^(1/3)]^2

Input

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

Exact result

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

Decimal approximation

4.8277165856693115058508599034137527538403435680843835066370462266
...

4.8277165856693115….

Alternate forms

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

$$\frac{\sqrt[6]{13}\left(\sqrt[3]{9-\sqrt{3}} + \sqrt[3]{9+\sqrt{3}}\right)^2}{3\sqrt[3]{6}}$$

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

Minimal polynomial

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

Expanded forms

$$\frac{2\sqrt{13}}{3} + \frac{\sqrt[6]{13}\sqrt[3]{28-6\sqrt{3}}}{3\sqrt[3]{2}} + \frac{\sqrt[6]{13}\sqrt[3]{28+6\sqrt{3}}}{3\sqrt[3]{2}}$$

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

and:

$$\frac{1}{G_{169}} = \frac{1}{3}\left[(\sqrt{13}-2)+\left(\frac{13-3\sqrt{13}}{2}\right)^{\frac{1}{3}} \times\left\{\left(3\sqrt{3}-\frac{11-\sqrt{13}}{2}\right)^{\frac{1}{3}}-\left(3\sqrt{3}+\frac{11-\sqrt{13}}{2}\right)^{\frac{1}{3}}\right\}\right]$$

1/3 [(sqrt13 – 2)+(1/2*(13-3sqrt13))^(1/3)*(((3sqrt3-1/2(11-sqrt13))^(1/3)-(3sqrt3+1/2(11-sqrt13))^(1/3)))]

Input

$$\frac{1}{3}\left((\sqrt{13}-2)+\sqrt[3]{\frac{1}{2}(13-3\sqrt{13})}\left(\sqrt[3]{3\sqrt{3}-\frac{1}{2}(11-\sqrt{13})}-\sqrt[3]{3\sqrt{3}+\frac{1}{2}(11-\sqrt{13})}\right)\right)$$

Result

$$\frac{1}{3}\left(-2+\sqrt{13}+\sqrt[3]{\frac{1}{2}(13-3\sqrt{13})}\left(\sqrt[3]{3\sqrt{3}+\frac{1}{2}(\sqrt{13}-11)}-\sqrt[3]{3\sqrt{3}+\frac{1}{2}(11-\sqrt{13})}\right)\right)$$

Decimal approximation

0.2168804008460634642084835038906402147766632806686521327986670993...

0.21688040084606…..

Alternate forms

$$\frac{1}{6}\left(\left(\sqrt[3]{-11+6\sqrt{3}+\sqrt{13}}-\sqrt[3]{11+6\sqrt{3}-\sqrt{13}}\right)\sqrt[3]{2\left(13-3\sqrt{13}\right)}+2\sqrt{13}-4\right)$$

---

root of $x^6+4x^5-2x^4+4x^3+2x^2+4x-1$ near $x=0.21688$

$$\frac{1}{6}\left(-4+2\sqrt{13}-\sqrt[3]{2\left(13-3\sqrt{13}\right)\left(11+6\sqrt{3}-\sqrt{13}\right)}+\sqrt[3]{2\left(13-3\sqrt{13}\right)\left(-11+6\sqrt{3}+\sqrt{13}\right)}\right)$$

Minimal polynomial

$$x^6+4x^5-2x^4+4x^3+2x^2+4x-1$$

Expanded forms

$$\frac{1}{3}\left(-2+\sqrt{13}+\sqrt[3]{\frac{1}{2}\left(-91+39\sqrt{3}+23\sqrt{13}-9\sqrt{39}\right)}\right)-\frac{1}{3}\sqrt[3]{\frac{1}{2}\left(91+39\sqrt{3}-23\sqrt{13}-9\sqrt{39}\right)}$$

$$-\frac{2}{3}+\frac{\sqrt{13}}{3}-\frac{1}{3}\sqrt[3]{\frac{1}{2}\left(13-3\sqrt{13}\right)\left(3\sqrt{3}+\frac{1}{2}\left(11-\sqrt{13}\right)\right)}+\frac{1}{3}\sqrt[3]{\frac{1}{2}\left(13-3\sqrt{13}\right)\left(3\sqrt{3}+\frac{1}{2}\left(\sqrt{13}-11\right)\right)}$$

From the two above expression, we obtain, after some easy calculations:

3*(((13/4)^(1/6) [(1+1/(3sqrt3))^(1/3)+(1-1/(3sqrt3))^(1/3)]^2)) * ((1/3 [(sqrt13 – 2)+(1/2*(13-3sqrt13))^(1/3)*(((3sqrt3-1/2(11-sqrt13))^(1/3)- (3sqrt3+1/2(11-sqrt13))^(1/3)))]))

Input

$$3\left(\sqrt[6]{\frac{13}{4}}\left(\sqrt[3]{1+\frac{1}{3\sqrt{3}}}+\sqrt[3]{1-\frac{1}{3\sqrt{3}}}\right)^2\right)\left(\frac{1}{3}\left(\left(\sqrt{13}-2\right)+\sqrt[3]{\frac{1}{2}\left(13-3\sqrt{13}\right)}\left(\sqrt[3]{3\sqrt{3}-\frac{1}{2}\left(11-\sqrt{13}\right)}-\sqrt[3]{3\sqrt{3}+\frac{1}{2}\left(11-\sqrt{13}\right)}\right)\right)\right)$$

Exact result

$$\frac{1}{\sqrt[3]{2}}\sqrt[6]{13}\left(\sqrt[3]{1-\frac{1}{3\sqrt{3}}}+\sqrt[3]{1+\frac{1}{3\sqrt{3}}}\right)^2\left(-2+\sqrt{13}+\sqrt[3]{\frac{1}{2}\left(13-3\sqrt{13}\right)}\left(\sqrt[3]{3\sqrt{3}+\frac{1}{2}\left(\sqrt{13}-11\right)}-\sqrt[3]{3\sqrt{3}+\frac{1}{2}\left(11-\sqrt{13}\right)}\right)\right)$$

Decimal approximation

3.141111324813447497404999670708601177282923195793819362473699314 9
...

3.141111324813447….. ≈ π

Alternate forms

root of $x^6 - 78x^5 + 819x^4 - 4914x^3 + 17901x^2 - 37908x + 37908$ near $x = 3.14111$

$$-\frac{1}{18\sqrt[3]{2}}\sqrt[6]{13}\left(\sqrt[3]{27-3\sqrt{3}}+\sqrt[3]{3(9+\sqrt{3})}\right)^2$$
$$\left(4-2\sqrt{13}+\sqrt[3]{2(13-3\sqrt{13})(11+6\sqrt{3}-\sqrt{13})}-\right.$$
$$\left.\sqrt[3]{2(13-3\sqrt{13})(-11+6\sqrt{3}+\sqrt{13})}\right)$$

$$\frac{1}{6\sqrt[3]{6}}\sqrt[6]{13}\left(\sqrt[3]{9-\sqrt{3}}+\sqrt[3]{9+\sqrt{3}}\right)^2$$
$$\left(-4+2\sqrt{13}-2^{2/3}\sqrt[3]{91+39\sqrt{3}-23\sqrt{13}-9\sqrt{39}}+\right.$$
$$\left.2^{2/3}\sqrt[3]{-91+39\sqrt{3}+23\sqrt{13}-9\sqrt{39}}\right)$$

We have:

$$g_{198} = \sqrt{(1+\sqrt{2})}(4\sqrt{2}+\sqrt{33})^{\frac{1}{6}}\left\{\sqrt{\left(\frac{9+\sqrt{33}}{8}\right)}+\sqrt{\left(\frac{1+\sqrt{33}}{8}\right)}\right\},$$
$$G_{205} = \left(\frac{1+\sqrt{5}}{2}\right)\left(\frac{3\sqrt{5}+\sqrt{41}}{2}\right)^{\frac{1}{4}}\left\{\sqrt{\left(\frac{7+\sqrt{41}}{8}\right)}+\sqrt{\left(\frac{\sqrt{41}-1}{8}\right)}\right\},$$

From:

$$g_{198} = \sqrt{(1+\sqrt{2})}(4\sqrt{2}+\sqrt{33})^{\frac{1}{6}}\left\{\sqrt{\left(\frac{9+\sqrt{33}}{8}\right)}+\sqrt{\left(\frac{1+\sqrt{33}}{8}\right)}\right\},$$

(1+sqrt2)^0.5 (4sqrt2+sqrt33)^(1/6) [(1/8*(9+sqrt33))^0.5+(1/8(1+sqrt33))^0.5]

Input

$$\sqrt{1+\sqrt{2}}\sqrt[6]{4\sqrt{2}+\sqrt{33}}\left(\sqrt{\frac{1}{8}(9+\sqrt{33})}+\sqrt{\frac{1}{8}(1+\sqrt{33})}\right)$$

Exact result

$$\sqrt{1+\sqrt{2}}\ \sqrt[6]{4\sqrt{2}+\sqrt{33}}\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(1+\sqrt{33}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(9+\sqrt{33}\right)}\right)$$

Decimal approximation

5.3049225181864859298455872334358072272926307626544499803523659465
…

5.30492251818648…

Alternate forms

$$\frac{1}{2}\sqrt[12]{65+8\sqrt{66}}\ \sqrt{\left(1+\sqrt{2}\right)\left(5+\sqrt{33}+\sqrt{42+10\sqrt{33}}\right)}$$

$$\frac{1}{8}\left(\sqrt{2-2i}+\sqrt{2+2i}\right)\sqrt[6]{4\sqrt{2}+\sqrt{33}}\left(\sqrt{2\left(1+\sqrt{33}\right)}+\sqrt{2\left(9+\sqrt{33}\right)}\right)$$

$$\sqrt[6]{\text{root of } x^8-22288x^7-3628x^6+1904x^5+26854x^4-1904x^3-3628x^2+22288x+1 \text{ near } x=22288.2}$$

$$\frac{\sqrt[6]{4\sqrt{2}+\sqrt{33}}\left(\sqrt{\left(1+\sqrt{2}\right)\left(1+\sqrt{33}\right)}+\sqrt{\left(1+\sqrt{2}\right)\left(9+\sqrt{33}\right)}\right)}{2\sqrt{2}}$$

Minimal polynomial

$$x^{48}-22288x^{42}-3628x^{36}+1904x^{30}+26854x^{24}-1904x^{18}-3628x^{12}+22288x^6+1$$

Expanded forms

$$\frac{1}{2}\sqrt[6]{4\sqrt{2}+\sqrt{33}}\left(\sqrt{\frac{9}{\sqrt{2}}+\frac{1}{2}\left(9+\sqrt{33}+\sqrt{66}\right)}+\sqrt{\frac{1}{2}+\frac{1}{2}\left(\sqrt{2}+\sqrt{33}+\sqrt{66}\right)}\right)$$

$$\frac{\sqrt{\left(1+\sqrt{2}\right)\left(1+\sqrt{33}\right)}\sqrt[6]{4\sqrt{2}+\sqrt{33}}}{2\sqrt{2}}+\frac{\sqrt{\left(1+\sqrt{2}\right)\left(9+\sqrt{33}\right)}\sqrt[6]{4\sqrt{2}+\sqrt{33}}}{2\sqrt{2}}$$

and:

$$G_{205} = \left(\frac{1+\sqrt{5}}{2}\right)\left(\frac{3\sqrt{5}+\sqrt{41}}{2}\right)^{\frac{1}{4}}\left\{\sqrt{\left(\frac{7+\sqrt{41}}{8}\right)}+\sqrt{\left(\frac{\sqrt{41}-1}{8}\right)}\right\},$$

(1/2(1+sqrt5)) (1/2(3sqrt5+sqrt41))^0.25 [(1/8*(7+sqrt41))^0.5+(1/8(sqrt41 – 1))^0.5]

Input

$$\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)\left(\frac{1}{2}\left(3\sqrt{5}+\sqrt{41}\right)\right)^{0.25}\left(\sqrt{\frac{1}{8}\left(7+\sqrt{41}\right)}+\sqrt{\frac{1}{8}\left(\sqrt{41}-1\right)}\right)$$

Result

5.4789397137741778631422933388746486067850216067301672332619100408...

5.47893971377417……..

From the two above expressions, after some easy calculations, we obtain:

47*1/(((((1/2(1+sqrt5)) (1/2(3sqrt5+sqrt41))^0.25 [(1/8*(7+sqrt41))^0.5+(1/8(sqrt41 – 1))^0.5])) * (((1+sqrt2)^0.5 (4sqrt2+sqrt33)^(1/6) [(1/8*(9+sqrt33))^0.5+(1/8(1+sqrt33))^0.5]))))

Input

$$47\times 1\Big/\left(\left(\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)\left(\frac{1}{2}\left(3\sqrt{5}+\sqrt{41}\right)\right)^{0.25}\left(\sqrt{\frac{1}{8}\left(7+\sqrt{41}\right)}+\sqrt{\frac{1}{8}\left(\sqrt{41}-1\right)}\right)\right)\left(\sqrt{1+\sqrt{2}}\,\sqrt[6]{4\sqrt{2}+\sqrt{33}}\left(\sqrt{\frac{1}{8}\left(9+\sqrt{33}\right)}+\sqrt{\frac{1}{8}\left(1+\sqrt{33}\right)}\right)\right)\right)$$

Result

1.6170456893611514740626547600902401324209904177855159070994338865...

1.61704568936115…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

We have:

$$G_{213}^2 = (5\sqrt{3}+\sqrt{71})^{\frac{1}{4}}\left(\frac{59+7\sqrt{71}}{4}\right)^{\frac{1}{6}} \times\left\{\sqrt{\left(\frac{21+12\sqrt{3}}{2}\right)}+\sqrt{\left(\frac{19+12\sqrt{3}}{2}\right)}\right\},$$

$$G_{217}^2 = \left\{\sqrt{\left(\frac{9+4\sqrt{7}}{2}\right)}+\sqrt{\left(\frac{11+4\sqrt{7}}{2}\right)}\right\} \times\left\{\sqrt{\left(\frac{12+5\sqrt{7}}{4}\right)}+\sqrt{\left(\frac{16+5\sqrt{7}}{4}\right)}\right\},$$

From:

$$G_{213}^2 = (5\sqrt{3}+\sqrt{71})^{\frac{1}{4}} \left(\frac{59+7\sqrt{71}}{4}\right)^{\frac{1}{6}} \times \left\{\sqrt{\left(\frac{21+12\sqrt{3}}{2}\right)} + \sqrt{\left(\frac{19+12\sqrt{3}}{2}\right)}\right\},$$

(5sqrt3+sqrt71)^0.25 (1/4*(59+7sqrt71))^(1/6)
[(1/2*(21+12sqrt3))^0.5+(1/2(19+12sqrt3))^0.5]

Input

$$(5\sqrt{3}+\sqrt{71})^{0.25} \sqrt[6]{\frac{1}{4}(59+7\sqrt{71})} \left(\sqrt{\frac{1}{2}(21+12\sqrt{3})} + \sqrt{\frac{1}{2}(19+12\sqrt{3})}\right)$$

Result

32.274023643400838325366335166633123694416994026577802276726711006...

32.2740236434008……

and:

$$G_{217}^2 = \left\{\sqrt{\left(\frac{9+4\sqrt{7}}{2}\right)} + \sqrt{\left(\frac{11+4\sqrt{7}}{2}\right)}\right\} \times \left\{\sqrt{\left(\frac{12+5\sqrt{7}}{4}\right)} + \sqrt{\left(\frac{16+5\sqrt{7}}{4}\right)}\right\},$$

[(1/2*(9+4sqrt7))^0.5+(1/2(11+4sqrt7))^0.5]
[(1/4*(12+5sqrt7))^0.5+(1/4(16+5sqrt7))^0.5]

Input

$$\left(\sqrt{\frac{1}{2}\left(9+4\sqrt{7}\right)}+\sqrt{\frac{1}{2}\left(11+4\sqrt{7}\right)}\right)\left(\sqrt{\frac{1}{4}\left(12+5\sqrt{7}\right)}+\sqrt{\frac{1}{4}\left(16+5\sqrt{7}\right)}\right)$$

Exact result

$$\left(\sqrt{\frac{1}{2}\left(9+4\sqrt{7}\right)}+\sqrt{\frac{1}{2}\left(11+4\sqrt{7}\right)}\right)\left(\frac{1}{2}\sqrt{12+5\sqrt{7}}+\frac{1}{2}\sqrt{16+5\sqrt{7}}\right)$$

Decimal approximation

33.447733831905979584002566367597200963458822812827578041494178473 2
...

33.4477338319059….

Alternate forms

$$\frac{1}{4}\left(2+\sqrt{7}+\sqrt{9+4\sqrt{7}}\right)\left(5+\sqrt{7}+\sqrt{24+10\sqrt{7}}\right)$$

$$\frac{1}{4}\left(\sqrt{12+5\sqrt{7}}+\sqrt{16+5\sqrt{7}}\right)\left(\sqrt{18+8\sqrt{7}}+\sqrt{22+8\sqrt{7}}\right)$$

---

root of $x^8-34x^7+18x^6+16x^5+7x^4+16x^3+18x^2-34x+1$ near $x=33.4473$

$$\frac{\sqrt{31\left(8+3\sqrt{7}\right)}+\sqrt{272+103\sqrt{7}}+\sqrt{284+109\sqrt{7}}+\sqrt{316+119\sqrt{7}}}{2\sqrt{2}}$$

Minimal polynomial

$$x^8 - 34x^7 + 18x^6 + 16x^5 + 7x^4 + 16x^3 + 18x^2 - 34x + 1$$

Expanded forms

$$\frac{1}{2}\left(\sqrt{\left(\frac{9}{2}+2\sqrt{7}\right)\left(12+5\sqrt{7}\right)} + \sqrt{\left(\frac{11}{2}+2\sqrt{7}\right)\left(12+5\sqrt{7}\right)} + \sqrt{\left(\frac{9}{2}+2\sqrt{7}\right)\left(16+5\sqrt{7}\right)} + \sqrt{\left(\frac{11}{2}+2\sqrt{7}\right)\left(16+5\sqrt{7}\right)}\right)$$

$$\frac{1}{2}\sqrt{\frac{1}{2}\left(9+4\sqrt{7}\right)\left(12+5\sqrt{7}\right)} + \frac{1}{2}\sqrt{\frac{1}{2}\left(11+4\sqrt{7}\right)\left(12+5\sqrt{7}\right)} + \frac{1}{2}\sqrt{\frac{1}{2}\left(9+4\sqrt{7}\right)\left(16+5\sqrt{7}\right)} + \frac{1}{2}\sqrt{\frac{1}{2}\left(11+4\sqrt{7}\right)\left(16+5\sqrt{7}\right)}$$

Dividing the two above expression, after some easy calculations, we obtain:

(((([(1/2*(9+4sqrt7))^0.5+(1/2(11+4sqrt7))^0.5]
[(1/4*(12+5sqrt7))^0.5+(1/4(16+5sqrt7))^0.5])) / (((5sqrt3+sqrt71)^0.25
(1/4*(59+7sqrt71))^(1/6) [(1/2*(21+12sqrt3))^0.5+(1/2(19+12sqrt3))^0.5]))))^14

Input

$$\left(\left(\left(\sqrt{\frac{1}{2}\left(9+4\sqrt{7}\right)} + \sqrt{\frac{1}{2}\left(11+4\sqrt{7}\right)}\right)\left(\sqrt{\frac{1}{4}\left(12+5\sqrt{7}\right)} + \sqrt{\frac{1}{4}\left(16+5\sqrt{7}\right)}\right)\right) \Big/ \left(\left(5\sqrt{3}+\sqrt{71}\right)^{0.25}\sqrt[6]{\frac{1}{4}\left(59+7\sqrt{71}\right)}\left(\sqrt{\frac{1}{2}\left(21+12\sqrt{3}\right)} + \sqrt{\frac{1}{2}\left(19+12\sqrt{3}\right)}\right)\right)\right)^{14}$$

Result

1.6486114189252492362932869545049375152963148797542877613812872744
...

1.648611418925…. ≈ ζ(2) = $\frac{\pi^2}{6}$ = 1.644934 ... (trace of the instanton shape)

From which, after some calculations, we obtain:

((((((([(1/2(9+4√7))^0.5+(1/2(11+4√7))^0.5][(1/4(12+5√7))^0.5+(1/4(16+5√7))^0.5]))/(((5√3+√71)^0.25(1/4(59+7√71))^(1/6)[(1/2(21+12√3))^0.5+(1/2(19+12√3))^0.5])))
)^14))^15-76-2Φ

Input

$$\left(\left(\left(\left(\left(\sqrt{\frac{1}{2}\left(9+4\sqrt{7}\right)}+\sqrt{\frac{1}{2}\left(11+4\sqrt{7}\right)}\right)\left(\sqrt{\frac{1}{4}\left(12+5\sqrt{7}\right)}+\sqrt{\frac{1}{4}\left(16+5\sqrt{7}\right)}\right)\right)\Big/\left(\left(5\sqrt{3}+\sqrt{71}\right)^{0.25}\sqrt[6]{\frac{1}{4}\left(59+7\sqrt{71}\right)}\left(\sqrt{\frac{1}{2}\left(21+12\sqrt{3}\right)}+\sqrt{\frac{1}{2}\left(19+12\sqrt{3}\right)}\right)\right)\right)^{14}\right)^{15}-76-2\Phi$$

Φ is the golden ratio conjugate

Result

1729.00…

1729

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. (1728 = $8^2 * 3^3$) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

(1/27(((((((([(1/2(9+4√7))^0.5+(1/2(11+4√7))^0.5][(1/4(12+5√7))^0.5+(1/4(16+5√7))^0.5]))/(((5√3+√71)^0.25(1/4(59+7√71))^(1/6)[(1/2(21+12√3))^0.5+(1/2(19+12√3))^0.5]))))^14))^15-76-2Φ-1))^2

Input

$$\left(\frac{1}{27}\left(\left(\left(\left(\left(\left(\sqrt{\frac{1}{2}\left(9+4\sqrt{7}\right)}+\sqrt{\frac{1}{2}\left(11+4\sqrt{7}\right)}\right)\left(\sqrt{\frac{1}{4}\left(12+5\sqrt{7}\right)}+\sqrt{\frac{1}{4}\left(16+5\sqrt{7}\right)}\right)\right)\Big/\left(\left(5\sqrt{3}+\sqrt{71}\right)^{0.25}\sqrt[6]{\frac{1}{4}\left(59+7\sqrt{71}\right)}\left(\sqrt{\frac{1}{2}\left(21+12\sqrt{3}\right)}+\sqrt{\frac{1}{2}\left(19+12\sqrt{3}\right)}\right)\right)\right)^{14}\right)^{15}-76-2\Phi-1\right)\right)^2$$

Φ is the golden ratio conjugate

Result

4096.00…

4096 = 64^2

Now, we have:

$$G_{225} = \left(\frac{1+\sqrt{5}}{4}\right)(2+\sqrt{3})^{\frac{1}{3}}\{\sqrt{(4+\sqrt{15})}+15^{\frac{1}{4}}\},$$

$$g_{238} = \left\{\sqrt{\left(\frac{1+2\sqrt{2}}{4}\right)}+\sqrt{\left(\frac{5+2\sqrt{2}}{4}\right)}\right\} \times \left\{\sqrt{\left(\frac{1+3\sqrt{2}}{4}\right)}+\sqrt{\left(\frac{5+3\sqrt{2}}{4}\right)}\right\},$$

From:

$$G_{225} = \left(\frac{1+\sqrt{5}}{4}\right)(2+\sqrt{3})^{\frac{1}{3}}\{\sqrt{(4+\sqrt{15})}+15^{\frac{1}{4}}\},$$

(1/4(1+sqrt5)) (2+sqrt3)^(1/3) [(4+sqrt15)^0.5+15^0.25]

Input

$$\left(\frac{1}{4}\left(1+\sqrt{5}\right)\right)\sqrt[3]{2+\sqrt{3}}\left(\sqrt{4+\sqrt{15}}+15^{0.25}\right)$$

Result

5.990702076486704970665210581660058297381636304353727645156112025 4...

5.990702076….

and:

$$g_{238} = \left\{\sqrt{\left(\frac{1+2\sqrt{2}}{4}\right)}+\sqrt{\left(\frac{5+2\sqrt{2}}{4}\right)}\right\} \times \left\{\sqrt{\left(\frac{1+3\sqrt{2}}{4}\right)}+\sqrt{\left(\frac{5+3\sqrt{2}}{4}\right)}\right\},$$

[(1/4*(1+2sqrt2))^0.5+(1/4(5+2sqrt2))^0.5]
[(1/4*(1+3sqrt2))^0.5+(1/4(5+3sqrt2))^0.5]

Input

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

Exact result

$$\left(\frac{1}{2}\sqrt{1+2\sqrt{2}}+\frac{1}{2}\sqrt{5+2\sqrt{2}}\right)\left(\frac{1}{2}\sqrt{1+3\sqrt{2}}+\frac{1}{2}\sqrt{5+3\sqrt{2}}\right)$$

Decimal approximation

6.3352883328635442071542858654823131521497473581500473659495217862
...

6.335288332….

