# On the possible mathematical connections between some equations of various sectors concerning the D-Branes and some Ramanujan's modular equations and approximations to $\pi$.

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## Abstract

*In this research thesis, we have described some new mathematical connections between some equations of various sectors concerning the D-Branes and some Ramanujan's modular equations and approximations to* $\pi$.

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From:

https://twitter.com/pickover/status/1034616624945541120

$$\frac{4}{\sqrt{522}}\ln\left[\left(\frac{5+\sqrt{29}}{\sqrt{2}}\right)^{3}\left(5\sqrt{29}+11\sqrt{6}\right)\left(\sqrt{\frac{9+3\sqrt{6}}{4}}+\sqrt{\frac{5+3\sqrt{6}}{4}}\right)^{6}\right]$$

3,141592653589793238462643383279

From:

**Dark D-brane Cosmology**
*Tomi Koivisto, Danielle Wills, Ivonne Zavala* - arXiv:1312.2597v2 [hep-th]
27 May 2014

- Matter dominated solution: $x = z = 0$, $\Omega = 1$, $w = 0$. This solution exists regardless of $\gamma$ and is a repellor.
- Potential dominated solution $x = 0$, $z = 1$, $\Omega = 0$, $\tilde{\gamma} = 1$, $w = -1$. This solution exists when $\lambda = 0$ and is then an attractor.
- Kinetic dominated solution: $x = \pm 1$, $z = 0$, $\Omega = 0$, $w = \tilde{\gamma}$. This solution exists regardless of $\tilde{\gamma}$. In the limit $\tilde{\gamma} = 0$ it is a saddle point, in the limit $\tilde{\gamma} = 1$ the downhill branch is an attractor given $\lambda < -\sqrt{6}$ and $\mu > 2\sqrt{6}$, and symmetrically, the uphill branch is an attractor given $\lambda > \sqrt{6}$ and $\mu < -2\sqrt{6}$.
- Kinetic scaling solution: $x = -\mu/2\sqrt{6}$, $z = 0$, $\Omega = 1 - \mu^2/24$, $w = 0$, $\tilde{\gamma} = 1$. This solution exists when $|\mu| < 2\sqrt{6}$ but is never stable.
- Field dominated solution: $x = \lambda/6$, $z = \sqrt{1-\lambda^2}$, $\Omega = 0$, $\tilde{\gamma} = 1$, $w = -1 + \lambda^2/3$. This solution exists when $0 < |\lambda| \leq \sqrt{6}$ and $\lambda(\lambda + 4\mu) \geq 12$. Further, it accelerates when $0 < |\lambda| < \sqrt{2}$.

Now, we analyze the following equations:

$$\frac{dx}{dN} = \frac{3x}{2}\left(\frac{(\tilde{\gamma}+1)(2\tilde{\gamma}-1)x^2}{\tilde{\gamma}\left(x^2+z^2-1\right)-z^2+1} + \tilde{\gamma}x^2 - z^2 + 1\right)$$
$$+\frac{\sqrt{3\tilde{\gamma}(\tilde{\gamma}+1)}x^2\left[\mu\left((10\tilde{\gamma}-3)x^2-2\tilde{\gamma}+3\right)+z^2((4-8\tilde{\gamma})\lambda+(2\tilde{\gamma}-3)\mu)\right]}{8\left(\tilde{\gamma}\left(x^2+z^2-1\right)-z^2+1\right)}, \quad (3.34)$$

$$\frac{dz}{dN} = \frac{z}{2}\left(3 + 3\tilde{\gamma}x^2 - 3z^2 - \sqrt{3\tilde{\gamma}(\tilde{\gamma}+1)}\lambda\, x\right), \quad (3.35)$$

$$\frac{d\tilde{\gamma}}{dN} = \frac{3\tilde{\gamma}\left(1-\tilde{\gamma}^2\right)x^2}{\tilde{\gamma}\left(x^2+z^2-1\right)-z^2+1} + \frac{\sqrt{3\tilde{\gamma}(\tilde{\gamma}+1)}(1-\tilde{\gamma})\tilde{\gamma}x\left(\mu+3\mu x^2-z^2(4\lambda+\mu)\right)}{4\left(\tilde{\gamma}\left(x^2+z^2-1\right)-z^2+1\right)}. \quad (3.36)$$

For (3.34), we have:

3/2(((1+1)(2-1)+1+1)))+((((sqrt(6)*((3sqrt(6)*(((10-3)+3)))))))) / 8

**Input:**

$$\frac{3}{2}((1+1)(2-1)+1+1)+\frac{1}{8}\left(\sqrt{6}\left(3\sqrt{6}\,((10-3)+3)\right)\right)$$

**Exact result:**

$$\frac{57}{2}$$

**Decimal form:**

28.5

28.5

For (3.35), we have:

1/2*sqrt(1-6)*(3+3*((sqrt(6)/6))^2-3*(1-6)-sqrt(3*2)*sqrt(6)*((sqrt(6)/6))

**Input:**

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

**Result:**

$$\frac{1}{2}\,i\sqrt{5}\left(\frac{37}{2}-\sqrt{6}\right)$$

**Decimal approximation:**

$$17.945016004347224124500007521760294508061996351416696678 37\ldots\, i$$

17.94501600434…

**Polar coordinates:**

$r \approx 17.945$ (radius), $\theta = 90°$ (angle)

The sum of the two equations is:

3/2*4+(((sqrt(6)*3sqrt(6)*(10)))/ 8) + (((1/2*sqrt(1-6)*(3+3*((sqrt(6)/6))^2-3*(1-6)-sqrt(3*2)*sqrt(6)*((sqrt(6)/6))))))

**Input:**

$$\frac{3}{2}\times 4+\frac{1}{8}\left(\sqrt{6}\times 3\left(\sqrt{6}\times 10\right)\right)+$$
$$\frac{1}{2}\sqrt{1-6}\left(3+3\left(\frac{\sqrt{6}}{6}\right)^2-3(1-6)-\sqrt{3\times 2}\,\sqrt{6}\times\frac{\sqrt{6}}{6}\right)$$

**Result:**

$$\frac{57}{2}+\frac{1}{2}\,i\sqrt{5}\left(\frac{37}{2}-\sqrt{6}\right)$$

**Decimal approximation:**

28.5 +
17.9450160043472241245000075217602945080619963514166966783... $i$

- **Polar coordinates:**

$r \approx 33.679$ (radius), $\theta \approx 32.1966°$ (angle)

33.679

**Alternate forms:**

$$\frac{1}{4}\left(114+37\sqrt{5}\,i-2\sqrt{30}\,i\right)$$

- $$\frac{57}{2}+\frac{37\,i\sqrt{5}}{4}-i\sqrt{\frac{15}{2}}$$

- $$\frac{1}{4}\,i\left(\sqrt{5\left(1393-148\sqrt{6}\right)}+-114\,i\right)$$

- **Minimal polynomial:**