Alternate forms

$$\frac{1}{2}\sqrt{\left(3+2\sqrt{2}+\sqrt{13+12\sqrt{2}}\right)\left(3+3\sqrt{2}+\sqrt{23+18\sqrt{2}}\right)}$$

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

$$\sqrt{\left(\text{root of } x^8-42x^7+75x^6-6x^5-52x^4-6x^3+75x^2-42x+1 \text{ near } x=40.1359\right)}$$

$$\frac{1}{4}\left(\sqrt{17\left(1+\sqrt{2}\right)}+\sqrt{13+5\sqrt{2}}+\sqrt{17+13\sqrt{2}}+\sqrt{37+25\sqrt{2}}\right)$$

Minimal polynomial

$$x^{16}-42x^{14}+75x^{12}-6x^{10}-52x^8-6x^6+75x^4-42x^2+1$$

Expanded forms

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

$$\frac{1}{4}\sqrt{(1+2\sqrt{2})(1+3\sqrt{2})}+\frac{1}{4}\sqrt{(5+2\sqrt{2})(1+3\sqrt{2})}+\frac{1}{4}\sqrt{(1+2\sqrt{2})(5+3\sqrt{2})}+\frac{1}{4}\sqrt{(5+2\sqrt{2})(5+3\sqrt{2})}$$

From which:

(((((([(1/4*(1+2sqrt2))^0.5+(1/4(5+2sqrt2))^0.5] [(1/4*(1+3sqrt2))^0.5+(1/4(5+3sqrt2))^0.5]))) / (((1/4(1+sqrt5)) (2+sqrt3)^(1/3) [(4+sqrt15)^0.5+15^0.25]))))^9

Input

$$\left(\frac{\left(\sqrt{\frac{1}{4}(1+2\sqrt{2})}+\sqrt{\frac{1}{4}(5+2\sqrt{2})}\right)\left(\sqrt{\frac{1}{4}(1+3\sqrt{2})}+\sqrt{\frac{1}{4}(5+3\sqrt{2})}\right)}{\left(\frac{1}{4}(1+\sqrt{5})\right)\sqrt[3]{2+\sqrt{3}}\left(\sqrt{4+\sqrt{15}}+15^{0.25}\right)}\right)^9$$

Result

1.654237905691881423397613048085452029551034094182775888400866 2695...

1.654237905…. result very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Or also:

(((3(((((((((([(1/4*(1+2sqrt2))^0.5+(1/4(5+2sqrt2))^0.5] [(1/4*(1+3sqrt2))^0.5+(1/4(5+3sqrt2))^0.5]))) - (((1/4(1+sqrt5)) (2+sqrt3)^(1/3) [(4+sqrt15)^0.5+15^0.25]))))))))))^15

Input

$$\left(3\left(\left(\sqrt{\frac{1}{4}\left(1+2\sqrt{2}\right)}+\sqrt{\frac{1}{4}\left(5+2\sqrt{2}\right)}\right)\left(\sqrt{\frac{1}{4}\left(1+3\sqrt{2}\right)}+\sqrt{\frac{1}{4}\left(5+3\sqrt{2}\right)}\right)-\left(\frac{1}{4}\left(1+\sqrt{5}\right)\right)\sqrt[3]{2+\sqrt{3}}\left(\sqrt{4+\sqrt{15}}+15^{0.25}\right)\right)\right)^{15}$$

Result

1.6454629156496941698628610535627310586882551687820509161641974172
…

1.645462915…. $\approx \zeta(2) = \frac{\pi^2}{6} = 1.644934$ ... (trace of the instanton shape)

We obtain also:

((((3(((((((((([(1/4*(1+2sqrt2))^0.5+(1/4(5+2sqrt2))^0.5]
[(1/4*(1+3sqrt2))^0.5+(1/4(5+3sqrt2))^0.5]))) - (((1/4(1+sqrt5)) (2+sqrt3)^(1/3)
[(4+sqrt15)^0.5+15^0.25]))))))))))^15)^15-26

Input

$$\left(\left(3\left(\left(\sqrt{\frac{1}{4}\left(1+2\sqrt{2}\right)}+\sqrt{\frac{1}{4}\left(5+2\sqrt{2}\right)}\right)\left(\sqrt{\frac{1}{4}\left(1+3\sqrt{2}\right)}+\sqrt{\frac{1}{4}\left(5+3\sqrt{2}\right)}\right)-\left(\frac{1}{4}\left(1+\sqrt{5}\right)\right)\sqrt[3]{2+\sqrt{3}}\left(\sqrt{4+\sqrt{15}}+15^{0.25}\right)\right)\right)^{15}\right)^{15}-26$$

Result

1729.18…

1729.18…..

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. (1728 = $8^2 * 3^3$) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

(1/27(((((3(((((((((([(1/4*(1+2sqrt2))^0.5+(1/4(5+2sqrt2))^0.5]
[(1/4*(1+3sqrt2))^0.5+(1/4(5+3sqrt2))^0.5]))) - (((1/4(1+sqrt5)) (2+sqrt3)^(1/3)
[(4+sqrt15)^0.5+15^0.25])))))))))))^15)^15-27))^2-φ/2

Input

$$\left(\frac{1}{27}\left(\left(\left(\left(3\left(\left(\sqrt{\frac{1}{4}\left(1+2\sqrt{2}\right)}+\sqrt{\frac{1}{4}\left(5+2\sqrt{2}\right)}\right)\left(\sqrt{\frac{1}{4}\left(1+3\sqrt{2}\right)}+\sqrt{\frac{1}{4}\left(5+3\sqrt{2}\right)}\right)-\left(\frac{1}{4}\left(1+\sqrt{5}\right)\right)\sqrt[3]{2+\sqrt{3}}\left(\sqrt{4+\sqrt{15}}+15^{0.25}\right)\right)\right)\right)^{15}\right)^{15}-27\right)\right)^{2}-\frac{\phi}{2}$$

ϕ is the golden ratio

Result

4096.04…

4096.04…. ≈ 4096 = 64^2

Series representations

$$\left(\frac{1}{27}\left(\left(\left(3\left(\left(\sqrt{\frac{1}{4}\left(1+2\sqrt{2}\right)}+\sqrt{\frac{1}{4}\left(5+2\sqrt{2}\right)}\right)\left(\sqrt{\frac{1}{4}\left(1+3\sqrt{2}\right)}+\sqrt{\frac{1}{4}\left(5+3\sqrt{2}\right)}\right)-\frac{1}{4}\left(1+\sqrt{5}\right)\sqrt[3]{2+\sqrt{3}}\left(\sqrt{4+\sqrt{15}}+15^{0.25}\right)\right)\right)^{15}\right)^{15}-27\right)\right)^2-\frac{\phi}{2}=-\frac{\phi}{2}+\frac{1}{729}\Bigg(-27+$$

$$225\,051\,707\,283\,248\,404\,043\,264\,398\,919\,956\,893\,908\,530\,667\,320\,312\,401\,148\,007\,480\,414\,880\,605\,588\,527\,456\,387\,252\,533\,530\,387\,658\,761\,101\,443$$

$$\left(\left(\left(\frac{1}{2}\sqrt{1+2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}+\frac{1}{2}\sqrt{5+2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}\right)\left(\frac{1}{2}\sqrt{1+3\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}+\frac{1}{2}\sqrt{5+3\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}\right)-\frac{1}{4}\sqrt[3]{2+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\left(1.96799+\sqrt{4+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(15-z_0)^k z_0^{-k}}{k!}}\right)\right)^{225}\right)^2$$

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

$$\left(\frac{1}{27}\left(\left(\left(3\left(\left(\sqrt{\frac{1}{4}\left(1+2\sqrt{2}\right)}+\sqrt{\frac{1}{4}\left(5+2\sqrt{2}\right)}\right)\left(\sqrt{\frac{1}{4}\left(1+3\sqrt{2}\right)}+\sqrt{\frac{1}{4}\left(5+3\sqrt{2}\right)}\right)-\frac{1}{4}\left(1+\sqrt{5}\right)\sqrt[3]{2+\sqrt{3}}\left(\sqrt{4+\sqrt{15}}+15^{0.25}\right)\right)\right)^{15}\right)^{15}-27\right)\right)^2-\frac{\phi}{2}=-\frac{\phi}{2}+\frac{1}{729}\Bigg(-27+$$

$$225\,051\,707\,283\,248\,404\,043\,264\,398\,919\,956\,893\,908\,530\,667\,320\,312\,401\,148\,007\,480\,414\,880\,605\,588\,527\,456\,387\,252\,533\,530\,387\,658\,761\,101\,443$$

$$\left(\left(\left(\frac{1}{2}\sqrt{\left(1+2\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)}+\frac{1}{2}\sqrt{\left(5+2\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)}\right)\right.\right.$$

$$\left(\frac{1}{2}\sqrt{\left(1+3\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)}+\frac{1}{2}\sqrt{\left(5+3\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)}\right)-$$

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

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

$$\left.\left.\left(1.96799+\sqrt{\left(4+\exp\left(i\pi\left\lfloor\frac{\arg(15-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(15-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)}\right)\right)^{225}\right)^2$$

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

$$\left(\frac{1}{27}\left(\left(\left(3\left(\left(\sqrt{\frac{1}{4}\left(1+2\sqrt{2}\right)}+\sqrt{\frac{1}{4}\left(5+2\sqrt{2}\right)}\right)\left(\sqrt{\frac{1}{4}\left(1+3\sqrt{2}\right)}+\sqrt{\frac{1}{4}\left(5+3\sqrt{2}\right)}\right)-\frac{1}{4}\left(1+\sqrt{5}\right)\sqrt[3]{2+\sqrt{3}}\left(\sqrt{4+\sqrt{15}}+15^{0.25}\right)\right)\right)^{15}\right)^{15}-27\right)\right)^2-\frac{\phi}{2}=-\frac{\phi}{2}+\frac{1}{729}\left(-27+\right.$$

$$225\,051\,707\,283\,248\,404\,043\,264\,398\,919\,956\,893\,908\,530\,667\,320\,312\,401\,148\,007\,480\,414\,880\,605\,588\,527\,456\,387\,252\,533\,530\,387\,658\,761\,101\,443$$

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

$$\left(\frac{1}{2}\sqrt{\left(1+3\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}z_0^{1/2(1+\lfloor\arg(2-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)}+\frac{1}{2}\sqrt{\left(5+3\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}z_0^{1/2(1+\lfloor\arg(2-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)}\right)-$$

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

$$\left(1+\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(5-z_0)/(2\pi)\rfloor}z_0^{1/2(1+\lfloor\arg(5-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\left(1.96799+\right.$$

$$\left.\left.\left.\sqrt{\left(4+\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(15-z_0)/(2\pi)\rfloor}z_0^{1/2(1+\lfloor\arg(15-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(15-z_0)^k z_0^{-k}}{k!}\right)}\right)\right)\right)^{225}\right)^2$$

We have:

$$G_{265}^2 = \sqrt{\left\{(2+\sqrt{5})\left(\frac{7+\sqrt{53}}{2}\right)\right\}}\left\{\sqrt{\left(\frac{89+5\sqrt{265}}{8}\right)}+\sqrt{\left(\frac{81+5\sqrt{265}}{8}\right)}\right\},$$

$$G_{289} = \left[\sqrt{\left\{\frac{17+\sqrt{17}+17^{\frac{1}{4}}(5+\sqrt{17})}{16}\right\}}+\sqrt{\left\{\frac{1+\sqrt{17}+17^{\frac{1}{4}}(5+\sqrt{17})}{16}\right\}}\right]^2,$$

From:

$$G_{265}^2 = \sqrt{\left\{(2+\sqrt{5})\left(\frac{7+\sqrt{53}}{2}\right)\right\}}\left\{\sqrt{\left(\frac{89+5\sqrt{265}}{8}\right)}+\sqrt{\left(\frac{81+5\sqrt{265}}{8}\right)}\right\},$$

[((((2+sqrt5))(1/2(7+sqrt53))))^0.5]
[(1/8*(89+5sqrt265))^0.5+(1/8(81+5sqrt265))^0.5]

Input

$$\sqrt{(2+\sqrt{5})\left(\frac{1}{2}(7+\sqrt{53})\right)}\left(\sqrt{\frac{1}{8}(89+5\sqrt{265})}+\sqrt{\frac{1}{8}(81+5\sqrt{265})}\right)$$

Exact result

$$\sqrt{\frac{1}{2}(2+\sqrt{5})(7+\sqrt{53})}\left(\frac{1}{2}\sqrt{\frac{1}{2}(81+5\sqrt{265})}+\frac{1}{2}\sqrt{\frac{1}{2}(89+5\sqrt{265})}\right)$$

Decimal approximation

50.159687983020382568666854827034993177912872451993729147673175206 6...

50.159687983….

Alternate forms

$$\frac{1}{4}\sqrt{\frac{1}{2}\left(2+\sqrt{5}\right)\left(7+\sqrt{53}\right)}\,\left(5\sqrt{5}+\sqrt{53}+\sqrt{81-8\,i}+\sqrt{81+8\,i}\right)$$

$$\frac{1}{4}\sqrt{\left(2+\sqrt{5}\right)\left(7+\sqrt{53}\right)}\,\left(\sqrt{81+5\sqrt{265}}+\sqrt{89+5\sqrt{265}}\right)$$

---

root of $x^8-47x^7-153x^6-268x^5-362x^4-268x^3-153x^2-47x+1$ near $x=50.1597$

Minimal polynomial

$$x^8-47x^7-153x^6-268x^5-362x^4-268x^3-153x^2-47x+1$$

Expanded forms

$$\frac{1}{4}\sqrt{\left(2+\sqrt{5}\right)\left(7+\sqrt{53}\right)\left(81+5\sqrt{265}\right)}+\frac{1}{4}\sqrt{\left(2+\sqrt{5}\right)\left(7+\sqrt{53}\right)\left(89+5\sqrt{265}\right)}$$

$$\frac{1}{2}\left(\sqrt{\frac{2459}{4}+\frac{1097\sqrt{5}}{4}+\frac{337\sqrt{53}}{4}+\frac{151\sqrt{265}}{4}}+\sqrt{\frac{2571}{4}+\frac{1153\sqrt{5}}{4}+\frac{353\sqrt{53}}{4}+\frac{159\sqrt{265}}{4}}\right)$$

and:

$$G_{289} = \left[\sqrt{\left\{\frac{17+\sqrt{17}+17^{\frac{1}{4}}(5+\sqrt{17})}{16}\right\}} + \sqrt{\left\{\frac{1+\sqrt{17}+17^{\frac{1}{4}}(5+\sqrt{17})}{16}\right\}}\right]^2,$$

[(1/16(17+sqrt17+17^(1/4)(5+sqrt17)))^0.5+(1/16(1+sqrt17+17^(1/4)(5+sqrt17)))^0.5]^2

Input

$$\left(\sqrt{\frac{1}{16}\left(17+\sqrt{17}+\sqrt[4]{17}\left(5+\sqrt{17}\right)\right)} + \sqrt{\frac{1}{16}\left(1+\sqrt{17}+\sqrt[4]{17}\left(5+\sqrt{17}\right)\right)}\right)^2$$

Exact result

$$\left(\frac{1}{4}\sqrt{1+\sqrt{17}+\sqrt[4]{17}\left(5+\sqrt{17}\right)} + \frac{1}{4}\sqrt{17+\sqrt{17}+\sqrt[4]{17}\left(5+\sqrt{17}\right)}\right)^2$$

Decimal approximation

7.7835147315253990681077446230553615847817956976413614423585213085

...

7.78351473….

Alternate forms

$$\frac{1}{16}\left(\sqrt{1+5\sqrt[4]{17}+\sqrt{17}+17^{3/4}} + \sqrt{17+5\sqrt[4]{17}+\sqrt{17}+17^{3/4}}\right)^2$$

$$\frac{1}{16}\left(\sqrt{1+\sqrt{17}+\sqrt[4]{17}\left(5+\sqrt{17}\right)} + \sqrt{17+\sqrt{17}+\sqrt[4]{17}\left(5+\sqrt{17}\right)}\right)^2$$

$$\text{root of } x^8 - 9x^7 + 11x^6 - 12x^5 + 2x^4 - 12x^3 + 11x^2 - 9x + 1 \text{ near } x = 7.78351$$

Minimal polynomial

$$x^8 - 9x^7 + 11x^6 - 12x^5 + 2x^4 - 12x^3 + 11x^2 - 9x + 1$$

Expanded form

$$\frac{9}{8} + \frac{5\sqrt[4]{17}}{8} + \frac{\sqrt{17}}{8} + \frac{17^{3/4}}{8} + \frac{1}{8}\sqrt{\left(1+\sqrt{17}+\sqrt[4]{17}\,(5+\sqrt{17})\right)\left(17+\sqrt{17}+\sqrt[4]{17}\,(5+\sqrt{17})\right)}$$

Dividing the two expressions, after some calculations, we obtain:

1/4((([((((2+sqrt5))(1/2(7+sqrt53))))^0.5]
[(1/8*(89+5sqrt265))^0.5+(1/8(81+5sqrt265))^0.5])))/((([(1/16(17+sqrt17+17^(1/4)(
5+sqrt17)))^0.5+(1/16(1+sqrt17+17^(1/4)(5+sqrt17)))^0.5]^2)))

Input

$$\frac{1}{4} \times \frac{\sqrt{(2+\sqrt{5})\left(\frac{1}{2}(7+\sqrt{53})\right)}\left(\sqrt{\frac{1}{8}\left(89+5\sqrt{265}\right)} + \sqrt{\frac{1}{8}\left(81+5\sqrt{265}\right)}\right)}{\left(\sqrt{\frac{1}{16}\left(17+\sqrt{17}+\sqrt[4]{17}\,(5+\sqrt{17})\right)} + \sqrt{\frac{1}{16}\left(1+\sqrt{17}+\sqrt[4]{17}\,(5+\sqrt{17})\right)}\right)^2}$$

Exact result

$$\frac{\sqrt{\frac{1}{2}(2+\sqrt{5})(7+\sqrt{53})}\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(81+5\sqrt{265}\right)} + \frac{1}{2}\sqrt{\frac{1}{2}\left(89+5\sqrt{265}\right)}\right)}{4\left(\frac{1}{4}\sqrt{1+\sqrt{17}+\sqrt[4]{17}\,(5+\sqrt{17})} + \frac{1}{4}\sqrt{17+\sqrt{17}+\sqrt[4]{17}\,(5+\sqrt{17})}\right)^2}$$

Decimal approximation

1.6110873337163382646641491876274149528948393234064137086327227638
...

1.611087333716…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Alternate forms

$$\frac{\sqrt{(2+\sqrt{5})(7+\sqrt{53})}\left(\sqrt{81+5\sqrt{265}}+\sqrt{89+5\sqrt{265}}\right)}{\left(\sqrt{1+5\sqrt[4]{17}+\sqrt{17}+17^{3/4}}+\sqrt{17+5\sqrt[4]{17}+\sqrt{17}+17^{3/4}}\right)^2}$$

$$\left(\sqrt{\frac{1}{2}(2+\sqrt{5})(7+\sqrt{53})}\left(\text{root of } x^4-162x^2+6625 \text{ near } x=9.01094-0.443905\,i+\text{root of } x^4-162x^2+6625 \text{ near } x=9.01094+0.443905\,i+5\sqrt{5}+\sqrt{53}\right)\right)\Big/\left(\text{root of } x^8-68x^6+1360x^4-9792x^2+17408 \text{ near } x=6.29666+\text{root of } x^8-4x^6-368x^4-2112x^2-4096 \text{ near } x=4.86292\right)^2$$

$$\frac{\sqrt{(2+\sqrt{5})(7+\sqrt{53})(81+5\sqrt{265})}}{\left(\sqrt{1+5\sqrt[4]{17}+\sqrt{17}+17^{3/4}}+\sqrt{17+5\sqrt[4]{17}+\sqrt{17}+17^{3/4}}\right)^2}+\frac{\sqrt{(2+\sqrt{5})(7+\sqrt{53})(89+5\sqrt{265})}}{\left(\sqrt{1+5\sqrt[4]{17}+\sqrt{17}+17^{3/4}}+\sqrt{17+5\sqrt[4]{17}+\sqrt{17}+17^{3/4}}\right)^2}$$

$$\left(\sqrt{2459+1097\sqrt{5}+337\sqrt{53}+151\sqrt{265}}+\sqrt{2571+1153\sqrt{5}+353\sqrt{53}+159\sqrt{265}}\right)\Big/\left(\sqrt{1+5\sqrt[4]{17}+\sqrt{17}+17^{3/4}}+\sqrt{17+5\sqrt[4]{17}+\sqrt{17}+17^{3/4}}\right)^2$$

Expanded form

$$\frac{\sqrt{(2+\sqrt{5})(7+\sqrt{53})\left(81+5\sqrt{265}\right)}}{16\left(\frac{1}{4}\sqrt{1+\sqrt{17}+\sqrt[4]{17}\,(5+\sqrt{17})}+\frac{1}{4}\sqrt{17+\sqrt{17}+\sqrt[4]{17}\,(5+\sqrt{17})}\right)^2}+\frac{\sqrt{(2+\sqrt{5})(7+\sqrt{53})\left(89+5\sqrt{265}\right)}}{16\left(\frac{1}{4}\sqrt{1+\sqrt{17}+\sqrt[4]{17}\,(5+\sqrt{17})}+\frac{1}{4}\sqrt{17+\sqrt{17}+\sqrt[4]{17}\,(5+\sqrt{17})}\right)^2}$$

We have:

$$G_{301}^2 = \left\{(8+3\sqrt{7})\left(\frac{23\sqrt{43}+57\sqrt{7}}{2}\right)\right\}^{\frac{1}{4}} \times\left\{\sqrt{\left(\frac{46+7\sqrt{43}}{4}\right)}+\sqrt{\left(\frac{42+7\sqrt{43}}{4}\right)}\right\}$$

$$g_{310} = \left(\frac{1+\sqrt{5}}{2}\right)\sqrt{(1+\sqrt{2})}\left\{\sqrt{\left(\frac{7+2\sqrt{10}}{4}\right)}+\sqrt{\left(\frac{3+2\sqrt{10}}{4}\right)}\right\},$$

From:

$$G_{301}^2 = \left\{(8+3\sqrt{7})\left(\frac{23\sqrt{43}+57\sqrt{7}}{2}\right)\right\}^{\frac{1}{4}}$$
$$\times\left\{\sqrt{\left(\frac{46+7\sqrt{43}}{4}\right)}+\sqrt{\left(\frac{42+7\sqrt{43}}{4}\right)}\right\},$$

[((8+3sqrt7))(1/2(23sqrt43+57sqrt7))]^0.25 [(1/4*(46+7sqrt43))^0.5+(1/4(42+7sqrt43))^0.5]

Input

$$\left((8+3\sqrt{7})\left(\frac{1}{2}\left(23\sqrt{43}+57\sqrt{7}\right)\right)\right)^{0.25}\left(\sqrt{\frac{1}{4}\left(46+7\sqrt{43}\right)}+\sqrt{\frac{1}{4}\left(42+7\sqrt{43}\right)}\right)$$

Result

66.38532547775184475959635541624699410464061976879850453579489376 1...

66.3853254777….

and:

$$g_{310} = \left(\frac{1+\sqrt{5}}{2}\right)\sqrt{(1+\sqrt{2})}\left\{\sqrt{\left(\frac{7+2\sqrt{10}}{4}\right)}+\sqrt{\left(\frac{3+2\sqrt{10}}{4}\right)}\right\},$$

(1/2*(1+sqrt5)) (1+sqrt2)^0.5 [(1/4*(7+2sqrt10))^0.5+(1/4(3+2sqrt10))^0.5]

Input

$$\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)\sqrt{1+\sqrt{2}}\left(\sqrt{\frac{1}{4}\left(7+2\sqrt{10}\right)}+\sqrt{\frac{1}{4}\left(3+2\sqrt{10}\right)}\right)$$

Exact result

$$\frac{1}{2}\sqrt{1+\sqrt{2}}\,\left(1+\sqrt{5}\right)\left(\frac{1}{2}\sqrt{3+2\sqrt{10}}+\frac{1}{2}\sqrt{7+2\sqrt{10}}\right)$$

Decimal approximation

8.426994150036207565797584019482413033314505526338499017496228058 2

…

8.42699415….

Alternate forms

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

$$\frac{1}{8}\left(\sqrt{2-2i}+\sqrt{2+2i}\right)\left(1+\sqrt{5}\right)\left(\sqrt{3+2\sqrt{10}}+\sqrt{7+2\sqrt{10}}\right)$$

$$\sqrt{\left(\text{root of } x^8-70x^7-73x^6+70x^5-52x^4-70x^3-73x^2+70x+1 \text{ near } x=71.0142\right)}$$

Minimal polynomial

$$x^{16}-70x^{14}-73x^{12}+70x^{10}-52x^8-70x^6-73x^4+70x^2+1$$

Expanded forms

$$\frac{1}{4}\sqrt{\left(1+\sqrt{2}\right)\left(3+2\sqrt{10}\right)}+\frac{1}{4}\sqrt{5\left(1+\sqrt{2}\right)\left(3+2\sqrt{10}\right)}+\frac{1}{4}\sqrt{\left(1+\sqrt{2}\right)\left(7+2\sqrt{10}\right)}+\frac{1}{4}\sqrt{5\left(1+\sqrt{2}\right)\left(7+2\sqrt{10}\right)}$$

$$\frac{1}{4}\left(\sqrt{3+3\sqrt{2}+4\sqrt{5}+2\sqrt{10}}+\sqrt{7+7\sqrt{2}+4\sqrt{5}+2\sqrt{10}}+\sqrt{15+15\sqrt{2}+20\sqrt{5}+10\sqrt{10}}+\sqrt{35+35\sqrt{2}+20\sqrt{5}+10\sqrt{10}}\right)$$

From the two above expression, after some calculations, we obtain:

(2*48) / (((((((([((8+3sqrt7))(1/2(23sqrt43+57sqrt7))]))))^0.25 [(1/4*(46+7sqrt43))^0.5+(1/4(42+7sqrt43))^0.5])) - (((1/2*(1+sqrt5)) (1+sqrt2)^0.5 [(1/4*(7+2sqrt10))^0.5+(1/4(3+2sqrt10))^0.5]))))

Input

$$(2\times 48)\Big/\left(\left(\left(8+3\sqrt{7}\right)\left(\frac{1}{2}\left(23\sqrt{43}+57\sqrt{7}\right)\right)\right)^{0.25}\left(\sqrt{\frac{1}{4}\left(46+7\sqrt{43}\right)}+\sqrt{\frac{1}{4}\left(42+7\sqrt{43}\right)}\right)-\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)\sqrt{1+\sqrt{2}}\left(\sqrt{\frac{1}{4}\left(7+2\sqrt{10}\right)}+\sqrt{\frac{1}{4}\left(3+2\sqrt{10}\right)}\right)\right)$$

Result

1.6563623865770762974360354869724932555996902085765333907820185402

...

1.656362386577…. result very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3$ = 1164.2696 i.e. 1.65578...

Or also:

11^2 / (((((((([((8+3sqrt7))(1/2(23sqrt43+57sqrt7))]))))^0.25 [(1/4*(46+7sqrt43))^0.5+(1/4(42+7sqrt43))^0.5])) + (((1/2*(1+sqrt5)) (1+sqrt2)^0.5 [(1/4*(7+2sqrt10))^0.5+(1/4(3+2sqrt10))^0.5]))))

Input

$$11^2 \Big/ \left(\left(\left(8 + 3\sqrt{7}\right) \left(\frac{1}{2}\left(23\sqrt{43} + 57\sqrt{7}\right)\right)\right)^{0.25} \left(\sqrt{\frac{1}{4}\left(46 + 7\sqrt{43}\right)} + \sqrt{\frac{1}{4}\left(42 + 7\sqrt{43}\right)}\right) + \left(\frac{1}{2}\left(1 + \sqrt{5}\right)\right)\sqrt{1 + \sqrt{2}} \left(\sqrt{\frac{1}{4}\left(7 + 2\sqrt{10}\right)} + \sqrt{\frac{1}{4}\left(3 + 2\sqrt{10}\right)}\right)\right)$$

Result

1.6173806747606331561957152438717956189094732754730469370388638980
...

1.61738067476…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

We have:

$$G_{333} = \frac{1}{2}(6+\sqrt{37})^{\frac{1}{4}}(7\sqrt{3}+2\sqrt{37})^{\frac{1}{6}}\{\sqrt{(7+2\sqrt{3})}+\sqrt{(3+2\sqrt{3})}\},$$

1/2(6+sqrt37)^0.25 (7sqrt3+2sqrt37)^(1/6) [(7+2sqrt3)^0.5+(3+2sqrt3)^0.5]

Input

$$\left(\frac{1}{2}\left(6 + \sqrt{37}\right)^{0.25}\right) \sqrt[6]{7\sqrt{3} + 2\sqrt{37}} \left(\sqrt{7 + 2\sqrt{3}} + \sqrt{3 + 2\sqrt{3}}\right)$$

Result

9.1651519881933109158432796709185493122029784122313483581527017164
...

9.165151988….

From which:

89 1/(6((1/2(6+sqrt37)^0.25 (7sqrt3+2sqrt37)^(1/6) [(7+2sqrt3)^0.5+(3+2sqrt3)^0.5])))

Input

$$89\times\frac{1}{6\left(\left(\frac{1}{2}\left(6+\sqrt{37}\right)^{0.25}\right)\sqrt[6]{7\sqrt{3}+2\sqrt{37}}\left(\sqrt{7+2\sqrt{3}}+\sqrt{3+2\sqrt{3}}\right)\right)}$$

Result

1.6184492469346782672429942886734947331771367899887667207021347574
...

1.6184492469…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

We have:

$$G_{441}^2 = \left(\frac{\sqrt{3}+\sqrt{7}}{2}\right)(2+\sqrt{3})^{\frac{1}{3}}\left\{\frac{2+\sqrt{7}+\sqrt{(7+4\sqrt{7})}}{2}\right\}\left\{\frac{\sqrt{(3+\sqrt{7})+(6\sqrt{7})^{\frac{1}{4}}}}{\sqrt{(3+\sqrt{7})-(6\sqrt{7})^{\frac{1}{4}}}}\right\},$$

$$G_{445} = \sqrt{(2+\sqrt{5})}\left(\frac{21+\sqrt{445}}{2}\right)^{\frac{1}{4}}\sqrt{\left\{\left(\frac{13+\sqrt{89}}{8}\right)+\sqrt{\left(\frac{5+\sqrt{89}}{8}\right)}\right\}},$$

$$G_{465}^2 = \sqrt{\left\{(2+\sqrt{3})\left(\frac{1+\sqrt{5}}{2}\right)\left(\frac{3\sqrt{3}+\sqrt{31}}{2}\right)\right\}}(5\sqrt{5}+2\sqrt{31})^{\frac{1}{6}}$$
$$\times\left\{\sqrt{\left(\frac{2+\sqrt{31}}{4}\right)}+\sqrt{\left(\frac{6+\sqrt{31}}{4}\right)}\right\}$$
$$\times\left\{\sqrt{\left(\frac{11+2\sqrt{31}}{2}\right)}+\sqrt{\left(\frac{13+2\sqrt{31}}{2}\right)}\right\},$$

From:

$$G_{441}^2 = \left(\frac{\sqrt{3}+\sqrt{7}}{2}\right)(2+\sqrt{3})^{\frac{1}{3}}\left\{\frac{2+\sqrt{7}+\sqrt{(7+4\sqrt{7})}}{2}\right\}\left\{\frac{\sqrt{(3+\sqrt{7})+(6\sqrt{7})^{\frac{1}{4}}}}{\sqrt{(3+\sqrt{7})-(6\sqrt{7})^{\frac{1}{4}}}}\right\},$$

(1/2*(sqrt3+sqrt7)) (2+sqrt3)^(1/3) (1/2*(2+sqrt7+(7+4sqrt7)^0.5)) (((((3+sqrt7)^0.5+(6sqrt7)^0.25))) / (((((3+sqrt7)^0.5-(6sqrt7)^0.25)))

Input

$$\left(\frac{1}{2}\left(\sqrt{3}+\sqrt{7}\right)\right)\sqrt[3]{2+\sqrt{3}}\left(\frac{1}{2}\left(2+\sqrt{7}+\sqrt{7+4\sqrt{7}}\right)\right)\times\frac{\sqrt{3+\sqrt{7}}+\left(6\sqrt{7}\right)^{0.25}}{\sqrt{3+\sqrt{7}}-\left(6\sqrt{7}\right)^{0.25}}$$

Result

172.64087217816086422023342429510817879521053958626306652342422349...

172.640872178….

and:

$$G_{445} = \sqrt{(2+\sqrt{5})}\left(\frac{21+\sqrt{445}}{2}\right)^{\frac{1}{4}}\sqrt{\left\{\left(\frac{13+\sqrt{89}}{8}\right)+\sqrt{\left(\frac{5+\sqrt{89}}{8}\right)}\right\}},$$

((2+sqrt5)^0.5) (1/2*(21+sqrt445))^0.25 sqrt[(1/8*(13+sqrt89))+(1/8(5+sqrt89))^0.5]

Input

$$\sqrt{2+\sqrt{5}}\left(\frac{1}{2}\left(21+\sqrt{445}\right)\right)^{0.25}\sqrt{\frac{1}{8}\left(13+\sqrt{89}\right)+\sqrt{\frac{1}{8}\left(5+\sqrt{89}\right)}}$$

Result

8.9778697879055384610148011807619713532466986199556182457746044826...

8.9778697879…..

From the ratio between the above two expressions, after some calculations, we obtain:

((8.9778697879 ((1/2*(sqrt3+sqrt7)) (2+sqrt3)^(1/3) (1/2*(2+sqrt7+(7+4sqrt7)^0.5)) (((((3+sqrt7)^0.5+(6sqrt7)^0.25)))) / (((((3+sqrt7)^0.5-(6sqrt7)^0.25)))))))^1/15

Input interpretation

$$\left(8.9778697879\left(\left(\frac{1}{2}\left(\sqrt{3}+\sqrt{7}\right)\right)\sqrt[3]{2+\sqrt{3}}\left(\frac{1}{2}\left(2+\sqrt{7}+\sqrt{7+4\sqrt{7}}\right)\right)\times\frac{\sqrt{3+\sqrt{7}}+\left(6\sqrt{7}\right)^{0.25}}{\sqrt{3+\sqrt{7}}-\left(6\sqrt{7}\right)^{0.25}}\right)\right)\text{^}(1/15)$$

Result

1.631878403357611678929064357295031129707526773063151006899593935 2

...

1.6318784033…. result very near to the mean between $\zeta(2) = \frac{\pi^2}{6} = 1.644934$ ... and the value of golden ratio 1.61803398…, i.e. 1.63148399

From:

$$G_{465}^2 = \sqrt{\left\{(2+\sqrt{3})\left(\frac{1+\sqrt{5}}{2}\right)\left(\frac{3\sqrt{3}+\sqrt{31}}{2}\right)\right\}(5\sqrt{5}+2\sqrt{31})^{\frac{1}{6}}}$$
$$\times\left\{\sqrt{\left(\frac{2+\sqrt{31}}{4}\right)}+\sqrt{\left(\frac{6+\sqrt{31}}{4}\right)}\right\}$$
$$\times\left\{\sqrt{\left(\frac{11+2\sqrt{31}}{2}\right)}+\sqrt{\left(\frac{13+2\sqrt{31}}{2}\right)}\right\},$$

((((2+sqrt3)(1/2*(1+sqrt5))(1/2*(3sqrt3+sqrt31))))^0.5 (5sqrt5+2sqrt31)^(1/6)
[(1/4*(2+sqrt31))^0.5+(1/4(6+sqrt31))^0.5]
[(1/2*(11+2sqrt31))^0.5+(1/2(13+2sqrt31))^0.5]

Input

$$\sqrt{(2+\sqrt{3})\left(\frac{1}{2}(1+\sqrt{5})\right)\left(\frac{1}{2}(3\sqrt{3}+\sqrt{31})\right)}\sqrt[6]{5\sqrt{5}+2\sqrt{31}}\left(\sqrt{\frac{1}{4}(2+\sqrt{31})}+\sqrt{\frac{1}{4}(6+\sqrt{31})}\right)\left(\sqrt{\frac{1}{2}(11+2\sqrt{31})}+\sqrt{\frac{1}{2}(13+2\sqrt{31})}\right)$$

Exact result

$$\frac{1}{2}\sqrt{(2+\sqrt{3})(1+\sqrt{5})(3\sqrt{3}+\sqrt{31})}\sqrt[6]{5\sqrt{5}+2\sqrt{31}}\left(\frac{\sqrt{2+\sqrt{31}}}{2}+\frac{\sqrt{6+\sqrt{31}}}{2}\right)\left(\sqrt{\frac{1}{2}(11+2\sqrt{31})}+\sqrt{\frac{1}{2}(13+2\sqrt{31})}\right)$$

Decimal approximation

200.10283384292805393742089378421492554827045666950208313869730977...

200.102833842928….

Alternate forms

$$\frac{1}{4}\sqrt[6]{5\sqrt{5}+2\sqrt{31}}\sqrt{\frac{1}{2}(1+\sqrt{5})(11+2\sqrt{31})(9+6\sqrt{3}+2\sqrt{31}+\sqrt{93})}\left(\sqrt{2+\sqrt{31}}+\sqrt{6+\sqrt{31}}\right)+\frac{1}{4}\sqrt[6]{5\sqrt{5}+2\sqrt{31}}\sqrt{\frac{1}{2}(1+\sqrt{5})(13+2\sqrt{31})(9+6\sqrt{3}+2\sqrt{31}+\sqrt{93})}\left(\sqrt{2+\sqrt{31}}+\sqrt{6+\sqrt{31}}\right)$$

$$\frac{1}{4\sqrt{2}}\sqrt[6]{5\sqrt{5}+2\sqrt{31}}\left(\sqrt{3\left(1+\sqrt{5}\right)\left(562+323\sqrt{3}+101\sqrt{31}+58\sqrt{93}\right)}+\sqrt{5\left(1+\sqrt{5}\right)\left(562+323\sqrt{3}+101\sqrt{31}+58\sqrt{93}\right)}+\sqrt{\left(1+\sqrt{5}\right)\left(1846+1055\sqrt{3}+329\sqrt{31}+190\sqrt{93}\right)}+\sqrt{\left(1+\sqrt{5}\right)\left(2578+1481\sqrt{3}+463\sqrt{31}+266\sqrt{93}\right)}\right)$$

Expanded form

$$\frac{1}{4}\sqrt{\frac{1}{2}\left(2+\sqrt{3}\right)\left(1+\sqrt{5}\right)\left(2+\sqrt{31}\right)\left(3\sqrt{3}+\sqrt{31}\right)\left(11+2\sqrt{31}\right)}\sqrt[6]{5\sqrt{5}+2\sqrt{31}}+\frac{1}{4}\sqrt{\frac{1}{2}\left(2+\sqrt{3}\right)\left(1+\sqrt{5}\right)\left(6+\sqrt{31}\right)\left(3\sqrt{3}+\sqrt{31}\right)\left(11+2\sqrt{31}\right)}\sqrt[6]{5\sqrt{5}+2\sqrt{31}}+\frac{1}{4}\sqrt{\frac{1}{2}\left(2+\sqrt{3}\right)\left(1+\sqrt{5}\right)\left(2+\sqrt{31}\right)\left(3\sqrt{3}+\sqrt{31}\right)\left(13+2\sqrt{31}\right)}\sqrt[6]{5\sqrt{5}+2\sqrt{31}}+\frac{1}{4}\sqrt{\frac{1}{2}\left(2+\sqrt{3}\right)\left(1+\sqrt{5}\right)\left(6+\sqrt{31}\right)\left(3\sqrt{3}+\sqrt{31}\right)\left(13+2\sqrt{31}\right)}\sqrt[6]{5\sqrt{5}+2\sqrt{31}}$$

From the ratio between

$$\frac{1}{2}\sqrt{\left(2+\sqrt{3}\right)\left(1+\sqrt{5}\right)\left(3\sqrt{3}+\sqrt{31}\right)}\sqrt[6]{5\sqrt{5}+2\sqrt{31}}\left(\frac{\sqrt{2+\sqrt{31}}}{2}+\frac{\sqrt{6+\sqrt{31}}}{2}\right)\left(\sqrt{\frac{1}{2}\left(11+2\sqrt{31}\right)}+\sqrt{\frac{1}{2}\left(13+2\sqrt{31}\right)}\right)$$

200.10283384292805393742089378421492554827045666950208313869730977...

and:

$$\left(\frac{1}{2}\left(\sqrt{3}+\sqrt{7}\right)\right)\sqrt[3]{2+\sqrt{3}}\left(\frac{1}{2}\left(2+\sqrt{7}+\sqrt{7+4\sqrt{7}}\right)\right)\times\frac{\sqrt{3+\sqrt{7}}+\left(6\sqrt{7}\right)^{0.25}}{\sqrt{3+\sqrt{7}}-\left(6\sqrt{7}\right)^{0.25}}$$

172.64087217816086422023342429510817879521053958626306652342422349
...

after some easy calculations, we obtain:

1+1/(1/172.641 * (((2+sqrt3)(1/2*(1+sqrt5))(1/2*(3sqrt3+sqrt31))))^0.5 (5sqrt5+2sqrt31)^(1/6) [(1/4*(2+sqrt31))^0.5+(1/4(6+sqrt31))^0.5] [(1/2*(11+2sqrt31))^0.5+(1/2(13+2sqrt31))^0.5])^3

Input interpretation

$$1+1\Big/\left(\left(\frac{1}{172.641}\sqrt{\left(2+\sqrt{3}\right)\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)\left(\frac{1}{2}\left(3\sqrt{3}+\sqrt{31}\right)\right)}\right)\sqrt[6]{5\sqrt{5}+2\sqrt{31}}\left(\sqrt{\frac{1}{4}\left(2+\sqrt{31}\right)}+\sqrt{\frac{1}{4}\left(6+\sqrt{31}\right)}\right)\left(\sqrt{\frac{1}{2}\left(11+2\sqrt{31}\right)}+\sqrt{\frac{1}{2}\left(13+2\sqrt{31}\right)}\right)\right)^3$$

Result

1.6422026767838305449880644938472073777291188538155727575585281099
...

1.64220267678…. $\approx \zeta(2) = \frac{\pi^2}{6} = 1.644934$ ... (trace of the instanton shape)

We obtain also:

1/(2Pi)((200.102833842928 /172.640872178) + 8.9778697879)

Input interpretation

$$\frac{1}{2\pi}\left(\frac{200.102833842928}{172.640872178}+8.9778697879\right)$$

Result

1.6133440549…

1.6133440549…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Alternative representations

$$\frac{\frac{200.1028338429280000}{172.6408721780000} + 8.97786978790000}{2\pi} = \frac{8.97786978790000 + \frac{200.1028338429280000}{172.6408721780000}}{360\,°}$$

$$\frac{\frac{200.1028338429280000}{172.6408721780000} + 8.97786978790000}{2\pi} = -\frac{8.97786978790000 + \frac{200.1028338429280000}{172.6408721780000}}{2\,i\log(-1)}$$

$$\frac{\frac{200.1028338429280000}{172.6408721780000} + 8.97786978790000}{2\pi} = \frac{8.97786978790000 + \frac{200.1028338429280000}{172.6408721780000}}{2\cos^{-1}(-1)}$$

Series representations

$$\frac{\frac{200.1028338429280000}{172.6408721780000} + 8.97786978790000}{2\pi} = \frac{1.26711745765085}{\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}}$$

$$\frac{\frac{200.1028338429280000}{172.6408721780000} + 8.97786978790000}{2\pi} = \frac{2.53423491530170}{-1.000000000000000 + \sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}}$$

$$\frac{\frac{200.1028338429280000}{172.6408721780000} + 8.97786978790000}{2\pi} = \frac{5.06846983060339}{\sum_{k=0}^{\infty} \frac{2^{-k}(-6+50k)}{\binom{3k}{k}}}$$

Integral representations

$$\frac{\frac{200.1028338429280000}{172.6408721780000} + 8.97786978790000}{2\pi} = \frac{2.53423491530170}{\int_0^{\infty} \frac{1}{1+t^2}\, dt}$$

$$\frac{\frac{200.1028338429280000}{172.6408721780000} + 8.97786978790000}{2\pi} = \frac{1.26711745765085}{\int_0^{1} \sqrt{1-t^2}\, dt}$$

$$\frac{\frac{200.1028338429280000}{172.6408721780000} + 8.97786978790000}{2\pi} = \frac{2.53423491530170}{\int_0^{\infty} \frac{\sin(t)}{t}\, dt}$$

(4Pi)((200.102833842928 /172.640872178) *1/ 8.9778697879)

Input interpretation

$$(4\pi)\left(\frac{200.102833842928}{172.640872178} \times \frac{1}{8.9778697879}\right)$$

Result

1.6223560756…

1.6223560756…. result that is a good approximation to the value of the golden ratio 1.618033988749...

Alternative representations

$$\frac{200.1028338429280000 \times 4\pi}{172.6408721780000 \times 8.97786978790000} = \frac{144\,074.0403669081600\,°}{8.97786978790000 \times 172.6408721780000}$$

$$\frac{200.1028338429280000 \times 4\pi}{172.6408721780000 \times 8.97786978790000} = -\frac{800.4113353717120000\, i \log(-1)}{8.97786978790000 \times 172.6408721780000}$$

$$\frac{200.1028338429280000 \times 4\pi}{172.6408721780000 \times 8.97786978790000} = \frac{800.4113353717120000 \cos^{-1}(-1)}{8.97786978790000 \times 172.6408721780000}$$

Series representations

$$\frac{200.1028338429280000 \times 4\pi}{172.6408721780000 \times 8.97786978790000} = 2.06564791103375 \sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}$$

$$\frac{200.1028338429280000 \times 4\pi}{172.6408721780000 \times 8.97786978790000} = -1.03282395551687 + 1.03282395551687 \sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}$$

$$\frac{200.1028338429280000 \times 4 \pi}{172.6408721780000 \times 8.97786978790000} = 0.516411977758437 \sum_{k=0}^{\infty} \frac{2^{-k} (-6 + 50 k)}{\binom{3 k}{k}}$$

Integral representations

$$\frac{200.1028338429280000 \times 4 \pi}{172.6408721780000 \times 8.97786978790000} = 1.03282395551687 \int_0^{\infty} \frac{1}{1 + t^2} \, dt$$

$$\frac{200.1028338429280000 \times 4 \pi}{172.6408721780000 \times 8.97786978790000} = 2.06564791103375 \int_0^1 \sqrt{1 - t^2} \, dt$$

$$\frac{200.1028338429280000 \times 4 \pi}{172.6408721780000 \times 8.97786978790000} = 1.03282395551687 \int_0^{\infty} \frac{\sin(t)}{t} \, dt$$

We have:

$$G_{505}^2 = (2+\sqrt{5})\sqrt{\left\{\left(\frac{1+\sqrt{5}}{2}\right)(10+\sqrt{101})\right\}}$$
$$\times\left\{\left(\frac{5\sqrt{5}+\sqrt{101}}{4}\right)+\sqrt{\left(\frac{105+\sqrt{505}}{8}\right)}\right\},$$

$$g_{522} = \sqrt{\left(\frac{5+\sqrt{29}}{2}\right)}(5\sqrt{29}+11\sqrt{6})^{\frac{1}{6}}\left\{\sqrt{\left(\frac{9+3\sqrt{6}}{4}\right)}+\sqrt{\left(\frac{5+3\sqrt{6}}{4}\right)}\right\},$$

$$G_{553}^2 = \left\{\sqrt{\left(\frac{96+11\sqrt{79}}{4}\right)}+\sqrt{\left(\frac{100+11\sqrt{79}}{4}\right)}\right\}$$
$$\times\left\{\sqrt{\left(\frac{141+16\sqrt{79}}{2}\right)}+\sqrt{\left(\frac{143+16\sqrt{79}}{2}\right)}\right\},$$

$$g_{630} = (\sqrt{14}+\sqrt{15})^{\frac{1}{6}}\sqrt{\left\{(1+\sqrt{2})\left(\frac{3+\sqrt{5}}{2}\right)\left(\frac{\sqrt{3}+\sqrt{7}}{2}\right)\right\}}$$
$$\times\left\{\sqrt{\left(\frac{\sqrt{15}+\sqrt{7}+2}{4}\right)}+\sqrt{\left(\frac{\sqrt{15}+\sqrt{7}-2}{4}\right)}\right\}$$
$$\times\left\{\sqrt{\left(\frac{\sqrt{15}+\sqrt{7}+4}{8}\right)}+\sqrt{\left(\frac{\sqrt{15}+\sqrt{7}-4}{8}\right)}\right\},$$

$$G_{765}^2 = \left(\frac{3+\sqrt{5}}{2}\right)(16+\sqrt{255})^{\frac{1}{6}}\sqrt{\left\{(4+\sqrt{15})\left(\frac{9+\sqrt{85}}{2}\right)\right\}}$$
$$\times\left\{\sqrt{\left(\frac{6+\sqrt{51}}{4}\right)}+\sqrt{\left(\frac{10+\sqrt{51}}{4}\right)}\right\}$$
$$\times\left\{\sqrt{\left(\frac{18+3\sqrt{51}}{4}\right)}+\sqrt{\left(\frac{22+3\sqrt{51}}{4}\right)}\right\},$$

$$G_{777}^2 = \sqrt{\left\{(2+\sqrt{3})(6+\sqrt{37})\left(\frac{\sqrt{3}+\sqrt{7}}{2}\right)\right\}}(246\sqrt{7}+107\sqrt{37})^{\frac{1}{6}}$$
$$\times\left\{\sqrt{\left(\frac{6+3\sqrt{7}}{4}\right)}+\sqrt{\left(\frac{10+3\sqrt{7}}{4}\right)}\right\}$$
$$\times\left\{\sqrt{\left(\frac{15+6\sqrt{7}}{2}\right)}+\sqrt{\left(\frac{17+6\sqrt{7}}{2}\right)}\right\},$$

From:

$$G_{505}^2 = (2+\sqrt{5})\sqrt{\left\{\left(\frac{1+\sqrt{5}}{2}\right)(10+\sqrt{101})\right\}} \times \left\{\left(\frac{5\sqrt{5}+\sqrt{101}}{4}\right)+\sqrt{\left(\frac{105+\sqrt{505}}{8}\right)}\right\},$$

(2+sqrt5) * [(1/2*(1+sqrt5))(10+sqrt101)]^0.5* [(1/4*(5sqrt5+sqrt101))+(1/8(105+sqrt505))^0.5]

Input

$$(2+\sqrt{5})\sqrt{\left(\frac{1}{2}(1+\sqrt{5})\right)(10+\sqrt{101})}\left(\frac{1}{4}(5\sqrt{5}+\sqrt{101})+\sqrt{\frac{1}{8}(105+\sqrt{505})}\right)$$

Exact result

$$(2+\sqrt{5})\sqrt{\frac{1}{2}(1+\sqrt{5})(10+\sqrt{101})}\left(\frac{1}{4}(5\sqrt{5}+\sqrt{101})+\frac{1}{2}\sqrt{\frac{1}{2}(105+\sqrt{505})}\right)$$

Decimal approximation

224.36895935132763918399413635761729391464432800073649303816535945...

224.36895935….

Alternate forms

$$\sqrt{\text{root of } 256x^8 - 13134080x^7 + 12406662784x^6 + 566469885440x^5 + 8970692383216x^4 + 59000758979200x^3 + 133454526025384x^2 - 21580568998020x + 63001502001 \text{ near } x = 50341.4}$$

$$\frac{1}{4}\left(2+\sqrt{5}\right)\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)\left(10+\sqrt{101}\right)}\left(5\sqrt{5}+\sqrt{101}\right) + \frac{1}{4}\left(2+\sqrt{5}\right)\sqrt{\left(1+\sqrt{5}\right)\left(10+\sqrt{101}\right)\left(105+\sqrt{505}\right)}$$

$$\frac{1}{8}\left(2+\sqrt{5}\right)\left(5\sqrt{10\left(1+\sqrt{5}\right)\left(10+\sqrt{101}\right)} + \sqrt{202\left(1+\sqrt{5}\right)\left(10+\sqrt{101}\right)} + 2\sqrt{1555+1151\sqrt{5}+155\sqrt{101}+115\sqrt{505}}\right)$$

Minimal polynomial

$$256x^{16} - 13134080x^{14} + 12406662784x^{12} + 566469885440x^{10} + 8970692383216x^8 + 59000758979200x^6 + 133454526025384x^4 - 21580568998020x^2 + 63001502001$$

Expanded forms

$$\frac{25}{4}\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)\left(10+\sqrt{101}\right)} + \frac{5}{2}\sqrt{\frac{5}{2}\left(1+\sqrt{5}\right)\left(10+\sqrt{101}\right)} + \frac{1}{2}\sqrt{\frac{101}{2}\left(1+\sqrt{5}\right)\left(10+\sqrt{101}\right)} + \frac{1}{4}\sqrt{\frac{505}{2}\left(1+\sqrt{5}\right)\left(10+\sqrt{101}\right)} + \frac{1}{2}\sqrt{\left(1+\sqrt{5}\right)\left(10+\sqrt{101}\right)\left(105+\sqrt{505}\right)} + \frac{1}{4}\sqrt{5\left(1+\sqrt{5}\right)\left(10+\sqrt{101}\right)\left(105+\sqrt{505}\right)}$$

$$\frac{5}{2}\sqrt{25+25\sqrt{5}+\frac{5\sqrt{101}}{2}+\frac{5\sqrt{505}}{2}}+$$
$$\frac{1}{4}\sqrt{2525+2525\sqrt{5}+\frac{505\sqrt{101}}{2}+\frac{505\sqrt{505}}{2}}+$$
$$\frac{1}{4}\sqrt{7775+5755\sqrt{5}+775\sqrt{101}+575\sqrt{505}}+$$
$$\frac{25}{4}\sqrt{5+5\sqrt{5}+\frac{1}{2}\left(\sqrt{101}+\sqrt{505}\right)}+$$
$$\frac{1}{2}\left(\sqrt{505+505\sqrt{5}+\frac{101\sqrt{101}}{2}+\frac{101\sqrt{505}}{2}}+\sqrt{1555+1151\sqrt{5}+155\sqrt{101}+115\sqrt{505}}\right)$$

From:

$$g_{522} = \sqrt{\left(\frac{5+\sqrt{29}}{2}\right)}(5\sqrt{29}+11\sqrt{6})^{\frac{1}{6}}\left\{\sqrt{\left(\frac{9+3\sqrt{6}}{4}\right)}+\sqrt{\left(\frac{5+3\sqrt{6}}{4}\right)}\right\},$$

(1/2*(5+sqrt29))^0.5 ((5sqrt29+11sqrt6))^(1/6) [(1/4*(9+3sqrt6))^0.5+(1/4(5+3sqrt6))^0.5]

Input

$$\sqrt{\frac{1}{2}\left(5+\sqrt{29}\right)}\sqrt[6]{5\sqrt{29}+11\sqrt{6}}\left(\sqrt{\frac{1}{4}\left(9+3\sqrt{6}\right)}+\sqrt{\frac{1}{4}\left(5+3\sqrt{6}\right)}\right)$$

Exact result

$$\sqrt{\frac{1}{2}\left(5+\sqrt{29}\right)}\sqrt[6]{11\sqrt{6}+5\sqrt{29}}\left(\frac{1}{2}\sqrt{5+3\sqrt{6}}+\frac{1}{2}\sqrt{9+3\sqrt{6}}\right)$$

Decimal approximation

16.733627372862632001654199780484070484400153552417234409678167491
...

16.7336273728….

Alternate forms

$$\frac{1}{2}\sqrt[12]{1451+110\sqrt{174}}\sqrt{\left(5+\sqrt{29}\right)\left(7+3\sqrt{6}+\sqrt{99+42\sqrt{6}}\right)}$$

$$\sqrt[6]{\text{root of } x^8-21955360x^7-352900x^6+19040x^5+382984198x^4-19040x^3-352900x^2+21955360x+1 \text{ near } x=2.19554\times10^7}$$

$$\frac{\sqrt{5+\sqrt{29}}\sqrt[6]{11\sqrt{6}+5\sqrt{29}}\left(\sqrt{3\left(3+\sqrt{6}\right)}+\sqrt{5+3\sqrt{6}}\right)}{2\sqrt{2}}$$

Minimal polynomial

$$x^{48}-21955360x^{42}-352900x^{36}+19040x^{30}+382984198x^{24}-19040x^{18}-352900x^{12}+21955360x^6+1$$

Expanded forms

$$\frac{1}{4}\sqrt[6]{11\sqrt{6}+5\sqrt{29}}\left(\sqrt{50+30\sqrt{6}+10\sqrt{29}+6\sqrt{174}}+\sqrt{90+30\sqrt{6}+18\sqrt{29}+6\sqrt{174}}\right)$$

$$\frac{\sqrt{\left(5+3\sqrt{6}\right)\left(5+\sqrt{29}\right)}\ \sqrt[6]{11\sqrt{6}+5\sqrt{29}}}{2\sqrt{2}}+$$
$$\frac{\sqrt{\left(9+3\sqrt{6}\right)\left(5+\sqrt{29}\right)}\ \sqrt[6]{11\sqrt{6}+5\sqrt{29}}}{2\sqrt{2}}$$

Dividing the two above expressions, after some easy calculations, we obtain:

22/((((((2+sqrt5)[(1/2(1+sqrt5))(10+sqrt101)]^0.5 [(1/4(5sqrt5+sqrt101))+(1/8(105+sqrt505))^0.5]))1/(((1/2(5+sqrt29))^0.5 ((5sqrt29+11sqrt6))^(1/6) [(1/4(9+3sqrt6))^0.5+(1/4(5+3sqrt6))^0.5])))))

Input

$$22\Bigg/\left(\left(2+\sqrt{5}\right)\sqrt{\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)\left(10+\sqrt{101}\right)}\left(\frac{1}{4}\left(5\sqrt{5}+\sqrt{101}\right)+\sqrt{\frac{1}{8}\left(105+\sqrt{505}\right)}\right)\times\frac{1}{\sqrt{\frac{1}{2}\left(5+\sqrt{29}\right)}\ \sqrt[6]{5\sqrt{29}+11\sqrt{6}}\left(\sqrt{\frac{1}{4}\left(9+3\sqrt{6}\right)}+\sqrt{\frac{1}{4}\left(5+3\sqrt{6}\right)}\right)}\right)$$

Exact result

$$\frac{22\sqrt[6]{11\sqrt{6}+5\sqrt{29}}\ \sqrt{\frac{5+\sqrt{29}}{\left(1+\sqrt{5}\right)\left(10+\sqrt{101}\right)}}\left(\frac{1}{2}\sqrt{5+3\sqrt{6}}+\frac{1}{2}\sqrt{9+3\sqrt{6}}\right)}{\left(2+\sqrt{5}\right)\left(\frac{1}{4}\left(5\sqrt{5}+\sqrt{101}\right)+\frac{1}{2}\sqrt{\frac{1}{2}\left(105+\sqrt{505}\right)}\right)}$$

Decimal approximation

1.6407786677234929288130202794041134185207134487439845364524553596

…

$1.6407786677.... \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934$ ... (trace of the instanton shape)

Alternate form

$$\left(44\left(\sqrt{5}-2\right)\sqrt[6]{11\sqrt{6}+5\sqrt{29}}\sqrt{\frac{\left(5+\sqrt{29}\right)\left(\sqrt{101}-10\right)}{1+\sqrt{5}}}\left(\sqrt{3\left(3+\sqrt{6}\right)}+\sqrt{5+3\sqrt{6}}\right)\right)\Big/\left(5\sqrt{5}+\sqrt{101}+\sqrt{2\left(105+\sqrt{505}\right)}\right)$$

Expanded form

$$\frac{11\sqrt[6]{11\sqrt{6}+5\sqrt{29}}\sqrt{\frac{(5+3\sqrt{6})(5+\sqrt{29})}{(1+\sqrt{5})(10+\sqrt{101})}}}{\left(2+\sqrt{5}\right)\left(\frac{1}{4}\left(5\sqrt{5}+\sqrt{101}\right)+\frac{1}{2}\sqrt{\frac{1}{2}\left(105+\sqrt{505}\right)}\right)}+\frac{11\sqrt[6]{11\sqrt{6}+5\sqrt{29}}\sqrt{\frac{(9+3\sqrt{6})(5+\sqrt{29})}{(1+\sqrt{5})(10+\sqrt{101})}}}{\left(2+\sqrt{5}\right)\left(\frac{1}{4}\left(5\sqrt{5}+\sqrt{101}\right)+\frac{1}{2}\sqrt{\frac{1}{2}\left(105+\sqrt{505}\right)}\right)}$$

From:

$$G_{553}^2 = \left\{\sqrt{\left(\frac{96+11\sqrt{79}}{4}\right)}+\sqrt{\left(\frac{100+11\sqrt{79}}{4}\right)}\right\} \times \left\{\sqrt{\left(\frac{141+16\sqrt{79}}{2}\right)}+\sqrt{\left(\frac{143+16\sqrt{79}}{2}\right)}\right\},$$

[(1/4*(96+11sqrt79))^0.5+(1/4(100+11sqrt79))^0.5]
[(1/2*(141+16sqrt79))^0.5+(1/2(143+16sqrt79))^0.5]

Input

$$\left(\sqrt{\frac{1}{4}\left(96+11\sqrt{79}\right)}+\sqrt{\frac{1}{4}\left(100+11\sqrt{79}\right)}\right)\left(\sqrt{\frac{1}{2}\left(141+16\sqrt{79}\right)}+\sqrt{\frac{1}{2}\left(143+16\sqrt{79}\right)}\right)$$

Exact result

$$\left(\frac{1}{2}\sqrt{96+11\sqrt{79}}+\frac{1}{2}\sqrt{100+11\sqrt{79}}\right)\left(\sqrt{\frac{1}{2}\left(141+16\sqrt{79}\right)}+\sqrt{\frac{1}{2}\left(143+16\sqrt{79}\right)}\right)$$

Decimal approximation

333.5818476121288758358757625578577264991187960077111951607240090 1...

333.581847612….

Alternate forms

$$\frac{1}{4}\left(8+\sqrt{79}+\sqrt{141+16\sqrt{79}}\right)\left(11+\sqrt{79}+\sqrt{192+22\sqrt{79}}\right)$$

$$\frac{1}{4}\left(\sqrt{96+11\sqrt{79}}+\sqrt{100+11\sqrt{79}}\right)\left(\sqrt{282+32\sqrt{79}}+\sqrt{286+32\sqrt{79}}\right)$$

---

root of $x^8-334x^7+138x^6+496x^5+127x^4+496x^3+138x^2-334x+1$ near $x=333.582$

$$\frac{1}{2\sqrt{2}}\left(7\sqrt{7\left(80+9\sqrt{79}\right)}+\sqrt{27632+3109\sqrt{79}}+\sqrt{28004+3151\sqrt{79}}+\sqrt{28204+3173\sqrt{79}}\right)$$

Minimal polynomial

$$x^8-334x^7+138x^6+496x^5+127x^4+496x^3+138x^2-334x+1$$

Expanded forms

$$\frac{1}{2}\left(\sqrt{\left(\frac{141}{2}+8\sqrt{79}\right)\left(96+11\sqrt{79}\right)}+\sqrt{\left(\frac{143}{2}+8\sqrt{79}\right)\left(96+11\sqrt{79}\right)}+\sqrt{\left(\frac{141}{2}+8\sqrt{79}\right)\left(100+11\sqrt{79}\right)}+\sqrt{\left(\frac{143}{2}+8\sqrt{79}\right)\left(100+11\sqrt{79}\right)}\right)$$

$$\frac{1}{2}\sqrt{\frac{1}{2}\left(96+11\sqrt{79}\right)\left(141+16\sqrt{79}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(100+11\sqrt{79}\right)\left(141+16\sqrt{79}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(96+11\sqrt{79}\right)\left(143+16\sqrt{79}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(100+11\sqrt{79}\right)\left(143+16\sqrt{79}\right)}$$

Subtracting

$$\left(\frac{1}{2}\sqrt{96+11\sqrt{79}}+\frac{1}{2}\sqrt{100+11\sqrt{79}}\right)\left(\sqrt{\frac{1}{2}\left(141+16\sqrt{79}\right)}+\sqrt{\frac{1}{2}\left(143+16\sqrt{79}\right)}\right)$$

by

$$\left(2+\sqrt{5}\right)\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)\left(10+\sqrt{101}\right)}\left(\frac{1}{4}\left(5\sqrt{5}+\sqrt{101}\right)+\frac{1}{2}\sqrt{\frac{1}{2}\left(105+\sqrt{505}\right)}\right)$$

we obtain, after some calculations:

1+1/((([(1/4(96+11sqrt79))^0.5+(1/4(100+11sqrt79))^0.5] [(1/2(141+16sqrt79))^0.5+(1/2(143+16sqrt79))^0.5]))-(((2+sqrt5) [(1/2(1+sqrt5))(10+sqrt101)]^0.5 [(1/4(5√5+√101))+(1/8(105+√505))^0.5])))^1/11

Input

$$1+1\Big/\left(\left(\left(\left(\sqrt{\frac{1}{4}\left(96+11\sqrt{79}\right)}+\sqrt{\frac{1}{4}\left(100+11\sqrt{79}\right)}\right)\left(\sqrt{\frac{1}{2}\left(141+16\sqrt{79}\right)}+\sqrt{\frac{1}{2}\left(143+16\sqrt{79}\right)}\right)-(2+\sqrt{5})\sqrt{\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)\left(10+\sqrt{101}\right)}\left(\frac{1}{4}\left(5\sqrt{5}+\sqrt{101}\right)+\sqrt{\frac{1}{8}\left(105+\sqrt{505}\right)}\right)\right)\right)\hat{\ }(1/11)\right)$$

Exact result

$$1+1\Big/\left(\left(\left(\left(\frac{1}{2}\sqrt{96+11\sqrt{79}}+\frac{1}{2}\sqrt{100+11\sqrt{79}}\right)\left(\sqrt{\frac{1}{2}\left(141+16\sqrt{79}\right)}+\sqrt{\frac{1}{2}\left(143+16\sqrt{79}\right)}\right)-(2+\sqrt{5})\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)\left(10+\sqrt{101}\right)}\left(\frac{1}{4}\left(5\sqrt{5}+\sqrt{101}\right)+\frac{1}{2}\sqrt{\frac{1}{2}\left(105+\sqrt{505}\right)}\right)\right)\right)\hat{\ }(1/11)\right)$$

Decimal approximation

1.652683108700832573849863645493623238365625291478463308610970420 1...

1.6526831087…. result very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Alternate forms

$$1 + 2^{3/11} \Big/ \left(\left(14 \sqrt{14 \left(80 + 9 \sqrt{79}\right)} + 2 \sqrt{2 \left(27632 + 3109 \sqrt{79}\right)} + 2 \sqrt{2 \left(28004 + 3151 \sqrt{79}\right)} + 2 \sqrt{2 \left(28204 + 3173 \sqrt{79}\right)} - 25 \sqrt{2 \left(1 + \sqrt{5}\right)\left(10 + \sqrt{101}\right)} - 10 \sqrt{10 \left(1 + \sqrt{5}\right)\left(10 + \sqrt{101}\right)} - 2 \sqrt{202 \left(1 + \sqrt{5}\right)\left(10 + \sqrt{101}\right)} - \sqrt{1010 \left(1 + \sqrt{5}\right)\left(10 + \sqrt{101}\right)} - 4 \sqrt{1555 + 1151 \sqrt{5} + 155 \sqrt{101} + 115 \sqrt{505}} - 2 \sqrt{5 \left(1555 + 1151 \sqrt{5} + 155 \sqrt{101} + 115 \sqrt{505}\right)}\right) \hat{} (1/11)\right)$$

$$\left(2^{3/11} + \left(14 \sqrt{14 \left(80 + 9 \sqrt{79}\right)} + 2 \sqrt{2 \left(27632 + 3109 \sqrt{79}\right)} + 2 \sqrt{2 \left(28004 + 3151 \sqrt{79}\right)} + 2 \sqrt{2 \left(28204 + 3173 \sqrt{79}\right)} - 25 \sqrt{2 \left(1 + \sqrt{5}\right)\left(10 + \sqrt{101}\right)} - 10 \sqrt{10 \left(1 + \sqrt{5}\right)\left(10 + \sqrt{101}\right)} - 2 \sqrt{202 \left(1 + \sqrt{5}\right)\left(10 + \sqrt{101}\right)} - \sqrt{1010 \left(1 + \sqrt{5}\right)\left(10 + \sqrt{101}\right)} - 4 \sqrt{1555 + 1151 \sqrt{5} + 155 \sqrt{101} + 115 \sqrt{505}} - 2 \sqrt{5 \left(1555 + 1151 \sqrt{5} + 155 \sqrt{101} + 115 \sqrt{505}\right)}\right) \hat{} (1/11)\right) \Big/ \left(\left(14 \sqrt{14 \left(80 + 9 \sqrt{79}\right)} + 2 \sqrt{2 \left(27632 + 3109 \sqrt{79}\right)} + 2 \sqrt{2 \left(28004 + 3151 \sqrt{79}\right)} + 2 \sqrt{2 \left(28204 + 3173 \sqrt{79}\right)} - 25 \sqrt{2 \left(1 + \sqrt{5}\right)\left(10 + \sqrt{101}\right)} - 10 \sqrt{10 \left(1 + \sqrt{5}\right)\left(10 + \sqrt{101}\right)} - 2 \sqrt{202 \left(1 + \sqrt{5}\right)\left(10 + \sqrt{101}\right)} - \sqrt{1010 \left(1 + \sqrt{5}\right)\left(10 + \sqrt{101}\right)} - 4 \sqrt{1555 + 1151 \sqrt{5} + 155 \sqrt{101} + 115 \sqrt{505}} - 2 \sqrt{5 \left(1555 + 1151 \sqrt{5} + 155 \sqrt{101} + 115 \sqrt{505}\right)}\right) \hat{} (1/11)\right)$$

$$
\begin{aligned}
&\Big(2^{3/11} + \Big(2\sqrt{2(96+11\sqrt{79})(141+16\sqrt{79})} + \\
&\quad 2\sqrt{2(100+11\sqrt{79})(141+16\sqrt{79})} + \\
&\quad 2\sqrt{2(96+11\sqrt{79})(143+16\sqrt{79})} + \\
&\quad 2\sqrt{2(100+11\sqrt{79})(143+16\sqrt{79})} - \\
&\quad 25\sqrt{2(1+\sqrt{5})(10+\sqrt{101})} - 10\sqrt{10(1+\sqrt{5})(10+\sqrt{101})} - \\
&\quad 2\sqrt{202(1+\sqrt{5})(10+\sqrt{101})} - \sqrt{1010(1+\sqrt{5})(10+\sqrt{101})} - \\
&\quad 4\sqrt{(1+\sqrt{5})(10+\sqrt{101})(105+\sqrt{505})} - \\
&\quad 2\sqrt{5(1+\sqrt{5})(10+\sqrt{101})(105+\sqrt{505})}\Big)\hat{}\,(1/11)\Big) \Big/ \\
&\Big(\Big(2\sqrt{2(96+11\sqrt{79})(141+16\sqrt{79})} + \\
&\quad 2\sqrt{2(100+11\sqrt{79})(141+16\sqrt{79})} + \\
&\quad 2\sqrt{2(96+11\sqrt{79})(143+16\sqrt{79})} + \\
&\quad 2\sqrt{2(100+11\sqrt{79})(143+16\sqrt{79})} - \\
&\quad 25\sqrt{2(1+\sqrt{5})(10+\sqrt{101})} - 10\sqrt{10(1+\sqrt{5})(10+\sqrt{101})} - \\
&\quad 2\sqrt{202(1+\sqrt{5})(10+\sqrt{101})} - \sqrt{1010(1+\sqrt{5})(10+\sqrt{101})} - \\
&\quad 4\sqrt{(1+\sqrt{5})(10+\sqrt{101})(105+\sqrt{505})} - \\
&\quad 2\sqrt{5(1+\sqrt{5})(10+\sqrt{101})(105+\sqrt{505})}\Big)\hat{}\,(1/11)\Big)
\end{aligned}
$$

From:

$$g_{630} = (\sqrt{14}+\sqrt{15})^{\frac{1}{6}} \sqrt{\left\{(1+\sqrt{2})\left(\frac{3+\sqrt{5}}{2}\right)\left(\frac{\sqrt{3}+\sqrt{7}}{2}\right)\right\}}$$
$$\times \left\{\sqrt{\left(\frac{\sqrt{15}+\sqrt{7}+2}{4}\right)}+\sqrt{\left(\frac{\sqrt{15}+\sqrt{7}-2}{4}\right)}\right\}$$
$$\times \left\{\sqrt{\left(\frac{\sqrt{15}+\sqrt{7}+4}{8}\right)}+\sqrt{\left(\frac{\sqrt{15}+\sqrt{7}-4}{8}\right)}\right\},$$

(sqrt14+sqrt15)^(1/6) [(1+sqrt2)(1/2(3+√5))+(1/2(sqrt3+√7))]^0.5 [(1/4(√15+√7 + 2))^0.5+(1/4(√15+√7 – 2))^0.5] [(1/8(√15+√7 + 4))^0.5+(1/8(√15+√7 – 4))^0.5]

Input

$$\sqrt[6]{\sqrt{14}+\sqrt{15}}\sqrt{(1+\sqrt{2})\left(\frac{1}{2}(3+\sqrt{5})\right)+\frac{1}{2}(\sqrt{3}+\sqrt{7})}$$
$$\left(\sqrt{\frac{1}{4}(\sqrt{15}+\sqrt{7}+2)}+\sqrt{\frac{1}{4}(\sqrt{15}+\sqrt{7}-2)}\right)$$
$$\left(\sqrt{\frac{1}{8}(\sqrt{15}+\sqrt{7}+4)}+\sqrt{\frac{1}{8}(\sqrt{15}+\sqrt{7}-4)}\right)$$

Exact result

$$\sqrt[6]{\sqrt{14}+\sqrt{15}}\sqrt{\frac{1}{2}(1+\sqrt{2})(3+\sqrt{5})+\frac{1}{2}(\sqrt{3}+\sqrt{7})}$$
$$\left(\frac{1}{2}\sqrt{-2+\sqrt{7}+\sqrt{15}}+\frac{1}{2}\sqrt{2+\sqrt{7}+\sqrt{15}}\right)$$
$$\left(\frac{1}{2}\sqrt{\frac{1}{2}(-4+\sqrt{7}+\sqrt{15})}+\frac{1}{2}\sqrt{\frac{1}{2}(4+\sqrt{7}+\sqrt{15})}\right)$$

Decimal approximation

17.623908118731032578680892160191760490425623653614243492567598056...

17.623908118731…..

Alternate forms

$$\frac{1}{8}\sqrt{3+3\sqrt{2}+\sqrt{3}+\sqrt{5}+\sqrt{7}+\sqrt{10}}\ \sqrt[6]{\sqrt{14}+\sqrt{15}}\left(\sqrt{-2+\sqrt{7}+\sqrt{15}}+\sqrt{2+\sqrt{7}+\sqrt{15}}\right)\left(\sqrt{-4+\sqrt{7}+\sqrt{15}}+\sqrt{4+\sqrt{7}+\sqrt{15}}\right)$$

$$\frac{1}{8}\sqrt{\left(3+3\sqrt{2}+\sqrt{3}+\sqrt{5}+\sqrt{7}+\sqrt{10}\right)\left(-4+\sqrt{7}+\sqrt{15}\right)}\ \sqrt[6]{\sqrt{14}+\sqrt{15}}\left(\sqrt{-2+\sqrt{7}+\sqrt{15}}+\sqrt{2+\sqrt{7}+\sqrt{15}}\right)+\frac{1}{8}\sqrt{\left(3+3\sqrt{2}+\sqrt{3}+\sqrt{5}+\sqrt{7}+\sqrt{10}\right)\left(4+\sqrt{7}+\sqrt{15}\right)}\ \sqrt[6]{\sqrt{14}+\sqrt{15}}\left(\sqrt{-2+\sqrt{7}+\sqrt{15}}+\sqrt{2+\sqrt{7}+\sqrt{15}}\right)$$

Expanded form

$$\frac{1}{4}\sqrt[6]{\sqrt{14}+\sqrt{15}}\ \sqrt{\left(\frac{1}{2}\left(-4+\sqrt{7}+\sqrt{15}\right)\left(-2+\sqrt{7}+\sqrt{15}\right)\left(\frac{1}{2}\left(1+\sqrt{2}\right)\left(3+\sqrt{5}\right)+\frac{1}{2}\left(\sqrt{3}+\sqrt{7}\right)\right)\right)}+\frac{1}{4}\sqrt[6]{\sqrt{14}+\sqrt{15}}\ \sqrt{\left(\frac{1}{2}\left(-4+\sqrt{7}+\sqrt{15}\right)\left(2+\sqrt{7}+\sqrt{15}\right)\left(\frac{1}{2}\left(1+\sqrt{2}\right)\left(3+\sqrt{5}\right)+\frac{1}{2}\left(\sqrt{3}+\sqrt{7}\right)\right)\right)}+\frac{1}{4}\sqrt[6]{\sqrt{14}+\sqrt{15}}\ \sqrt{\left(\frac{1}{2}\left(-2+\sqrt{7}+\sqrt{15}\right)\left(4+\sqrt{7}+\sqrt{15}\right)\left(\frac{1}{2}\left(1+\sqrt{2}\right)\left(3+\sqrt{5}\right)+\frac{1}{2}\left(\sqrt{3}+\sqrt{7}\right)\right)\right)}+\frac{1}{4}\sqrt[6]{\sqrt{14}+\sqrt{15}}\ \sqrt{\left(\frac{1}{2}\left(2+\sqrt{7}+\sqrt{15}\right)\left(4+\sqrt{7}+\sqrt{15}\right)\left(\frac{1}{2}\left(1+\sqrt{2}\right)\left(3+\sqrt{5}\right)+\frac{1}{2}\left(\sqrt{3}+\sqrt{7}\right)\right)\right)}$$

From:

$$G_{765}^2 = \left(\frac{3+\sqrt{5}}{2}\right)(16+\sqrt{255})^{\frac{1}{6}}\sqrt{\left\{(4+\sqrt{15})\left(\frac{9+\sqrt{85}}{2}\right)\right\}}$$
$$\times\left\{\sqrt{\left(\frac{6+\sqrt{51}}{4}\right)}+\sqrt{\left(\frac{10+\sqrt{51}}{4}\right)}\right\}$$
$$\times\left\{\sqrt{\left(\frac{18+3\sqrt{51}}{4}\right)}+\sqrt{\left(\frac{22+3\sqrt{51}}{4}\right)}\right\},$$

(1/2*(3+sqrt5)) (16+sqrt255)^(1/6) (((4+sqrt15)(1/2*(9+sqrt85))))^0.5 [(1/4*(6+sqrt51))^0.5+(1/4(10+sqrt51))^0.5] [(1/4*(18+3sqrt51))^0.5+(1/4(22+3sqrt51))^0.5]

Input

$$\left(\frac{1}{2}(3+\sqrt{5})\right)\sqrt[6]{16+\sqrt{255}}\sqrt{(4+\sqrt{15})\left(\frac{1}{2}(9+\sqrt{85})\right)}\left(\sqrt{\frac{1}{4}(6+\sqrt{51})}+\sqrt{\frac{1}{4}(10+\sqrt{51})}\right)\left(\sqrt{\frac{1}{4}(18+3\sqrt{51})}+\sqrt{\frac{1}{4}(22+3\sqrt{51})}\right)$$

Exact result

$$\frac{1}{2}(3+\sqrt{5})\sqrt{\frac{1}{2}(4+\sqrt{15})(9+\sqrt{85})}\sqrt[6]{16+\sqrt{255}}\left(\frac{\sqrt{6+\sqrt{51}}}{2}+\frac{\sqrt{10+\sqrt{51}}}{2}\right)\left(\frac{1}{2}\sqrt{18+3\sqrt{51}}+\frac{1}{2}\sqrt{22+3\sqrt{51}}\right)$$

Decimal approximation

986.7726750808841758065063458306266829012262630164527972979928968 9...

986.7726750808841….

Alternate forms

$$\frac{1}{16}\left(3+\sqrt{5}\right)\sqrt{\left(4+\sqrt{15}\right)\left(9+\sqrt{85}\right)}\,\sqrt[6]{16+\sqrt{255}}\left(\sqrt{6+\sqrt{51}}+\sqrt{10+\sqrt{51}}\right)\left(\sqrt{18-3\,i\,\sqrt{15}}+\sqrt{2}\left(3\sqrt{\frac{3}{2}}+\sqrt{\frac{17}{2}}+\sqrt{\frac{3}{2}\,i\left(\sqrt{15}+-6\,i\right)}\right)\right)$$

$$\frac{1}{8}\left(3+\sqrt{5}\right)\sqrt{\frac{3}{2}\left(6+\sqrt{51}\right)\left(36+9\sqrt{15}+5\sqrt{51}+4\sqrt{85}\right)}\,\sqrt[6]{16+\sqrt{255}}\left(\sqrt{6+\sqrt{51}}+\sqrt{10+\sqrt{51}}\right)+\frac{1}{8\sqrt{2}}\left(3+\sqrt{5}\right)\sqrt{\left(22+3\sqrt{51}\right)\left(36+9\sqrt{15}+5\sqrt{51}+4\sqrt{85}\right)}\,\sqrt[6]{16+\sqrt{255}}\left(\sqrt{6+\sqrt{51}}+\sqrt{10+\sqrt{51}}\right)$$

$$\frac{1}{8\sqrt{2}}\sqrt[6]{16+\sqrt{255}}\left(9\sqrt{2064+533\sqrt{15}+289\sqrt{51}+224\sqrt{85}}+3\sqrt{5\left(2064+533\sqrt{15}+289\sqrt{51}+224\sqrt{85}\right)}+5\sqrt{4092+1057\sqrt{15}+573\sqrt{51}+444\sqrt{85}}+3\sqrt{5\left(4092+1057\sqrt{15}+573\sqrt{51}+444\sqrt{85}\right)}+3\sqrt{3\left(8076+2087\sqrt{15}+1131\sqrt{51}+876\sqrt{85}\right)}+\sqrt{15\left(8076+2087\sqrt{15}+1131\sqrt{51}+876\sqrt{85}\right)}+3\sqrt{26688+6893\sqrt{15}+3737\sqrt{51}+2896\sqrt{85}}+\sqrt{5\left(26688+6893\sqrt{15}+3737\sqrt{51}+2896\sqrt{85}\right)}\right)$$

Expanded form

$$\frac{3}{8}\sqrt{\frac{1}{2}\left(4+\sqrt{15}\right)\left(6+\sqrt{51}\right)\left(18+3\sqrt{51}\right)\left(9+\sqrt{85}\right)}\sqrt[6]{16+\sqrt{255}}+$$
$$\frac{1}{8}\sqrt{\frac{5}{2}\left(4+\sqrt{15}\right)\left(6+\sqrt{51}\right)\left(18+3\sqrt{51}\right)\left(9+\sqrt{85}\right)}\sqrt[6]{16+\sqrt{255}}+$$
$$\frac{3}{8}\sqrt{\frac{1}{2}\left(4+\sqrt{15}\right)\left(10+\sqrt{51}\right)\left(18+3\sqrt{51}\right)\left(9+\sqrt{85}\right)}\sqrt[6]{16+\sqrt{255}}+$$
$$\frac{1}{8}\sqrt{\frac{5}{2}\left(4+\sqrt{15}\right)\left(10+\sqrt{51}\right)\left(18+3\sqrt{51}\right)\left(9+\sqrt{85}\right)}\sqrt[6]{16+\sqrt{255}}+$$
$$\frac{3}{8}\sqrt{\frac{1}{2}\left(4+\sqrt{15}\right)\left(6+\sqrt{51}\right)\left(22+3\sqrt{51}\right)\left(9+\sqrt{85}\right)}\sqrt[6]{16+\sqrt{255}}+$$
$$\frac{1}{8}\sqrt{\frac{5}{2}\left(4+\sqrt{15}\right)\left(6+\sqrt{51}\right)\left(22+3\sqrt{51}\right)\left(9+\sqrt{85}\right)}\sqrt[6]{16+\sqrt{255}}+$$
$$\frac{3}{8}\sqrt{\frac{1}{2}\left(4+\sqrt{15}\right)\left(10+\sqrt{51}\right)\left(22+3\sqrt{51}\right)\left(9+\sqrt{85}\right)}\sqrt[6]{16+\sqrt{255}}+$$
$$\frac{1}{8}\sqrt{\frac{5}{2}\left(4+\sqrt{15}\right)\left(10+\sqrt{51}\right)\left(22+3\sqrt{51}\right)\left(9+\sqrt{85}\right)}\sqrt[6]{16+\sqrt{255}}$$

From:

$$G_{777}^{2} = \sqrt{\left\{(2+\sqrt{3})(6+\sqrt{37})\left(\frac{\sqrt{3}+\sqrt{7}}{2}\right)\right\}}(246\sqrt{7}+107\sqrt{37})^{\frac{1}{6}}$$
$$\times\left\{\sqrt{\left(\frac{6+3\sqrt{7}}{4}\right)}+\sqrt{\left(\frac{10+3\sqrt{7}}{4}\right)}\right\}$$
$$\times\left\{\sqrt{\left(\frac{15+6\sqrt{7}}{2}\right)}+\sqrt{\left(\frac{17+6\sqrt{7}}{2}\right)}\right\},$$

(((2+sqrt3) (6+sqrt37) (1/2*(sqrt3+sqrt7)))^0.5 (((246sqrt7+107sqrt37)))^(1/6)
[(1/4*(6+3sqrt7))^0.5+(1/4(10+3sqrt7))^0.5]
[(1/2*(15+6sqrt7))^0.5+(1/2(17+6sqrt7))^0.5]

Input

$$\sqrt{(2+\sqrt{3})(6+\sqrt{37})\left(\frac{1}{2}(\sqrt{3}+\sqrt{7})\right)}\sqrt[6]{246\sqrt{7}+107\sqrt{37}}$$
$$\left(\sqrt{\frac{1}{4}(6+3\sqrt{7})}+\sqrt{\frac{1}{4}(10+3\sqrt{7})}\right)\left(\sqrt{\frac{1}{2}(15+6\sqrt{7})}+\sqrt{\frac{1}{2}(17+6\sqrt{7})}\right)$$

Exact result

$$\sqrt{\frac{1}{2}(2+\sqrt{3})(\sqrt{3}+\sqrt{7})(6+\sqrt{37})}\sqrt[6]{246\sqrt{7}+107\sqrt{37}}$$
$$\left(\frac{1}{2}\sqrt{6+3\sqrt{7}}+\frac{1}{2}\sqrt{10+3\sqrt{7}}\right)\left(\sqrt{\frac{1}{2}(15+6\sqrt{7})}+\sqrt{\frac{1}{2}(17+6\sqrt{7})}\right)$$

Decimal approximation

1044.2048545055534425664886148406305611383653989517741388463542051
...

1044.2048545055534…..

Alternate forms

$$\frac{1}{4}\sqrt{\frac{1}{2}(3+2\sqrt{3}+2\sqrt{7}+\sqrt{21})(6+\sqrt{37})}\sqrt[6]{246\sqrt{7}+107\sqrt{37}}$$
$$\left(\sqrt{3(2+\sqrt{7})}+\sqrt{10+3\sqrt{7}}\right)\left(\sqrt{6(5+2\sqrt{7})}+\sqrt{34+12\sqrt{7}}\right)$$

$$\frac{1}{4}\sqrt{3(5+2\sqrt{7})(3+2\sqrt{3}+2\sqrt{7}+\sqrt{21})(6+\sqrt{37})}$$
$$\sqrt[6]{246\sqrt{7}+107\sqrt{37}}\left(\sqrt{3(2+\sqrt{7})}+\sqrt{10+3\sqrt{7}}\right)+$$
$$\frac{1}{4}\sqrt{(17+6\sqrt{7})(3+2\sqrt{3}+2\sqrt{7}+\sqrt{21})(6+\sqrt{37})}$$
$$\sqrt[6]{246\sqrt{7}+107\sqrt{37}}\left(\sqrt{3(2+\sqrt{7})}+\sqrt{10+3\sqrt{7}}\right)$$

Expanded form

$$\frac{1}{4}\sqrt{(2+\sqrt{3})(\sqrt{3}+\sqrt{7})(6+3\sqrt{7})(15+6\sqrt{7})(6+\sqrt{37})}\sqrt[6]{246\sqrt{7}+107\sqrt{37}}+\frac{1}{4}\sqrt{(2+\sqrt{3})(\sqrt{3}+\sqrt{7})(10+3\sqrt{7})(15+6\sqrt{7})(6+\sqrt{37})}\sqrt[6]{246\sqrt{7}+107\sqrt{37}}+\frac{1}{4}\sqrt{(2+\sqrt{3})(\sqrt{3}+\sqrt{7})(6+3\sqrt{7})(17+6\sqrt{7})(6+\sqrt{37})}\sqrt[6]{246\sqrt{7}+107\sqrt{37}}+\frac{1}{4}\sqrt{(2+\sqrt{3})(\sqrt{3}+\sqrt{7})(10+3\sqrt{7})(17+6\sqrt{7})(6+\sqrt{37})}\sqrt[6]{246\sqrt{7}+107\sqrt{37}}$$

We have:

$$\begin{aligned} G_{1225} &= \left(\frac{1+\sqrt{5}}{2}\right)(6+\sqrt{35})^{\frac{1}{4}}\left\{\frac{7^{\frac{1}{4}}+\sqrt{(4+\sqrt{7})}}{2}\right\}^{\frac{3}{2}} \\ &\qquad \times\left[\sqrt{\left\{\frac{43+15\sqrt{7}+(8+3\sqrt{7})\sqrt{(10\sqrt{7})}}{8}\right\}}\right. \\ &\qquad \left.+\sqrt{\left\{\frac{35+15\sqrt{7}+(8+3\sqrt{7})\sqrt{(10\sqrt{7})}}{8}\right\}}\right], \\ G_{1353}^2 &= \sqrt{\left\{(3+\sqrt{11})(5+3\sqrt{3})\left(\frac{11+\sqrt{123}}{2}\right)\right\}} \\ &\qquad \times\left(\frac{6817+321\sqrt{451}}{4}\right)^{\frac{1}{6}} \\ &\qquad \times\left\{\sqrt{\left(\frac{17+3\sqrt{33}}{8}\right)}+\sqrt{\left(\frac{25+3\sqrt{33}}{8}\right)}\right\} \\ &\qquad \times\left\{\sqrt{\left(\frac{561+99\sqrt{33}}{8}\right)}+\sqrt{\left(\frac{569+99\sqrt{33}}{8}\right)}\right\}, \end{aligned}$$

From:

$$G_{1225} = \left(\frac{1+\sqrt{5}}{2}\right)(6+\sqrt{35})^{\frac{1}{4}}\left\{\frac{7^{\frac{1}{4}}+\sqrt{(4+\sqrt{7})}}{2}\right\}^{\frac{3}{2}}$$
$$\times\left[\sqrt{\left\{\frac{43+15\sqrt{7}+(8+3\sqrt{7})\sqrt{(10\sqrt{7})}}{8}\right\}}+\sqrt{\left\{\frac{35+15\sqrt{7}+(8+3\sqrt{7})\sqrt{(10\sqrt{7})}}{8}\right\}}\right],$$

(1/2*(1+sqrt5)) (6+sqrt35)^0.25 (1/2(7^0.25 + ((4+sqrt7)^0.5)))^1.5 [(((1/8*(43+15sqrt7+(8+3sqrt7)(10sqrt7)^0.5))))^0.5+(((1/8*(35+15sqrt7+(8+3sqrt7)(10sqrt7)^0.5))^0.5))]

Input

$$\left(\frac{1}{2}\left(1+\sqrt{5}\right)\right)\left(6+\sqrt{35}\right)^{0.25}\left(\frac{1}{2}\left(7^{0.25}+\sqrt{4+\sqrt{7}}\right)\right)^{1.5}\left(\sqrt{\frac{1}{8}\left(43+15\sqrt{7}+\left(8+3\sqrt{7}\right)\sqrt{10\sqrt{7}}\right)}+\sqrt{\frac{1}{8}\left(35+15\sqrt{7}+\left(8+3\sqrt{7}\right)\sqrt{10\sqrt{7}}\right)}\right)$$

Result

82.12171625977795959216471461742180170924594654407312726410033245 6...

82.1217162597779…..

And:

$$G^2_{1353} = \sqrt{\left\{(3+\sqrt{11})(5+3\sqrt{3})\left(\frac{11+\sqrt{123}}{2}\right)\right\}} \times \left(\frac{6817+321\sqrt{451}}{4}\right)^{\frac{1}{6}} \times \left\{\sqrt{\left(\frac{17+3\sqrt{33}}{8}\right)}+\sqrt{\left(\frac{25+3\sqrt{33}}{8}\right)}\right\} \times \left\{\sqrt{\left(\frac{561+99\sqrt{33}}{8}\right)}+\sqrt{\left(\frac{569+99\sqrt{33}}{8}\right)}\right\},$$

((((3+sqrt11)(5+3sqrt3)(1/2*(11+sqrt123)))))^0.5*(1/4*(6817+321sqrt451))^(1/6)
[(1/8*(17+3sqrt33))^0.5+(1/8(25+3sqrt33))^0.5]
[(1/8*(561+99sqrt33))^0.5+(1/8(569+99sqrt33))^0.5]

Input

$$\left(\sqrt{(3+\sqrt{11})(5+3\sqrt{3})\left(\frac{1}{2}(11+\sqrt{123})\right)}\sqrt[6]{\frac{1}{4}(6817+321\sqrt{451})}\right)\left(\sqrt{\frac{1}{8}(17+3\sqrt{33})}+\sqrt{\frac{1}{8}(25+3\sqrt{33})}\right)\left(\sqrt{\frac{1}{8}(561+99\sqrt{33})}+\sqrt{\frac{1}{8}(569+99\sqrt{33})}\right)$$

Exact result

$$\frac{1}{2^{5/6}}\sqrt{(5+3\sqrt{3})(3+\sqrt{11})(11+\sqrt{123})}\sqrt[6]{6817+321\sqrt{451}}\left(\frac{1}{2}\sqrt{\frac{1}{2}(17+3\sqrt{33})}+\frac{1}{2}\sqrt{\frac{1}{2}(25+3\sqrt{33})}\right)\left(\frac{1}{2}\sqrt{\frac{1}{2}(561+99\sqrt{33})}+\frac{1}{2}\sqrt{\frac{1}{2}(569+99\sqrt{33})}\right)$$

Decimal approximation

10756.140933072259735134541705077326995219472620706158177308491747
…

10756.140933072259….

From:

$$G_{1645}^2 = (2+\sqrt{5})\sqrt{\left\{(3+\sqrt{7})\left(\frac{7+\sqrt{47}}{2}\right)\right\}}\left(\frac{73\sqrt{5}+9\sqrt{329}}{2}\right)^{\frac{1}{4}}$$

$$\times\left\{\sqrt{\left(\frac{119+7\sqrt{329}}{8}\right)}+\sqrt{\left(\frac{127+7\sqrt{329}}{8}\right)}\right\}$$

$$\times\left\{\sqrt{\left(\frac{743+41\sqrt{329}}{8}\right)}+\sqrt{\left(\frac{751+41\sqrt{329}}{8}\right)}\right\}.$$

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

Input

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

Exact result

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

Decimal approximation

28901.331627275895753726096134514092864156605324146787942909495805

…

28901.33162727589…..

Alternate forms

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

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

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

$$\frac{1}{4}\sqrt[4]{\frac{1}{2}\left(73\sqrt{5}+9\sqrt{329}\right)}$$
$$\left(5\sqrt{7\left(25\,557+9647\sqrt{7}+3723\sqrt{47}+1409\sqrt{329}\right)}+\right.$$
$$2\sqrt{35\left(25\,557+9647\sqrt{7}+3723\sqrt{47}+1409\sqrt{329}\right)}+$$
$$\left(2+\sqrt{5}\right)\left(\sqrt{7\left(128\,471+48\,495\sqrt{7}+18\,715\sqrt{47}+7083\sqrt{329}\right)}+\right.$$
$$\sqrt{923\,587+348\,627\sqrt{7}+134\,543\sqrt{47}+50\,919\sqrt{329}}+$$
$$\left.\left.\sqrt{928\,557+350\,503\sqrt{7}+135\,267\sqrt{47}+51\,193\sqrt{329}}\right)\right)$$

Expanded form

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

From:

$$\left.\begin{aligned} G_{363} &= 2^{\frac{5}{12}}t, \quad \text{where} \\ & 2t^3 - t^2\{(4+\sqrt{33}) + \sqrt{(11+2\sqrt{33})}\} \\ & \qquad - t\{1+\sqrt{(11+2\sqrt{33})}\} - 1 = 0 \end{aligned}\right\},$$

2*t^3-t^2(((4+sqrt33)+(11+2sqrt33)^0.5))-t((1+(11+2sqrt33)^0.5)) – 1 = 0

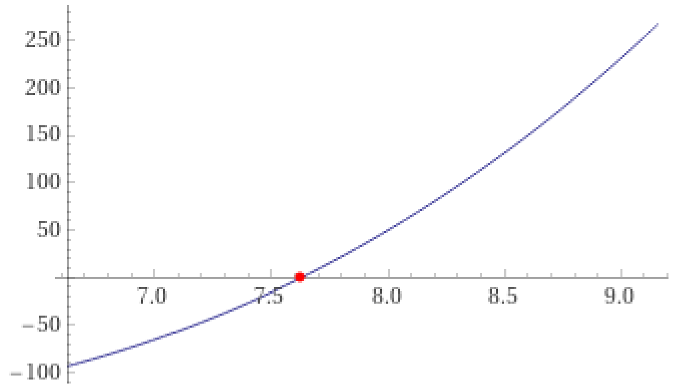
Input

$$2t^3 - t^2\left(\left(4+\sqrt{33}\right)+\sqrt{11+2\sqrt{33}}\right) - t\left(1+\sqrt{11+2\sqrt{33}}\right) - 1 = 0$$

Result

$$2t^3 - \left(4+\sqrt{33}+\sqrt{11+2\sqrt{33}}\right)t^2 - \left(1+\sqrt{11+2\sqrt{33}}\right)t - 1 = 0$$

Root plot



Alternate forms

$$t\left(-\left(-2t+\sqrt{11+2\sqrt{33}}+\sqrt{33}+4\right)t-\sqrt{11+2\sqrt{33}}-1\right)-1=0$$

$$2t^3 = \left(4+\sqrt{33}+\sqrt{11+2\sqrt{33}}\right)t^2 + \left(1+\sqrt{11+2\sqrt{33}}\right)t + 1$$

$$t^2\left(-\boxed{\text{root of } x^4 - 44x^2 + 528 \text{ near } x = 4.74227 - 0.699375\,i} - \boxed{\text{root of } x^4 - 44x^2 + 528 \text{ near } x = 4.74227 + 0.699375\,i} - 8 - 2\sqrt{33}\right) + t\left(-\boxed{\text{root of } x^4 - 44x^2 + 528 \text{ near } x = 4.74227 - 0.699375\,i} - \boxed{\text{root of } x^4 - 44x^2 + 528 \text{ near } x = 4.74227 + 0.699375\,i} - 2\right) + 4t^3 = 2$$

Expanded forms

$$2t^3 - \sqrt{11 + 2\sqrt{33}}\,t^2 - \sqrt{33}\,t^2 - 4t^2 - \sqrt{11 + 2\sqrt{33}}\,t - t - 1 = 0$$

$$2t^3 + \left(-4 - \sqrt{33} - \sqrt{11 + 2\sqrt{33}}\right)t^2 + \left(-1 - \sqrt{11 + 2\sqrt{33}}\right)t - 1 = 0$$

Real solution

$t \approx 7.6284$

7.6284

Complex solutions

$t \approx -0.19248 - 0.16880\,i$

$t \approx -0.19248 + 0.16880\,i$

Polar coordinates

$r = 0.256012$ (radius), $\theta = 2.42165$ (angle)

0.256012

From:

$$G_{363} = 2^{\frac{5}{12}} t,$$

2^(5/12) * 0.256012

Input interpretation

$2^{5/12} \times 0.256012$

Result

0.3417350207457788378090709315657941238108708431146022663959397955…

0.3417350207

2^(5/12) * 7.6284

Input interpretation

$2^{5/12} \times 7.6284$

Result

10.182692343550690148675517922427479548141677497990062688369244943…

10.18269234355….

From:

$$\left.\begin{array}{rcl} G_{325} & = & \left(\frac{3+\sqrt{13}}{2}\right)^{\frac{1}{4}} t, \quad \text{where} \\ & & t^3 + t^2\left(\frac{1-\sqrt{13}}{2}\right)^2 + t\left(\frac{1+\sqrt{13}}{2}\right)^2 + 1 \\ & & \quad = \sqrt{5}\left\{t^3 - t^2\left(\frac{1+\sqrt{13}}{2}\right) + t\left(\frac{1-\sqrt{13}}{2}\right) - 1\right\} \end{array}\right\},$$

Sqrt5 [t^3 – t^2 (1/2*(1+sqrt13)) + t(1/2*(1-sqrt13))-1]

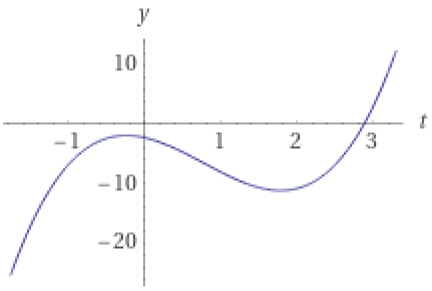
Input

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

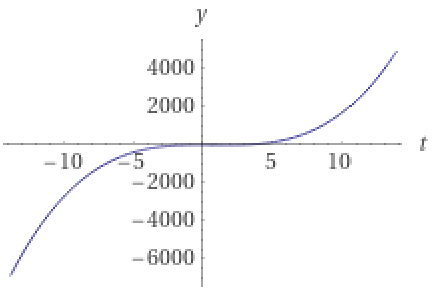
Result

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

Plots



(t from -1.8 to 3.3)



(t from -13.8 to 13.8)

Alternate forms

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

$$t\left(t\left(\sqrt{5}\,t - \frac{\sqrt{65}}{2} - \frac{\sqrt{5}}{2}\right) - \frac{\sqrt{65}}{2} + \frac{\sqrt{5}}{2}\right) - \sqrt{5}$$

$$\sqrt{5}\left(\left(t + \frac{1}{6}\left(-1-\sqrt{13}\right)\right)^3 + \left(\frac{1}{2}\left(1-\sqrt{13}\right) - \frac{1}{12}\left(-1-\sqrt{13}\right)^2\right)\left(t + \frac{1}{6}\left(-1-\sqrt{13}\right)\right) - \frac{1}{12}\left(-1-\sqrt{13}\right)\left(1-\sqrt{13}\right) + \frac{1}{108}\left(-1-\sqrt{13}\right)^3 - 1\right)$$

Expanded form

$$\sqrt{5}\, t^3 - \frac{\sqrt{65}\, t^2}{2} - \frac{\sqrt{5}\, t^2}{2} - \frac{\sqrt{65}\, t}{2} + \frac{\sqrt{5}\, t}{2} - \sqrt{5}$$

Real root

$t \approx 2.8765$

2.8765

Complex roots

$t \approx -0.28688 - 0.51511\, i$

$t \approx -0.28688 + 0.51511\, i$

Polar coordinates

$r = 0.589609$ (radius), $\theta = 2.07894$ (angle)

0.589609

Polynomial discriminant

$\Delta = -2800$

Properties as a real function

Domain

$\mathbb{R}$ (all real numbers)

Range

$\mathbb{R}$ (all real numbers)

Surjectivity

surjective onto $\mathbb{R}$

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

Derivative

$$\frac{d}{dt}\left(\sqrt{5}\left(t^3 - \frac{1}{2}t^2\left(1+\sqrt{13}\right) + \frac{1}{2}t\left(1-\sqrt{13}\right) - 1\right)\right) = -\frac{1}{2}\sqrt{5}\left(-6t^2 + 2\left(1+\sqrt{13}\right)t + \sqrt{13} - 1\right)$$

Indefinite integral

$$\int \sqrt{5}\left(-1 + \frac{1}{2}\left(1-\sqrt{13}\right)t - \frac{1}{2}\left(1+\sqrt{13}\right)t^2 + t^3\right)dt = \frac{1}{2}\sqrt{5}\left(\frac{t^4}{2} - \frac{1}{3}\left(1+\sqrt{13}\right)t^3 - \frac{\sqrt{13}\,t^2}{2} + \frac{t^2}{2} - 2t\right) + \text{constant}$$

Local maximum

$$\max\left\{\sqrt{5}\left(t^3 - \frac{1}{2}t^2\left(1+\sqrt{13}\right) + \frac{1}{2}t\left(1-\sqrt{13}\right) - 1\right)\right\} = \frac{4}{27}\sqrt{5}\left(-16 - \sqrt{13} + \sqrt{2\left(1+\sqrt{13}\right)} + \sqrt{26\left(1+\sqrt{13}\right)}\right)$$

$$\text{at } t = \frac{1}{6} + \frac{\sqrt{13}}{6} - \frac{1}{3}\sqrt{2\left(1+\sqrt{13}\right)}$$

Local minimum

$$\min\left\{\sqrt{5}\left(t^3 - \frac{1}{2}t^2\left(1+\sqrt{13}\right) + \frac{1}{2}t\left(1-\sqrt{13}\right) - 1\right)\right\} = -\frac{4}{27}\sqrt{5}\left(16 + \sqrt{13} + \sqrt{2\left(1+\sqrt{13}\right)} + \sqrt{26\left(1+\sqrt{13}\right)}\right)$$

$$\text{at } t = \frac{1}{6} + \frac{\sqrt{13}}{6} + \frac{1}{3}\sqrt{2\left(1+\sqrt{13}\right)}$$

From:

$$G_{325} = \left(\frac{3+\sqrt{13}}{2}\right)^{\frac{1}{4}} t,$$

(1/2*(3+sqrt13))^0.25 * 2.8765

Input interpretation

$$\left(\frac{1}{2}\left(3+\sqrt{13}\right)\right)^{0.25} \times 2.8765$$

Result

3.877788751015730125327142364030583257270347160156564820295098884 4...

3.87778875101573

Here all the results that we have obtained from the development of the previous expressions.

2.781323803920547….

5.8364372603724….

5.93160414841568….

6.2220252193329….

7.033656610253….

20.37749997725….

2.911116655774….

3.32593429313….

3.39813955444….

11.5730481521….

3.464643979529….

3.830586436322…..

0.2817853021….

3.6548630551090639….

15.3156144852002258……

15.833404207477….

16.542097553485……

0.518874943499968……

4.245471976946……

18.21547254999….

4.587808247….

4.8277165856693115….

0.21688040084606…..

5.30492251818648

5.47893971377417

32.2740236434008……

33.4477338319059….

5.990702076….

6.335288332….

50.159687983….

7.78351473….

66.3853254777….

8.42699415….

9.165151988….

172.640872178….

8.9778697879…..

200.102833842928….

224.36895935….

16.7336273728….

333.581847612….

17.623908118731…..

986.7726750808841….

1044.2048545055534…..

82.1217162597779…..

10756.140933072259….

28901.33162727589…..

10.18269234355….

3.87778875101573

From the sum, we obtain:

(3.464643979529+3.830586436322+0.2817853021+3.6548630551090639 +15.3156144852002258+15.833404207477 +16.542097553485 +0.518874943499968 +4.245471976946+18.21547254999+4.587808247)

Input interpretation

3.464643979529 + 3.830586436322 + 0.2817853021 + 3.6548630551090639 + 15.3156144852002258 + 15.833404207477 + 16.542097553485 + 0.518874943499968 + 4.245471976946 + 18.21547254999 + 4.587808247

Result

86.4906227366582577

(2.781323803920547 +5.8364372603724 +5.93160414841568+6.2220252193329 +7.033656610253+20.37749997725+2.911116655774+3.32593429313+3.39813955 444+11.5730481521)

Input interpretation

2.781323803920547 + 5.8364372603724 + 5.93160414841568 + 6.2220252193329 + 7.033656610253 + 20.37749997725 + 2.911116655774 + 3.32593429313 + 3.39813955444 + 11.5730481521

Result

69.390785674988527

(4.8277165856693115+0.21688040084606+5.30492251818648 +5.47893971377417 +32.2740236434008 +33.4477338319059)

Input interpretation

4.8277165856693115 + 0.21688040084606 + 5.30492251818648 + 5.47893971377417 + 32.2740236434008 + 33.4477338319059

Result

81.5502166937827215

(5.990702076+6.335288332+50.159687983+7.78351473+66.3853254777+8.42699415+9.165151988 +172.640872178+8.9778697879+200.102833842928)

Input interpretation

5.990702076 + 6.335288332 + 50.159687983 + 7.78351473 + 66.3853254777 + 8.42699415 + 9.165151988 + 172.640872178 + 8.9778697879 + 200.102833842928

Result

535.968240545528

(224.36895935+16.7336273728+333.581847612+17.623908118731+986.7726750808841+1044.2048545055534+82.1217162597779 +10756.140933072259+28901.33162727589+10.18269234355+3.87778875101573)

Input interpretation

224.36895935 + 16.7336273728 + 333.581847612 + 17.623908118731 + 986.7726750808841 + 1044.2048545055534 + 82.1217162597779 + 10756.140933072259 + 28901.33162727589 + 10.18269234355 + 3.87778875101573

Result

42376.94062974246113

(42376.94062974246113+535.968240545528+81.5502166937827215+69.390785674988527+86.4906227366582577)

Input interpretation

42376.94062974246113 + 535.968240545528 + 81.5502166937827215 + 69.390785674988527 + 86.4906227366582577

Result

43150.3404953934186362

43150.3404953934186362 Final results of the sum

from which, we obtain:

sqrt(6*(((1/5^2(42376.9406297+535.9682405+81.5502166+69.3907856+86.4906227)+3))^1/15))

Input interpretation

$$\sqrt{\left(6\left(\frac{1}{5^2}(42\,376.9406297+535.9682405+81.5502166+69.3907856+86.4906227)+3\right)\text{^}(1/15)\right)}$$

Result

3.140524884790…

3.140524884790… ≈ π

We obtain also:

((1/5^2(42376.9406297+535.9682405+81.5502166+69.3907856+86.4906227)+3))

Input interpretation

$$\frac{1}{5^2}(42\,376.9406297+535.9682405+81.5502166+69.3907856+86.4906227)+3$$

Result

1729.013619804

1729.013619804

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. (1728 = $8^2 * 3^3$) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

((1/5^2(42376.9406297+535.9682405+81.5502166+69.3907856+86.4906227)+3))^1/15

Input interpretation

$$\left(\frac{1}{5^2}(42\,376.9406297+535.9682405+81.5502166+69.3907856+86.4906227)+3\right)\text{^}(1/15)$$

Result

1.64381609200…

1.64381609200….. ≈ ζ(2) = $\frac{\pi^2}{6}$ = 1.644934 ... (trace of the instanton shape)

(1/27((1/5^2(42376.9406297+535.9682405+81.5502166+69.3907856+86.4906227)+2)))^2

Input interpretation

$$\left(\frac{1}{27}\left(\frac{1}{5^2}(42376.9406297 + 535.9682405 + 81.5502166 + 69.3907856 + 86.4906227) + 2\right)\right)^2$$

Result

4096.0645682141605775012565157750342935528120713305898491083676268…

4096.0645682…. ≈ 4096 = 64^2

Now, we multiply the results and obtain:

(3.464643979529*3.830586436322*0.2817853021*3.6548630551090639 *15.3156144852002258*15.833404207477 *16.542097553485 *0.518874943499968 *4.245471976946*18.21547254999*4.587808247)

Input interpretation

3.464643979529 × 3.830586436322 × 0.2817853021 × 3.6548630551090639 × 15.3156144852002258 × 15.833404207477 × 16.542097553485 × 0.518874943499968 × 4.245471976946 × 18.21547254999 × 4.587808247

Result

1.00936212952519821587817530059781834993984139884351952028913… × 10^7

(2.781323803920547 *5.8364372603724 *5.93160414841568*6.2220252193329 *7.033656610253*20.37749997725*2.911116655774*3.32593429313*3.39813955444*11.5730481521)

Input interpretation

2.781323803920547 × 5.8364372603724 × 5.93160414841568 × 6.2220252193329 × 7.033656610253 × 20.37749997725 × 2.911116655774 × 3.32593429313 × 3.39813955444 × 11.5730481521

Result

$3.26962246946337593106594080941002112657092362157999003002034\ldots \times 10^7$

(4.8277165856693115*0.21688040084606*5.30492251818648 *5.47893971377417 *32.2740236434008 *33.4477338319059)

Input interpretation

4.8277165856693115 × 0.21688040084606 × 5.30492251818648 × 5.47893971377417 × 32.2740236434008 × 33.4477338319059

Result

32851.67004311093731447584131001792546874361354797287550621985730 8…

(5.990702076*6.335288332*50.159687983*7.78351473*66.3853254777*8.42699415*9.165151988 *172.640872178*8.9778697879*200.102833842928)

Input interpretation

5.990702076 × 6.335288332 × 50.159687983 × 7.78351473 × 66.3853254777 × 8.42699415 × 9.165151988 × 172.640872178 × 8.9778697879 × 200.102833842928

Result

$2.35629304255456518566547200179495085164046736167071218028887\ldots \times 10^{13}$

(224.36895935*16.7336273728*333.581847612*17.623908118731*986.7726750808841*1044.2048545055534*82.1217162597779 *10756.140933072259*28901.33162727589*10.18269234355*3.87778875101573)

Input interpretation

$224.36895935 \times 16.7336273728 \times 333.581847612 \times 17.623908118731 \times 986.7726750808841 \times 1044.2048545055534 \times 82.1217162597779 \times 10756.140933072259 \times 28901.33162727589 \times 10.18269234355 \times 3.87778875101573$

Result

$2.292658887451951005252371989868437777610269909356544967629 6\ldots \times 10^{25}$

(1.0093621295251982158781753 × 10^7 * 3.26962246946337593106 × 10^7 * 32851.670043110937314475 * 2.356293042554565185665472 × 10^13 * 2.292658887451951 × 10^25)

Input interpretation

$1.0093621295251982158781753 \times 10^7 \times 3.2696224694633759310 6 \times 10^7 \times 32851.670043110937314475 \times 2.356293042554565185665472 \times 10^{13} \times 2.292658887451951 \times 10^{25}$

Result

$5.856940496589346573185434908609371986358300990979207010525 78\ldots \times 10^{57}$

5.856940496589346573 × 10^{57} final result

From which:

(5.856940496589346573 × 10^57)^2 * (135^3+138^3) * (Pi^2)/49

where 135^3 and 138^3 are two Ramanujan cubes (see Ramanujan taxicab numbers)

Input interpretation

$(5.856940496589346573 \times 10^{57})^2 (135^3 + 138^3) \times \frac{\pi^2}{49}$

Result

$3.515851670480918214\ldots \times 10^{121}$

0.3515851670480918214*10^{122}

And:

1/(((5.856940496589346573 × 10^57)^2 * (135^3+138^3) * (Pi^2)/49))

Input interpretation

$$\frac{1}{(5.856940496589346573 \times 10^{57})^2 (135^3 + 138^3) \times \frac{\pi^2}{49}}$$

Result

$2.844261060260299050\ldots \times 10^{-122}$

$2.844261060260299050\ldots * 10^{-122}$

The results are equal to the observed value of ρ_Λ or Λ today that is precisely the classical dual of its quantum precursor values ρ_Q , Λ_Q in the quantum very early precursor vacuum U_Q as determined by our dual equations. With regard the Cosmological constant, fundamental are the following results: $\Lambda = 2.846 * 10^{-122}$ and $\Lambda_Q = 0.3516 * 10^{122}$ (**New Quantum Structure of the Space-Time** - *Norma G. SANCHEZ* - arXiv:1910.13382v1 [physics.gen-ph] 28 Oct 2019)

We obtain also:

233*1/(ln(5.856940496589346573 × 10^57)+11)

Input interpretation

$$233 \times \frac{1}{\log(5.856940496589346573 \times 10^{57}) + 11}$$

$\log(x)$ is the natural logarithm

Result

1.61788727653433643777...

1.61788727653433643777…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

(199+29+7+2)*1/(ln(5.856940496589346573 × 10^57)+11)

Input interpretation

$$(199 + 29 + 7 + 2) \times \frac{1}{\log(5.856940496589346573 \times 10^{57}) + 11}$$

log(x) is the natural logarithm

Result

1.645662165401878694 21…

1.645662165401878694 21…. ≈ ζ(2) = $\frac{\pi^2}{6}$ = 1.644934 ... (trace of the instanton shape)

Mathematical connections with some sectors of String Theory

Observations

We note that, from the number 8, we obtain as follows:

8^2

64

$8^2 \times 2 \times 8$

1024

$8^4 = 8^2 \times 2^6$

True

$8^4 = 4096$

$8^2 \times 2^6 = 4096$

$2^{13} = 2 \times 8^4$

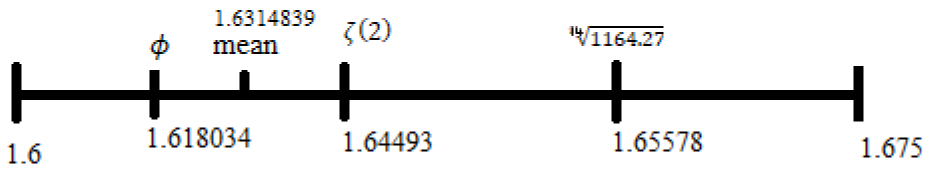
True

$2^{13} = 8192$

$2 \times 8^4 = 8192$

We notice how from the numbers 8 and 2 we get 64, 1024, 4096 and 8192, and that 8 is the fundamental number. In fact $8^2 = 64$, $8^3 = 512$, $8^4 = 4096$. We define it "fundamental number", since 8 is a Fibonacci number, which by rule, divided by the previous one, which is 5, gives 1.6 , a value that tends to the golden ratio, as for all numbers in the Fibonacci sequence

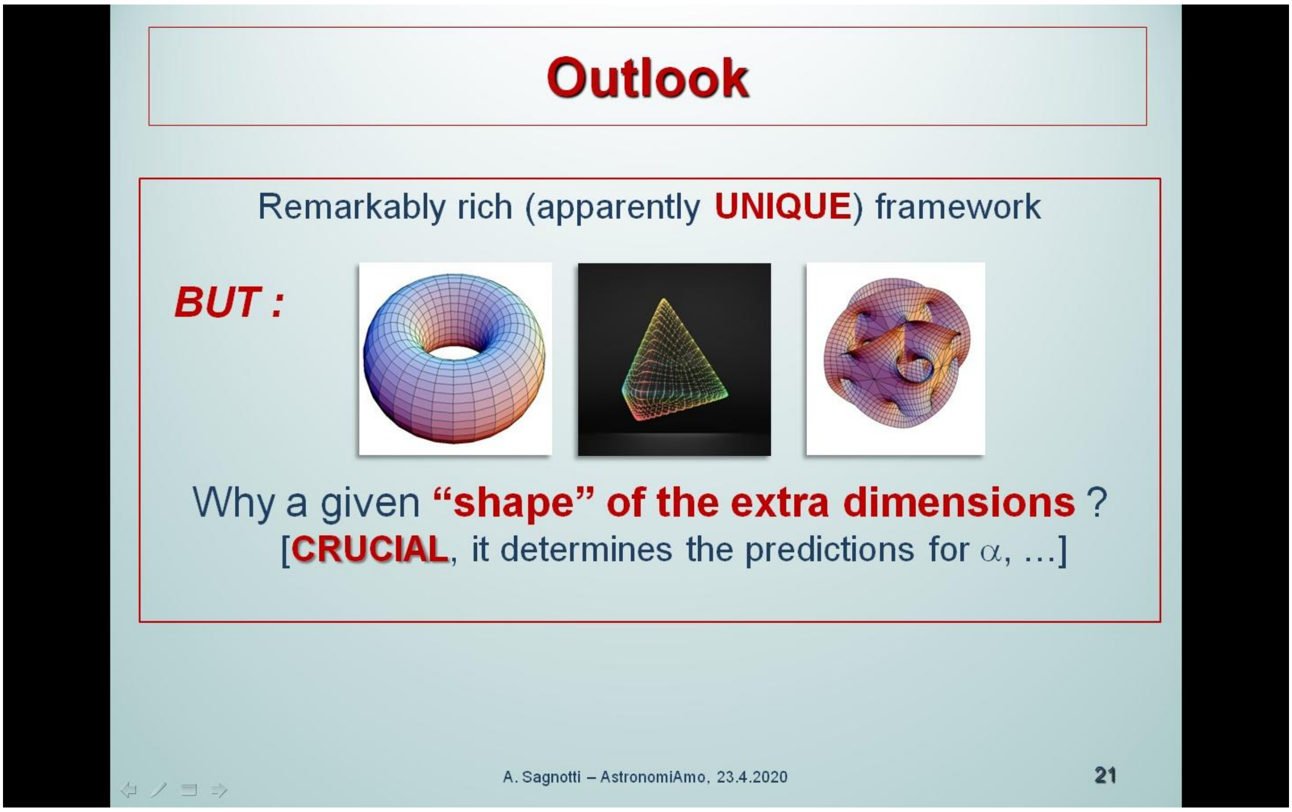
“Golden” Range



Finally we note how 8^2 = 64, multiplied by 27, to which we add 1, is equal to 1729, the so-called "Hardy-Ramanujan number". Then taking the 15th root of 1729, we obtain a value close to ζ(2) that 1.6438 ..., which, in turn, is included in the range of what we call "golden numbers"

Furthermore for all the results very near to 1728 or 1729, adding 64 = 8^2, one obtain values about equal to 1792 or 1793. These are values almost equal to the Planck multipole spectrum frequency 1792.35 and to the hypothetical Gluino mass

We have that:



From: *A. Sagnotti – AstronomiAmo, 23.04.2020*

In the above figure, it is said that: "why a given shape of the extra dimensions? Crucial, it determines the predictions for α".

We propose that whatever shape the compactified dimensions are, their geometry must be based on the values of the golden ratio and ζ(2), (the latter connected to 1728 or 1729, whose fifteenth root provides an excellent approximation to the above mentioned value) which are recurrent as solutions of the equations that we are going to develop. It is important to specify that the initial conditions are **always** values belonging to a fundamental chapter of the work of S. Ramanujan "Modular equations and Appoximations to Pi" (see references). These values are some multiples of 8 (64 and 4096), 276, which added to 4096, is equal to 4372, and finally $e^{\pi\sqrt{22}}$

We obtain, in certain cases, the following connections:

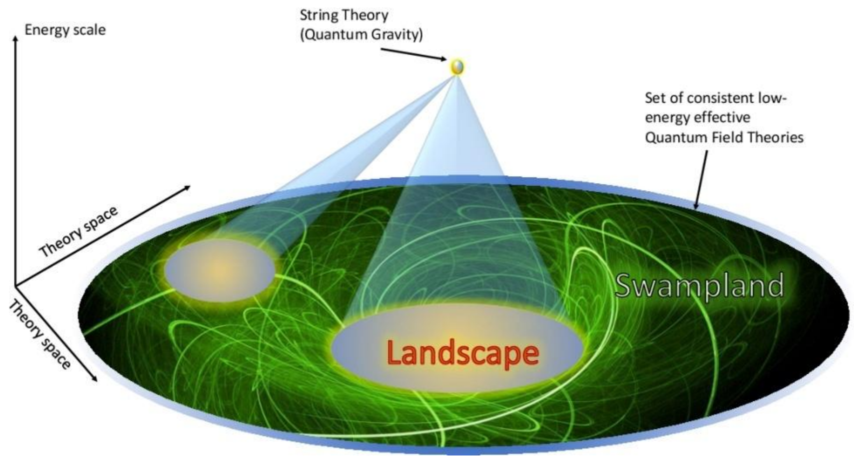


Fig. 1

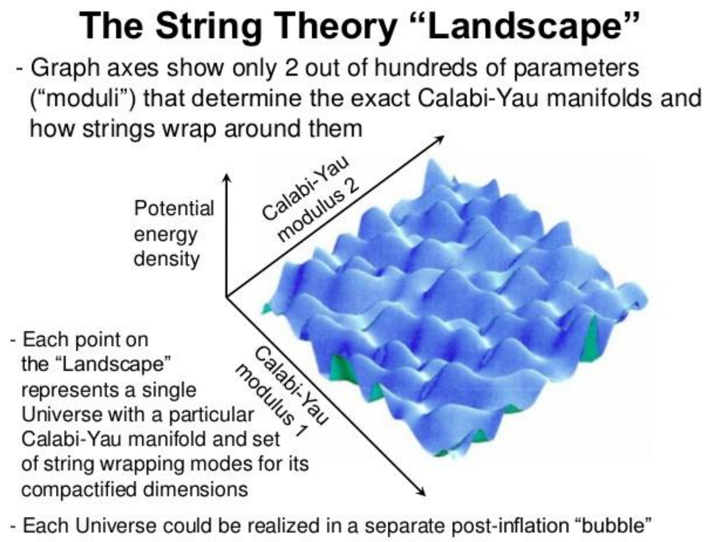


Fig. 2

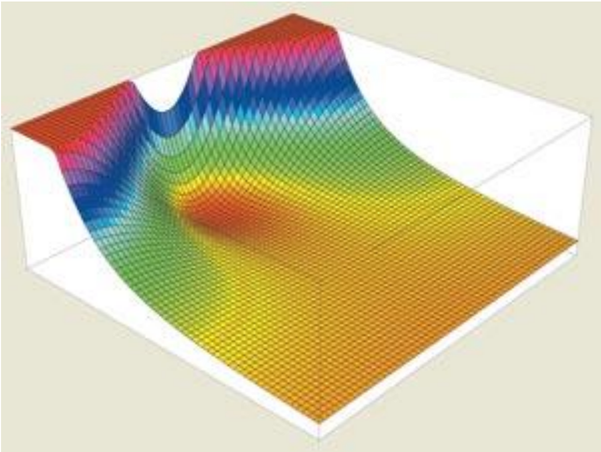


Fig. 3

Stringscape - a small part of the string-theory landscape showing the new de Sitter solution as a local minimum of the energy (vertical axis). The global minimum occurs at the infinite size of the extra dimensions on the extreme right of the figure.

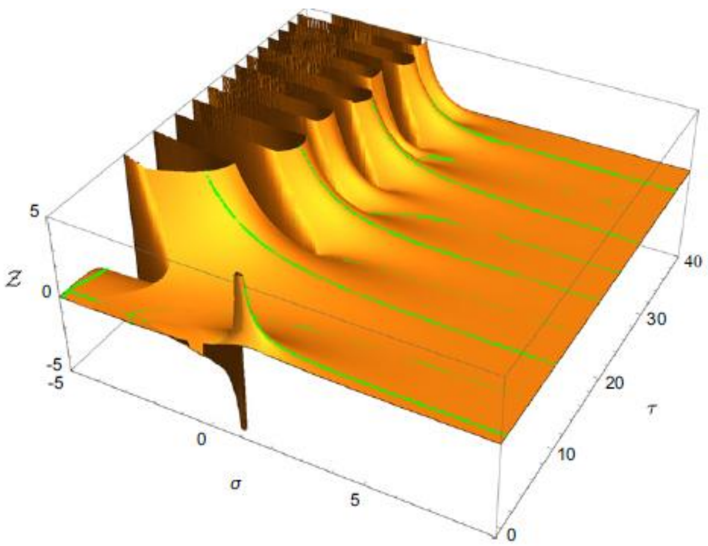


Figure 2. Lines in the complex plane where the Riemann zeta function ζ is real (green) depicted on a relief representing the positive absolute value of ζ for arguments $s \equiv \sigma + \mathrm{i}\tau$ where the real part of ζ is positive, and the negative absolute value of ζ where the real part of ζ is negative. This representation brings out most clearly that the lines of constant phase corresponding to phases of integer multiples of 2π run down the hills on the left-hand side, turn around on the right and terminate in the non-trivial zeros. This pattern repeats itself infinitely many times. The points of arrival and departure on the right-hand side of the picture are equally spaced and given by equation (11).

Fig. 4

With regard the Fig. 4 the points of arrival and departure on the right-hand side of the picture are equally spaced and given by the following equation:

$$\tau'_k \equiv k \, \frac{\pi}{\ln 2},$$

with $k = \ldots, -2, -1, 0, 1, 2, \ldots.$

we obtain:

2Pi/(ln(2))

Input:

$$2 \times \frac{\pi}{\log(2)}$$

Exact result:

$$\frac{2\pi}{\log(2)}$$

Decimal approximation:

9.064720283654387619255365891433333620343722935447591168372033095 8

…

9.06472028365….

Alternative representations:

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{\log_e(2)}$$

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{\log(a)\log_a(2)}$$

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

Series representations:

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

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

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

Integral representations:

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

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

From which:

(2Pi/(ln(2)))*(1/12 π log(2))

Input:

$$\left(2\times\frac{\pi}{\log(2)}\right)\left(\frac{1}{12}\,\pi\log(2)\right)$$

$\log(x)$ is the natural logarithm

Exact result:

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

Decimal approximation:

1.6449340668482264364724151666460251892189499012067984377355582293

...

1.6449340668…. = ζ(2) = $\frac{\pi^2}{6}$ = 1.644934 ...

From:

Modular equations and approximations to π - *Srinivasa Ramanujan*
Quarterly Journal of Mathematics, XLV, 1914, 350 – 372

We have that:

Hence

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

so that

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

Hence

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

Again

$$G_{37} = (6+\sqrt{37})^{\frac{1}{4}},$$

$$\begin{aligned} 64G_{37}^{24} &= e^{\pi\sqrt{37}} + 24 + 276e^{-\pi\sqrt{37}} + \cdots, \\ 64G_{37}^{-24} &= 4096e^{-\pi\sqrt{37}} - \cdots, \end{aligned}$$

so that

$$64(G_{37}^{24} + G_{37}^{-24}) = e^{\pi\sqrt{37}} + 24 + 4372e^{-\pi\sqrt{37}} - \cdots = 64\{(6+\sqrt{37})^{6} + (6-\sqrt{37})^{6}\}.$$

Hence

$$e^{\pi\sqrt{37}} = 199148647.999978\ldots.$$

Similarly, from

$$g_{58} = \sqrt{\left(\frac{5+\sqrt{29}}{2}\right)},$$

we obtain

$$64(g_{58}^{24} + g_{58}^{-24}) = e^{\pi\sqrt{58}} - 24 + 4372e^{-\pi\sqrt{58}} + \cdots = 64\left\{\left(\frac{5+\sqrt{29}}{2}\right)^{12} + \left(\frac{5-\sqrt{29}}{2}\right)^{12}\right\}.$$

Hence

$$e^{\pi\sqrt{58}} = 24591257751.99999982\ldots.$$

We note that, with regard 4372, we can to obtain the following results:

27((4372)^1/2-2-1/2(((√(10-2√5) -2))/((√5-1))))+φ

Input

$$27\left(\sqrt{4372} - 2 - \frac{1}{2} \times \frac{\sqrt{10 - 2\sqrt{5}} - 2}{\sqrt{5} - 1}\right) + \phi$$

ϕ is the golden ratio

Result

$$\phi + 27\left(-2 + 2\sqrt{1093} - \frac{\sqrt{10 - 2\sqrt{5}} - 2}{2(\sqrt{5} - 1)}\right)$$

Decimal approximation

1729.0526944170905625170637208637148763684189306538457854815447023...

1729.0526944….

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. (1728 = $8^2 * 3^3$) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Alternate forms

$$\frac{1}{8}\left(-27\sqrt{5(10 - 2\sqrt{5})} + 58\sqrt{5} + 432\sqrt{1093} - 27\sqrt{2(5 - \sqrt{5})} - 374\right)$$

$$\phi - 54 + 54\sqrt{1093} + \frac{27}{4}\left(1 + \sqrt{5} - \sqrt{2(5 + \sqrt{5})}\right)$$

$$\phi - 54 + 54\sqrt{1093} - \frac{27\left(\sqrt{10 - 2\sqrt{5}} - 2\right)}{2\left(\sqrt{5} - 1\right)}$$

Minimal polynomial

$$256x^8 + 95744x^7 - 3248750080x^6 - 914210725504x^5 + 15498355554921184x^4 + 2911478392539914656x^3 - 32941144911224677091680x^2 - 3092528914069760354714456x + 26320050609744039027169013041$$

Expanded forms

$$-\frac{187}{4} + \frac{29\sqrt{5}}{4} + 54\sqrt{1093} - \frac{27}{8}\sqrt{10 - 2\sqrt{5}} - \frac{27}{8}\sqrt{5\left(10 - 2\sqrt{5}\right)}$$

$$-\frac{107}{2} + \frac{\sqrt{5}}{2} + 54\sqrt{1093} + \frac{27}{\sqrt{5} - 1} - \frac{27\sqrt{10 - 2\sqrt{5}}}{2\left(\sqrt{5} - 1\right)}$$

Series representations

$$27\left(\sqrt{4372} - 2 - \frac{\sqrt{10 - 2\sqrt{5}} - 2}{\left(\sqrt{5} - 1\right)2}\right) + \phi = \left(162 - 108\sqrt{1093} - 2\phi - 108\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} + 108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} + 2\phi\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} - 27\sqrt{9 - 2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9 - 2\sqrt{5}\right)^{-k}\right) \Big/ \left(2\left(-1 + \sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k}\right)\right)$$

$$27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$

$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+2\phi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(9-2\sqrt{5}\right)^{-k}}{k!}\right)\Bigg/\left(2\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

$$27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$

$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+108\sqrt{1093}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+2\phi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}-27\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}\right)\Bigg/\left(2\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right)$$

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

Or:

27((4096+276)^1/2-2-1/2(((√(10-2√5) -2))⁄((√5-1))))+φ

Input

$$27\left(\sqrt{4096+276}-2-\frac{1}{2}\times\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)+\phi$$

ϕ is the golden ratio

Result

$$\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)$$

Decimal approximation

1729.052694417090562517063720863714876368418930653845785481544 7023
…

1729.0526944…. as above

Alternate forms

$$\frac{1}{8}\left(-27\sqrt{5\left(10-2\sqrt{5}\right)}+58\sqrt{5}+432\sqrt{1093}-27\sqrt{2\left(5-\sqrt{5}\right)}-374\right)$$

$$\phi-54+54\sqrt{1093}+\frac{27}{4}\left(1+\sqrt{5}-\sqrt{2\left(5+\sqrt{5}\right)}\right)$$

$$\phi-54+54\sqrt{1093}-\frac{27\left(\sqrt{10-2\sqrt{5}}-2\right)}{2\left(\sqrt{5}-1\right)}$$

Minimal polynomial

$$256 x^8 + 95\,744 x^7 - 3\,248\,750\,080 x^6 - 914\,210\,725\,504 x^5 + 15\,498\,355\,554\,921\,184 x^4 + 2\,911\,478\,392\,539\,914\,656 x^3 - 32\,941\,144\,911\,224\,677\,091\,680 x^2 - 3\,092\,528\,914\,069\,760\,354\,714\,456 x + 26\,320\,050\,609\,744\,039\,027\,169\,013\,041$$

Expanded forms

$$-\frac{187}{4} + \frac{29\sqrt{5}}{4} + 54\sqrt{1093} - \frac{27}{8}\sqrt{10-2\sqrt{5}} - \frac{27}{8}\sqrt{5\left(10-2\sqrt{5}\right)}$$

$$-\frac{107}{2} + \frac{\sqrt{5}}{2} + 54\sqrt{1093} + \frac{27}{\sqrt{5}-1} - \frac{27\sqrt{10-2\sqrt{5}}}{2\left(\sqrt{5}-1\right)}$$

Series representations

$$27\left(\sqrt{4096+276} - 2 - \frac{\sqrt{10-2\sqrt{5}} - 2}{\left(\sqrt{5}-1\right)2}\right) + \phi = \left(162 - 108\sqrt{1093} - 2\phi - 108\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} + 108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} + 2\phi\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k} - 27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9-2\sqrt{5}\right)^{-k}\right) \Big/ \left(2\left(-1+\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k}\right)\right)$$

$$27\left(\sqrt{4096+276}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$

$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+\right.$$

$$108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+2\phi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-$$

$$\left.27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(9-2\sqrt{5}\right)^{-k}}{k!}\right)\Big/$$

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

$$27\left(\sqrt{4096+276}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi=$$

$$\left(162-108\sqrt{1093}-2\phi-108\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+\right.$$

$$108\sqrt{1093}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+$$

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

$$\left.27\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/$$

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

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

From which:

(27((4372)^1/2-2-1/2(((√(10-2√5) -2))/((√5-1))))+φ)^1/15

Input

$$\sqrt[15]{27\left(\sqrt{4372}-2-\frac{1}{2}\times\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)+\phi}$$

ϕ is the golden ratio

Exact result

$$\sqrt[15]{\phi+27\left(-2+2\sqrt{1093}-\frac{\sqrt{10-2\sqrt{5}}-2}{2\left(\sqrt{5}-1\right)}\right)}$$

Decimal approximation

1.643818568584986279990230131703681005418575687350518480483418312 4

...

1.64381856858…. ≈ ζ(2) = $\frac{\pi^2}{6}$ = 1.644934 ...

Alternate forms

$$\sqrt[15]{\phi-54+54\sqrt{1093}-\frac{27\left(\sqrt{10-2\sqrt{5}}-2\right)}{2\left(\sqrt{5}-1\right)}}$$

$$\frac{1}{\sqrt[15]{\frac{2\left(\sqrt{5}-1\right)}{166-108\sqrt{5}-108\sqrt{1093}+108\sqrt{5465}-27\sqrt{2\left(5-\sqrt{5}\right)}}}}$$

$$\sqrt[15]{\text{root of } 256x^8 + 95744x^7 - 3248750080x^6 - 914210725504x^5 + 15498355554921184x^4 + 2911478392539914656x^3 - 32941144911224677091680x^2 - 3092528914069760354714456x + 26320050609744039027169013041 \text{ near } x = 1729.05}$$

Minimal polynomial

$$256x^{120} + 95744x^{105} - 3248750080x^{90} - 914210725504x^{75} + 15498355554921184x^{60} + 2911478392539914656x^{45} - 32941144911224677091680x^{30} - 3092528914069760354714456x^{15} + 26320050609744039027169013041$$

Expanded forms

$$\sqrt[15]{\frac{1}{2}(1+\sqrt{5}) + 27\left(-2 + 2\sqrt{1093} - \frac{\sqrt{10-2\sqrt{5}} - 2}{2(\sqrt{5}-1)}\right)}$$

$$\sqrt[15]{-\frac{187}{4} + \frac{29\sqrt{5}}{4} + 54\sqrt{1093} - \frac{27}{8}\sqrt{10-2\sqrt{5}} - \frac{27}{8}\sqrt{5(10-2\sqrt{5})}}$$

All 15th roots of ϕ + 27 (-2 + 2 sqrt(1093) - (sqrt(10 - 2 sqrt(5)) - 2)/(2 (sqrt(5) - 1)))

$$e^0 \sqrt[15]{\phi + 27\left(-2 + 2\sqrt{1093} - \frac{\sqrt{10-2\sqrt{5}} - 2}{2(\sqrt{5}-1)}\right)} \approx 1.64382$$ (real, principal root)

$$e^{(2i\pi)/15} \sqrt[15]{\phi + 27\left(-2 + 2\sqrt{1093} - \frac{\sqrt{10-2\sqrt{5}} - 2}{2(\sqrt{5}-1)}\right)} \approx 1.50170 + 0.6686i$$

$$e^{(4 i \pi)/15} \sqrt[15]{\phi + 27 \left(-2 + 2 \sqrt{1093} - \frac{\sqrt{10 - 2\sqrt{5}} - 2}{2\left(\sqrt{5} - 1\right)}\right)} \approx 1.0999 + 1.2216\, i$$

$$e^{(2 i \pi)/5} \sqrt[15]{\phi + 27 \left(-2 + 2 \sqrt{1093} - \frac{\sqrt{10 - 2\sqrt{5}} - 2}{2\left(\sqrt{5} - 1\right)}\right)} \approx 0.5080 + 1.5634\, i$$

$$e^{(8 i \pi)/15} \sqrt[15]{\phi + 27 \left(-2 + 2 \sqrt{1093} - \frac{\sqrt{10 - 2\sqrt{5}} - 2}{2\left(\sqrt{5} - 1\right)}\right)} \approx -0.17183 + 1.63481\, i$$

Series representations

$$\sqrt[15]{27 \left(\sqrt{4372} - 2 - \frac{\sqrt{10 - 2\sqrt{5}} - 2}{\left(\sqrt{5} - 1\right) 2}\right) + \phi} =$$

$$\frac{1}{\sqrt[15]{2}} \left(\left(\left(162 - 108 \sqrt{1093} - 2 \phi - 108 \sqrt{4} \sum_{k=0}^{\infty} 4^{-k} \binom{\frac{1}{2}}{k} + 108 \sqrt{1093} \sqrt{4} \sum_{k=0}^{\infty} 4^{-k} \binom{\frac{1}{2}}{k} + 2 \phi \sqrt{4} \sum_{k=0}^{\infty} 4^{-k} \binom{\frac{1}{2}}{k} - 27 \sqrt{9 - 2\sqrt{5}} \sum_{k=0}^{\infty} \binom{\frac{1}{2}}{k} \left(9 - 2\sqrt{5}\right)^{-k}\right) \Big/ \left(-1 + \sqrt{4} \sum_{k=0}^{\infty} 4^{-k} \binom{\frac{1}{2}}{k}\right)\right) \hat{}\ (1/15)\right)$$

$$\sqrt[15]{27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi} =$$

$$\frac{1}{\sqrt[15]{2}}\left(\left(\left(162-108\sqrt{1093}-2\phi-108\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+ 108\sqrt{1093}\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+2\phi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}- 27\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(9-2\sqrt{5}\right)^{-k}}{k!}\right)\Big/ \left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\text{^}(1/15)\right)$$

$$\sqrt[15]{27\left(\sqrt{4372}-2-\frac{\sqrt{10-2\sqrt{5}}-2}{\left(\sqrt{5}-1\right)2}\right)+\phi} =$$

$$\frac{1}{\sqrt[15]{2}}\left(\left(\left(162-108\sqrt{1093}-2\phi-108\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+ 108\sqrt{1093}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+ 2\phi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}- 27\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/ \left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right)\text{^}(1/15)\right)$$

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

Integral representation

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

From:

An Update on Brane Supersymmetry Breaking
J. Mourad and A. Sagnotti - arXiv:1711.11494v1 [hep-th] 30 Nov 2017

From the following vacuum equations:

$$T\, e^{\gamma_E\, \phi} \;=\; -\,\frac{\beta_E^{(p)}\, h^2}{\gamma_E}\; e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

$$16\, k'\, e^{\,-\,2\,C} \;=\; \frac{h^2\left(p\;+\;1\;-\;\frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}}{(7\;-\;p)}$$

$$(A')^2 \;=\; k\, e^{\,-\,2\,A} \;+\; \frac{h^2}{16(p\,+\,1)}\left(7\;-\;p\;+\;\frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

we have obtained, from the results almost equals of the equations, putting

$4096\, e^{-\pi\sqrt{18}}$ instead of

$$e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

a new possible mathematical connection between the two exponentials. Thence, also the values concerning p, C, β_E and ϕ correspond to the exponents of e (i.e. of exp). Thence we obtain for p = 5 and $\beta_E = 1/2$:

$$e^{-6C+\phi} = 4096 e^{-\pi\sqrt{18}}$$

Therefore, with respect to the exponentials of the vacuum equations, the Ramanujan's exponential has a coefficient of 4096 which is equal to 64^2, while -6C+ϕ is equal to -$\pi\sqrt{18}$. From this it follows that it is possible to establish mathematically, the dilaton value.

For

exp((-Pi*sqrt(18))   we obtain:

Input:

$\exp\left(-\pi\sqrt{18}\right)$

Exact result:

$e^{-3\sqrt{2}\,\pi}$

Decimal approximation:

$1.6272016226072509292942156739117979541838581136954016\ldots \times 10^{-6}$

1.6272016… * 10^{-6}

Property:

$e^{-3\sqrt{2}\,\pi}$ is a transcendental number

Series representations:

$$e^{-\pi\sqrt{18}} = e^{-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now, we have the following calculations:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

$e^{-\pi\sqrt{18}}$ = 1.6272016… * 10^-6

from which:

$\frac{1}{4096} e^{-6C+\phi}$ = 1.6272016… * 10^-6

0.000244140625 $e^{-6C+\phi}$ = $e^{-\pi\sqrt{18}}$ = 1.6272016… * 10^-6

Now:

$$\ln\left(e^{-\pi\sqrt{18}}\right) = -13.328648814475 = -\pi\sqrt{18}$$

And:

(1.6272016* 10^-6) *1/ (0.000244140625)

Input interpretation:

$$\frac{1.6272016}{10^6} \times \frac{1}{0.000244140625}$$

Result:

0.0066650177536

0.006665017...

Thence:

$$0.000244140625\, e^{-6C+\phi} = e^{-\pi\sqrt{18}}$$

Dividing both sides by 0.000244140625, we obtain:

$$\frac{0.000244140625}{0.000244140625} e^{-6C+\phi} = \frac{1}{0.000244140625} e^{-\pi\sqrt{18}}$$

$$e^{-6C+\phi} = 0.0066650177536$$

((((exp((-Pi*sqrt(18)))))))*1/0.000244140625

Input interpretation:

$$\exp\left(-\pi\sqrt{18}\right)\times\frac{1}{0.000244140625}$$

Result:

0.00666501785…

0.00666501785…

Series representations:

$$\frac{\exp\left(-\pi\sqrt{18}\right)}{0.000244141} = 4096\exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096\exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096\exp\left(-\frac{\pi\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now:

$$e^{-6C+\phi} = 0.0066650177536$$

$$\exp(-\pi\sqrt{18})\times\frac{1}{0.000244140625} =$$

$$e^{-\pi\sqrt{18}}\times\frac{1}{0.000244140625}$$

$$= 0.00666501785\ldots$$

From:

ln(0.00666501784619)

Input interpretation:

log(0.00666501784619)

Result:

–5.010882647757…

-5.010882647757…

Alternative representations:

$$\log(0.006665017846190000) = \log_e(0.006665017846190000)$$

$$\log(0.006665017846190000) = \log(a)\log_a(0.006665017846190000)$$

$$\log(0.006665017846190000) = -\text{Li}_1(0.993334982153810000)$$

Series representations:

$$\log(0.006665017846190000) = -\sum_{k=1}^{\infty} \frac{(-1)^k (-0.993334982153810000)^k}{k}$$

$$\log(0.006665017846190000) = 2 i \pi \left\lfloor \frac{\arg(0.006665017846190000 - x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\log(0.006665017846190000) = \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2\pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - z_0)^k z_0^{-k}}{k}$$

Integral representation:

$$\log(0.006665017846190000) = \int_1^{0.006665017846190000} \frac{1}{t}\, dt$$

In conclusion:

$$-6C + \phi = -5.010882647757 \ldots$$

and for C = 1, we obtain:

$\phi = -5.010882647757 + 6 = \mathbf{0.989117352243} = \boldsymbol{\phi}$

Note that the values of n_s (spectral index) 0.965, of the average of the Omega mesons Regge slope 0.9874428571 and of the dilaton 0.989117352243, are also connected to the following two Rogers-Ramanujan continued fractions:

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

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

(http://www.bitman.name/math/article/102/109/)

The mean between the two results of the above Rogers-Ramanujan continued fractions is 0.97798855285, value very near to the ψ Regge slope 0.979:

Ψ	3	$m_c = 1500$	0.979	-0.09

Also performing the 512th root of the inverse value of the Pion meson rest mass 139.57, we obtain:

((1/(139.57)))^1/512

Input interpretation:

$$\sqrt[512]{\frac{1}{139.57}}$$

Result:

0.990400732708644027550973755713301415460732796178555551684...

0.99040073.... result very near to the dilaton value **0. 989117352243** = $\boldsymbol{\phi}$ and to the value of the following Rogers-Ramanujan continued fraction:

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

From

AdS Vacua from Dilaton Tadpoles and Form Fluxes - *J. Mourad and A. Sagnotti* - arXiv:1612.08566v2 [hep-th] 22 Feb 2017 - March 27, 2018

We have:

$$e^{2C} = \frac{2\,\xi\,e^{\frac{\phi}{2}}}{1 \pm \sqrt{1 - \frac{\xi T}{3}\,e^{2\phi}}}$$
$$\frac{h^2}{32} = \frac{\xi^7\,e^{4\phi}}{\left(1 \pm \sqrt{1 - \frac{\xi T}{3}\,e^{2\phi}}\right)^7}\left[\frac{42}{\xi}\left(1 \pm \sqrt{1 - \frac{\xi T}{3}\,e^{2\phi}}\right) + 5\,T\,e^{2\phi}\right]. \qquad (2.7)$$

For

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

ξ = 1

we obtain:

(2*e^(0.989117352243/2)) / (1+sqrt(((1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))

Input interpretation:

$$\frac{2\,e^{0.989117352243/2}}{1 + \sqrt{1 - \frac{1}{3} \times \frac{16}{\pi^2}\,e^{2\times 0.989117352243}}}$$

Result:

0.83941881822… –
1.4311851867… i

Polar coordinates:

$r = 1.65919106525$ (radius), $\theta = -59.607521917°$ (angle)

1.65919106525….. result very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Series representations:

$$\frac{2\, e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\, e^{2\times 0.98911735224300000}}{3\,\pi^2}}} = \frac{2\, e^{0.49455867612150000}}{1+\sqrt{-\frac{16\, e^{1.97823470448600000}}{3\,\pi^2}}\ \sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k \left(-\frac{e^{1.97823470448600000}}{\pi^2}\right)^{-k} \binom{\frac{1}{2}}{k}}$$

$$\frac{2\, e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\, e^{2\times 0.98911735224300000}}{3\,\pi^2}}} = \frac{2\, e^{0.49455867612150000}}{1+\sqrt{-\frac{16\, e^{1.97823470448600000}}{3\,\pi^2}}\ \sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k \left(-\frac{e^{1.97823470448600000}}{\pi^2}\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{2\, e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\, e^{2\times 0.98911735224300000}}{3\,\pi^2}}} = \frac{2\, e^{0.49455867612150000}}{1+\sqrt{z_0}\ \sum_{k=0}^{\infty}\frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1-\frac{16\, e^{1.97823470448600000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}}$$

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

From

$$\frac{h^2}{32} = \frac{\xi^7\, e^{4\phi}}{\left(1 \pm \sqrt{1-\frac{\xi T}{3}\, e^{2\phi}}\right)^7}\left[\frac{42}{\xi}\left(1 \pm \sqrt{1-\frac{\xi T}{3}\, e^{2\phi}}\right) + 5\, T\, e^{2\phi}\right]$$

we obtain:

e^(4*0.989117352243) / (((1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))^7 [42(1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))+5*16/(Pi)^2*e^(2*0.989117352243)]

Input interpretation:

$$\frac{e^{4\times 0.989117352243}}{\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)+5\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}\right)$$

Result:

50.84107889... −
20.34506335... i

Polar coordinates:

$r = 54.76072411$ (radius), $\theta = -21.80979492°$ (angle)

54.76072411…..

Series representations:

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.98911735224300000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.98911735224300000}}{\pi^2}\right)e^{4\times 0.98911735224300000}\right)\Big/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.98911735224300000}}{3\,\pi^2}}\right)^7 =$$

$$\left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Big/\left(\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right) e^{4\times 0.9891173522430000}\right) \Big/ \left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7 =$$

$$\left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2 \sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}} \sum_{k=0}^{\infty} \frac{\left(-\frac{3}{16}\right)^k \left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)\right) \Big/ \left(\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}} \sum_{k=0}^{\infty} \frac{\left(-\frac{3}{16}\right)^k \left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right) e^{4\times 0.9891173522430000}\right) \Big/ \left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7 =$$

$$\left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2 \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)\right) \Big/ \left(\pi^2\left(1+\sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

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

From which:

e^(4*0.989117352243) / (((1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243))))))^7 [42(1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))+5*16/(Pi)^2*e^(2*0.989117352243)]*1/34

Input interpretation:

$$\frac{e^{4\times 0.989117352243}}{\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)^7}$$

$$\left(42\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)+5\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}\right)\times\frac{1}{34}$$

Result:

1.495325850... −
0.5983842161... i

Polar coordinates:

$r = 1.610609533$ (radius), $\theta = -21.80979492°$ (angle)

1.610609533…. result that is a good approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.98911735224300000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.98911735224300000}}{\pi^2}\right)e^{4\times 0.98911735224300000}\right)\Big/\left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.98911735224300000}}{3\,\pi^2}}\right)^7\right)=$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Big/\left(17\,\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Big/\left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right)=$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(17\,\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Big/\left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right)=$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/\left(17\,\pi^2\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

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

Now, we have:

$$e^{2C} = \frac{2\xi e^{-\frac{\phi}{2}}}{1 + \sqrt{1 + \frac{\xi\Lambda}{3} e^{2\phi}}}, \qquad (2.9)$$

$$\frac{h^2}{32} = \frac{e^{-4\phi}}{\left[1 + \sqrt{1 + \frac{\Lambda}{3} e^{2\phi}}\right]^7} \left[42\left(1 + \sqrt{1 + \frac{\Lambda}{3} e^{2\phi}}\right) - 13\Lambda e^{2\phi}\right]. \qquad (2.10)$$

For:

$\xi = 1$

$\Lambda \simeq \frac{4\pi^2}{25}$

$\phi = 0.989117352243$

From

$$e^{2C} = \frac{2\xi e^{-\frac{\phi}{2}}}{1 + \sqrt{1 + \frac{\xi\Lambda}{3} e^{2\phi}}},$$

we obtain:

((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))))))

Input interpretation:

$$\frac{2 e^{-0.989117352243/2}}{1 + \sqrt{1 + \frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right) e^{2\times 0.989117352243}}}$$

Result:

0.382082347529...

0.382082347529….

Series representations:

$$\frac{2\,e^{-0.98911735224300000/2}}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}} = 2\Bigg/\left(e^{0.49455867612150000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)$$

$$\frac{2\,e^{-0.98911735224300000/2}}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}} = 2\Bigg/\left(e^{0.49455867612150000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

$$\frac{2\,e^{-0.98911735224300000/2}}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}} = \frac{2}{e^{0.49455867612150000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)}$$

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

From which:

1+1/(((4((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))))))))

Input interpretation:

$$1+\frac{1}{4\times\frac{2\,e^{-0.989117352243/2}}{1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}}}$$

Result:

1.65430921270...

1.6543092….. We note that, the result 1.6543092... is very near to the 14th root of the following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3 = 1164.2696$ i.e. 1.65578...

Indeed:

$$G_{505} = P^{-1/4}Q^{1/6} = (\sqrt{5}+2)^{1/2}\left(\frac{\sqrt{5}+1}{2}\right)^{1/4}(\sqrt{101}+10)^{1/4}$$

$$\times\left((130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}}\right)^{1/6}.$$

Thus, it remains to show that

$$(130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}} = \left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3,$$

which is straightforward. □

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1,65578\ldots$$

Series representations:

$$1+\frac{1}{\frac{4\left(2\,e^{-0.989117352243000/2}\right)}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.989117352243000}}{3\times 25}}}} =$$

$$1+\frac{e^{0.4945586761215000}}{8}+\frac{1}{8}\,e^{0.4945586761215000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}}} =$$

$$1+\frac{e^{0.49455867612150000}}{8}+\frac{1}{8}\,e^{0.49455867612150000}\sqrt{\frac{4\,e^{1.97823470448600000}\,\pi^2}{75}}$$

$$\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.97823470448600000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}}} = 1+\frac{e^{0.49455867612150000}}{8}+$$

$$\frac{1}{8}\,e^{0.49455867612150000}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.97823470448600000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}$$

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

And from

$$\frac{h^2}{32} = \frac{e^{-4\phi}}{\left[1+\sqrt{1+\frac{\Lambda}{3}\,e^{2\phi}}\right]^7}\left[42\left(1+\sqrt{1+\frac{\Lambda}{3}\,e^{2\phi}}\right)-13\,\Lambda\,e^{2\phi}\right].$$

we obtain:

e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))-13*(4Pi^2)/25*e^(2*0.989117352243)]

Input interpretation:

$$\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)$$

Result:

−0.034547055658…

-0.034547055658…

Series representations:

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}\left(4\pi^2\right)13\,e^{2\times 0.9891173522430000}\right)\right)e^{-4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7=$$

$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\right)\Big/\left(25\,e^{5.934704113458000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right.\right.$$

$$\left.e^{-4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7=$$

$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-\right.\right.\right.$$

$$25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}$$

$$\left.\left.\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(25\,e^{5.934704113458000}\right.$$

$$\left.\left.\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)$$

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right.\right.$$

$$\left.e^{-4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7=$$

$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\right.\right.\right.$$

$$\left.\left.\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(25\right.$$

$$e^{5.934704113458000}$$

$$\left.\left.\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)$$

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

From which:

47 *1/(((-1/(((((e^(-4*0.989117352243) /
[1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 *
[42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-
13*(4Pi^2)/25*e^(2*0.989117352243))])))))))

Input interpretation:

$$47\left(-\left(1/1/\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}\right.\right.\right.\right.\right.-$$

$$\left.\left.\left.\left.\left.13\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)\right)$$

Result:

1.6237116159...

1.6237116159…. result that is an approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$-\left(47/1/\left(e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}-\right.\right.\right.\right.$$

$$\left.\left.\left.\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)/$$

$$\left.\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)\right) =$$

$$\left(1974\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-\right.\right.$$

$$25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}$$

$$\left.\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)/\left(25\,e^{5.934704113458000}\right.$$

$$\left.\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$-\left(47 \Big/ 1 \Big/ \left(e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right) \Big/ \left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right) =$$

$$\left(1974\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right) \Big/ \left(25\,e^{5.934704113458000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$-\left(47 \Big/ 1 \Big/ \left(e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right) \Big/ \left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right) =$$

$$\left(1974\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\right) \Big/ \left(25\,e^{5.934704113458000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

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

And again:

32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))]))))

Input interpretation:

$$32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)$$

Result:

-1.1055057810...

-1.1055057810….

We note that the result -1.1055057810…. is very near to the value of Cosmological Constant, less 10^{-52} , thence 1.1056, with minus sign

Series representations:

$$\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\;-\frac{1}{25}\,(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(1344\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Big/\left(25\,e^{5.934704113458000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)$$

$$\left(32 e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(1344\left(-25 e^{1.978234704486000}+52 e^{3.956469408972000}\pi^2-25 e^{1.978234704486000}\sqrt{\frac{4 e^{1.978234704486000}\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(25 e^{5.934704113458000}\left(1+\sqrt{\frac{4 e^{1.978234704486000}\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)$$

$$\left(32 e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(1344\left(-25 e^{1.978234704486000}+52 e^{3.956469408972000}\pi^2-25 e^{1.978234704486000}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4 e^{1.978234704486000}\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(25 e^{5.934704113458000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4 e^{1.978234704486000}\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)$$

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

And:

-[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))])))))]^5

Input interpretation:

$$-\left(32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)^5$$

Result:

1.651220569...

1.651220569…. result very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Series representations:

$$-\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right.\right.\right.\right. -$$

$$\left.\left.\left.\left.\frac{1}{25}\,(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\right/$$

$$\left.\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\, e^{1.978234704486000}\,\pi^2-25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\right.\right.$$

$$\left.\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^5\right)\right/$$

$$\left(9\,765\,625\, e^{19.78234704486000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\right.\right.$$

$$\left.\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^{35}\right)$$

$$-\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\, e^{1.978234704486000}\,\pi^2-25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)\Big/\left(9\,765\,625\, e^{19.78234704486000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^{35}\right)$$

$$-\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\, e^{1.978234704486000}\,\pi^2-25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^5\right)\Big/\left(9\,765\,625\, e^{19.78234704486000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^{35}\right)$$

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

We obtain also:

-[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))])))))]^1/2

Input interpretation:

$$-\sqrt{\left(32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)}$$

Result:

-0
$1.0514303501\ldots i$

Polar coordinates:

$r = 1.05143035007$ (radius), $\theta = -90°$ (angle)

1.05143035007

Series representations:

$$-\sqrt{\left(\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}=-\frac{8}{5}\sqrt{21}$$

$$\sqrt{\left(\left(25-52\,e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)}$$

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)} = -\frac{8}{5}\sqrt{21}\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)}$$

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)} =$$

$$-\frac{8}{5}\sqrt{21}\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)}$$

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

1 / -[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))]))))]^1/2

Input interpretation:

$$-\left(1\Big/\left(\sqrt{\left(32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)}\right)\right)$$

Result:

0.95108534763... i

Polar coordinates:

$r = 0.95108534763$ (radius), $\theta = 90°$ (angle)

0.95108534763

We know that the primordial fluctuations are consistent with Gaussian purely adiabatic scalar perturbations characterized by a power spectrum with a spectral index $n_s = 0.965 \pm 0.004$, consistent with the predictions of slow-roll, single-field, inflation.

Thence 0.95108534763 is a result very near to the spectral index n_s , to the mesonic Regge slope, to the inflaton value at the end of the inflation 0.9402 and to the value of the following Rogers-Ramanujan continued fraction:

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

Series representations:

$$-\left(1\Bigg/\left(\sqrt{\left(\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Bigg/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}\right)\right)=$$

$$-\left(5\Bigg/\left(8\sqrt{21}\sqrt{\left(\left(\left(25-52\,e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Bigg/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)\right)}\right)\right)$$

$$-\left(1\Big/\left(\sqrt{\left(\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}\right)\right)=$$

$$-\left(5\Big/\left(8\sqrt{21}\sqrt{\left(\left(25-52\,e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)}\right)\right)$$

$$-\left(1\Bigg/\left(\sqrt{\left(\left(32\,e^{-4\times 0.98911735224300000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.98911735224300000}\right)\right)\right)\Bigg/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}\right)^7\right)}\right)\right)=$$

$$-\left(5\Bigg/\left(8\sqrt{21}\sqrt{\left(\left(25-52\,e^{1.978234704486000}\,\pi^2+25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\Bigg/\left(e^{3.956469408972000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)}\right)\right)$$

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

From the previous expression

$$\frac{e^{-4\times 0.989117352243}}{\frac{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}\right)^7}{\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}\right)\right)}}$$

= -0.034547055658…

we have also:

1+1/(((4((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))))))))) + (-0.034547055658)

Input interpretation:

$$1+\frac{1}{4\times\frac{2\,e^{-0.989117352243/2}}{1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\,\pi^2\right)\right)e^{2\times 0.989117352243}}}}-0.034547055658$$

Result:

1.61976215705...

1.61976215705….. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}}}-0.0345470556580000=$$

$$0.9654529443420000+\frac{e^{0.4945586761215000}}{8}+\frac{1}{8}\,e^{0.4945586761215000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}}}-0.0345470556580000=$$

$$0.9654529443420000+\frac{e^{0.4945586761215000}}{8}+\frac{1}{8}\,e^{0.4945586761215000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}}}-0.0345470556580000=$$

$$0.9654529443420000+\frac{e^{0.4945586761215000}}{8}+$$

$$\frac{1}{8}\,e^{0.4945586761215000}\,\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}$$

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

From

Properties of Nilpotent Supergravity

E. Dudas, S. Ferrara, A. Kehagias and A. Sagnotti - arXiv:1507.07842v2 [hep-th] 14 Sep 2015

We have that:

Cosmological inflation with a tiny tensor–to–scalar ratio r, consistently with PLANCK data, may also be described within the present framework, for instance choosing

$$\alpha(\Phi) \;=\; i\,M\left(\Phi \;+\; b\,\Phi\,e^{ik\Phi}\right)\;. \tag{4.35}$$

This potential bears some similarities with the Kähler moduli inflation of [32] and with the poly–instanton inflation of [33]. One can verify that $\chi = 0$ solves the field equations, and that the potential along the $\chi = 0$ trajectory is now

$$V \;=\; \frac{M^2}{3}\left(1 \;-\; a\;\phi\;e^{-\gamma\,\phi}\right)^2\;. \tag{4.36}$$

We analyzing the following equation:

$$V \;=\; \frac{M^2}{3}\left(1 \;-\; a\;\phi\;e^{-\gamma\,\phi}\right)^2\;.$$

$$\phi \;=\; \varphi \;-\; \frac{\sqrt{6}}{k}\;,$$

$$a = \frac{b\gamma}{e} < 0\,, \qquad \gamma = \frac{k}{\sqrt{6}} < 0\,.$$

We have:

(M^2)/3*[1-(b/euler number * k/sqrt6) * (φ- sqrt6/k) * exp(-(k/sqrt6)(φ- sqrt6/k))]^2

i.e.

V = (M^2)/3*[1-(b/euler number * k/sqrt6) * (φ- sqrt6/k) * exp(-(k/sqrt6)(φ- sqrt6/k))]^2

For k = 2 and φ = 0.9991104684, that is the value of the scalar field that is equal to the value of the following Rogers-Ramanujan continued fraction:

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

we obtain:

V = (M^2)/3*[1-(b/euler number * 2/sqrt6) * (0.9991104684- sqrt6/2) * exp(-(2/sqrt6)(0.9991104684- sqrt6/2))]^2

Input interpretation:

$$V = \frac{M^2}{3}\left(1-\left(\frac{b}{e}\times\frac{2}{\sqrt{6}}\right)\left(0.9991104684-\frac{\sqrt{6}}{2}\right)\exp\left(-\frac{2}{\sqrt{6}}\left(0.9991104684-\frac{\sqrt{6}}{2}\right)\right)\right)^2$$

Result:

$$V = \frac{1}{3}(0.0814845\,b+1)^2 M^2$$

Solutions:

$$b = \frac{225.913\left(-0.054323\, M^2 \pm 6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2} \quad (M \neq 0)$$

Alternate forms:

$$V = 0.00221324\,(b + 12.2723)^2\, M^2$$

$$V = 0.00221324\left(b^2\, M^2 + 24.5445\, b\, M^2 + 150.609\, M^2\right)$$

$$-0.00221324\, b^2\, M^2 - 0.054323\, b\, M^2 - \frac{M^2}{3} + V = 0$$

Expanded form:

$$V = 0.00221324\, b^2\, M^2 + 0.054323\, b\, M^2 + \frac{M^2}{3}$$

Alternate form assuming b, M, and V are positive:

$$V = 0.00221324\,(b + 12.2723)^2\, M^2$$

Alternate form assuming b, M, and V are real:

$$V = 0.00221324\, b^2\, M^2 + 0.054323\, b\, M^2 + 0.333333\, M^2 + 0$$

Derivative:

$$\frac{\partial}{\partial b}\left(\frac{1}{3}\,(0.0814845\, b + 1)^2\, M^2\right) = 0.054323\,(0.0814845\, b + 1)\, M^2$$

Implicit derivatives

$$\frac{\partial b(M, V)}{\partial V} = \frac{154\,317\,775\,011\,120\,075}{36\,961\,748\,(226\,802\,245 + 18\,480\,874\, b)\, M^2}$$

$$\frac{\partial b(M, V)}{\partial M} = -\frac{\frac{226\,802\,245}{18\,480\,874} + b}{M}$$

$$\frac{\partial M(b, V)}{\partial V} = \frac{154\,317\,775\,011\,120\,075}{2\,(226\,802\,245 + 18\,480\,874\, b)^2\, M}$$

$$\frac{\partial M(b, V)}{\partial b} = -\frac{18\,480\,874\, M}{226\,802\,245 + 18\,480\,874\, b}$$

$$\frac{\partial V(b, M)}{\partial M} = \frac{2\,(226\,802\,245 + 18\,480\,874\, b)^2\, M}{154\,317\,775\,011\,120\,075}$$

$$\frac{\partial V(b, M)}{\partial b} = \frac{36\,961\,748\,(226\,802\,245 + 18\,480\,874\, b)\, M^2}{154\,317\,775\,011\,120\,075}$$

Global minimum:

$$\min\left\{\frac{1}{3}\,(0.0814845\, b + 1)^2\, M^2\right\} = 0 \text{ at } (b, M) = (-16, 0)$$

Global minima:

$$\min\left\{\frac{1}{3} M^2 \left(1 - \frac{(b\ 2)\left(0.9991104684 - \frac{\sqrt{6}}{2}\right) \exp\left(-\frac{2\left(0.9991104684 - \frac{\sqrt{6}}{2}\right)}{\sqrt{6}}\right)}{e\sqrt{6}}\right)^2\right\} = 0$$

for $b = -\frac{226802245}{18480874}$

$$\min\left\{\frac{1}{3} M^2 \left(1 - \frac{(b\ 2)\left(0.9991104684 - \frac{\sqrt{6}}{2}\right) \exp\left(-\frac{2\left(0.9991104684 - \frac{\sqrt{6}}{2}\right)}{\sqrt{6}}\right)}{e\sqrt{6}}\right)^2\right\} = 0$$

for $M = 0$

From:

$$b = \frac{225.913\left(-0.054323\, M^2 \pm 6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2} \quad (M \neq 0)$$

we obtain

(225.913 (-0.054323 M^2 + 6.58545×10^-10 sqrt(M^4)))/M^2

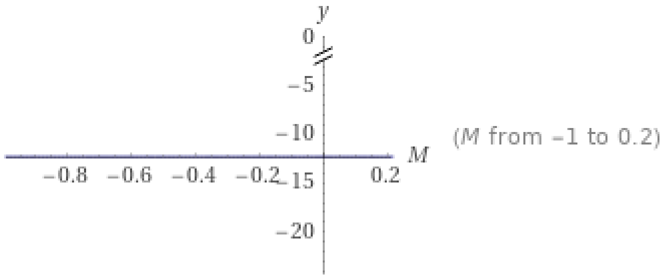
Input interpretation:

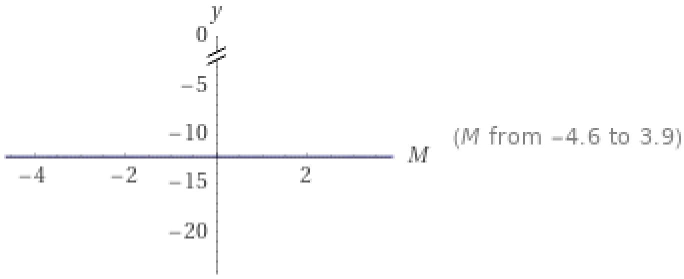
$$\frac{225.913\left(-0.054323\, M^2 + 6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}$$

Result:

$$\frac{225.913\left(6.58545\times 10^{-10}\sqrt{M^4} - 0.054323\, M^2\right)}{M^2}$$

Plots:





Alternate form assuming M is real:

-12.2723

-12.2723 result very near to the black hole entropy value 12.1904 = ln(196884)

Alternate forms:

$$-\frac{12.2723\left(M^2 - 1.21228\times 10^{-8}\sqrt{M^4}\right)}{M^2}$$

$$\frac{1.48774\times 10^{-7}\sqrt{M^4} - 12.2723\,M^2}{M^2}$$

Expanded form:

$$\frac{1.48774\times 10^{-7}\sqrt{M^4}}{M^2} - 12.2723$$

Property as a function:

Parity

even

Series expansion at M = 0:

$$\left(\frac{1.48774\times 10^{-7}\sqrt{M^4}}{M^2} - 12.2723\right) + O\left(M^6\right)$$

(generalized Puiseux series)

Series expansion at M = ∞:

$$-12.2723$$

Derivative:

$$\frac{d}{dM}\left(\frac{225.913\left(6.58545\times 10^{-10}\sqrt{M^4} - 0.054323\,M^2\right)}{M^2}\right) = \frac{3.55271\times 10^{-15}}{M}$$

Indefinite integral:

$$\int \frac{225.913\left(-0.054323\,M^2 + 6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}\,dM = \frac{1.48774\times 10^{-7}\sqrt{M^4}}{M} - 12.2723\,M + \text{constant}$$

Global maximum:

$$\max\left\{\frac{225.913\left(6.58545\times 10^{-10}\sqrt{M^4}-0.054323\,M^2\right)}{M^2}\right\}=-\frac{140\,119\,826\,723\,990\,341\,497\,649}{11\,417\,594\,849\,251\,000\,000\,000}\text{ at } M=-1$$

Global minimum:

$$\min\left\{\frac{225.913\left(6.58545\times 10^{-10}\sqrt{M^4}-0.054323\,M^2\right)}{M^2}\right\}=-\frac{140\,119\,826\,723\,990\,341\,497\,649}{11\,417\,594\,849\,251\,000\,000\,000}\text{ at } M=-1$$

Limit:

$$\lim_{M\to\pm\infty}\frac{225.913\left(-0.054323\,M^2+6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}=-12.2723$$

Definite integral after subtraction of diverging parts:

$$\int_0^\infty\left(\frac{225.913\left(-0.054323\,M^2+6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}--12.2723\right)dM=0$$

From b that is equal to

$$\frac{225.913\left(-0.054323\,M^2+6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}$$

From:

$$V = \frac{1}{3}(0.0814845\,b + 1)^2 M^2$$

we obtain:

1/3 (0.0814845 ((225.913 (-0.054323 M^2 + 6.58545×10^-10 sqrt(M^4)))/M^2) + 1)^2 M^2

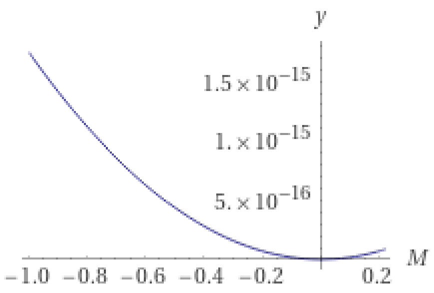
Input interpretation:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\,M^2 + 6.58545\times10^{-10}\sqrt{M^4}\right)}{M^2} + 1\right)^2 M^2$$

Result:

0

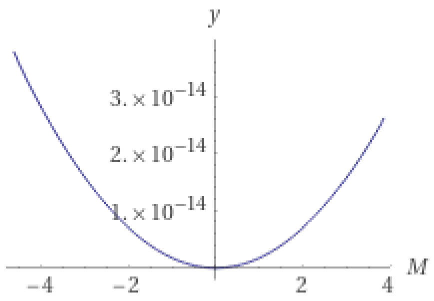
Plots: **(possible mathematical connection with an open string)**



(M from −1 to 0.2)

M = -0.5; M = 0.2

(possible mathematical connection with an open string)



(M from −4.6 to 3.9)

M = 2 ; M = 3

Root:

$M = 0$

Property as a function:

Parity

even

Series expansion at M = 0:

$O(M^{62194})$

(Taylor series)

Series expansion at M = ∞:

$1.75541 \times 10^{-15} M^2 + O\left(\left(\frac{1}{M}\right)^{62194}\right)$

(Taylor series)

Definite integral after subtraction of diverging parts:

$$\int_0^\infty \left(\frac{1}{3} M^2 \left(1 + \frac{18.4084 \left(-0.054323\, M^2 + 6.58545 \times 10^{-10} \sqrt{M^4}\right)}{M^2}\right)^2 - 1.75541 \times 10^{-15} M^2\right) dM = 0$$

For M = - 0.5 , we obtain:

$$\frac{1}{3} \left(0.0814845 \times \frac{225.913 \left(-0.054323\, M^2 + 6.58545 \times 10^{-10} \sqrt{M^4}\right)}{M^2} + 1\right)^2 M^2$$

1/3 (0.0814845 ((225.913 (-0.054323 (-0.5)^2 + 6.58545×10^-10 sqrt((-0.5)^4)))/(-0.5)^2) + 1)^2 * (-0.5^2)

Input interpretation:

$$\frac{1}{3} \left(0.0814845 \times \frac{225.913 \left(-0.054323\, (-0.5)^2 + 6.58545 \times 10^{-10} \sqrt{(-0.5)^4}\right)}{(-0.5)^2} + 1\right)^2 \left(-0.5^2\right)$$

Result:

$$-4.388513449474645453489707833780880208333333333333333333\ldots \times 10^{-16}$$

-4.38851344947*10^-16

For M = 0.2:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\,M^2+6.58545\times10^{-10}\sqrt{M^4}\right)}{M^2}+1\right)^2 M^2$$

1/3 (0.0814845 ((225.913 (-0.054323 0.2^2 + 6.58545×10^-10 sqrt(0.2^4)))/0.2^2) + 1)^2 0.2^2

Input interpretation:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\times0.2^2+6.58545\times10^{-10}\sqrt{0.2^4}\right)}{0.2^2}+1\right)^2\times0.2^2$$

Result:

$7.0216215191594327255835325340494083333333333333333333333333\ldots\times10^{-17}$

7.021621519159*10^{-17}

For M = 3:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\,M^2+6.58545\times10^{-10}\sqrt{M^4}\right)}{M^2}+1\right)^2 M^2$$

1/3 (0.0814845 ((225.913 (-0.054323 3^2 + 6.58545×10^-10 sqrt(3^4)))/3^2) + 1)^2 3^2

Input interpretation:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\times 3^2+6.58545\times 10^{-10}\sqrt{3^4}\right)}{3^2}+1\right)^2\times 3^2$$

Result:

$1.5798648418108723632562948201611168 75\times 10^{-14}$

1.57986484181*10^{-14}

For M = 2:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\,M^2+6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}+1\right)^2 M^2$$

1/3 (0.0814845 ((225.913 (-0.054323 2^2 + 6.58545×10^-10 sqrt(2^4)))/2^2) + 1)^2 2^2

Input interpretation:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\times 2^2+6.58545\times 10^{-10}\sqrt{2^4}\right)}{2^2}+1\right)^2\times 2^2$$

Result:

$7.02162151915943272558353253404940833333333333333333333333333... \times 10^{-15}$

$7.021621519 * 10^{-15}$

From the four results

7.021621519*10^-15 ; 1.57986484181*10^-14 ; 7.021621519159*10^-17 ;

-4.38851344947*10^-16

we obtain, after some calculations:

sqrt[1/(2Pi)(7.021621519*10^-15 + 1.57986484181*10^-14 +7.021621519*10^-17 - 4.38851344947*10^-16)]

Input interpretation:

$$\sqrt{\left(\frac{1}{2\pi}\left(7.021621519 \times 10^{-15} + 1.57986484181 \times 10^{-14} + 7.021621519 \times 10^{-17} - 4.38851344947 \times 10^{-16}\right)\right)}$$

Result:

$5.9776991059... \times 10^{-8}$

$5.9776991059 * 10^{-8}$ result very near to the Planck's electric flow 5.975498×10^{-8} that is equal to the following formula:

$$\phi_{\mathrm{P}}^{E} = \mathbf{E}_{\mathrm{P}} l_{\mathrm{P}}^{2} = \phi_{\mathrm{P}} l_{\mathrm{P}} = \sqrt{\frac{\hbar c}{\varepsilon_0}}$$

We note that:

1/55*((([(((1/[(7.021621519*10^-15 + 1.57986484181*10^-14 +7.021621519*10^-17 -4.38851344947*10^-16)])))^1/7]-((log^(5/8)(2))/(2 2^(1/8) 3^(1/4) e log^(3/2)(3)))))

Input interpretation:

$$\frac{1}{55}\left(\left(1/\left(7.021621519\times 10^{-15}+1.57986484181\times 10^{-14}+7.021621519\times 10^{-17}-4.38851344947\times 10^{-16}\right)\right)\text{^}(1/7)-\frac{\log^{5/8}(2)}{2\sqrt[8]{2}\,\sqrt[4]{3}\,e\log^{3/2}(3)}\right)$$

log(x) is the natural logarithm

Result:

1.6181818182…

1.6181818182… result that is a very good approximation to the value of the golden ratio 1.618033988749...

From the Planck units:

Planck Length

$$l_{\mathrm{P}} = \sqrt{\frac{4\pi\hbar G}{c^3}}$$

$5.729475 * 10^{-35}$ Lorentz-Heaviside value

Planck's Electric field strength

$$\mathbf{E}_{\mathrm{P}} = \frac{F_{\mathrm{P}}}{q_{\mathrm{P}}} = \sqrt{\frac{c^7}{16\pi^2 \varepsilon_0 \hbar G^2}}$$

$1.820306 * 10^{61}$ V*m Lorentz-Heaviside value

Planck's Electric flux

$$\phi_{\mathrm{P}}^{E} = \mathbf{E}_{\mathrm{P}} l_{\mathrm{P}}^2 = \phi_{\mathrm{P}} l_{\mathrm{P}} = \sqrt{\frac{\hbar c}{\varepsilon_0}}$$

$5.975498*10^{-8}$ V*m Lorentz-Heaviside value

Planck's Electric potential

$$\phi_P = V_P = \frac{E_P}{q_P} = \sqrt{\frac{c^4}{4\pi\varepsilon_0 G}}$$

$1.042940*10^{27}$ V Lorentz-Heaviside value

Relationship between Planck's Electric Flux and Planck's Electric Potential

$\mathbf{E_P * l_P}$ = $(1.820306 * 10^{61}) * 5.729475 * 10^{-35}$

Input interpretation:

$$\frac{(1.820306 \times 10^{61}) \times 5.729475}{10^{35}}$$

Result:

1 042 939 771 935 000 000 000 000 000

Scientific notation:

$1.042939771935 \times 10^{27}$

$1.042939771935*10^{27} \approx 1.042940*10^{27}$

Or:

$\mathbf{E_P * l_P^2 / l_P}$ = $(5.975498*10^{-8})*1/(5.729475 * 10^{-35})$

Input interpretation:

$$5.975498 \times 10^{-8} \times \frac{1}{\frac{5.729475}{10^{35}}}$$

Result:

$1.042939885417075735560413475929295441554418162222542205001 33\ldots \times 10^{27}$

$1.042939885417*10^{27} \approx 1.042940*10^{27}$

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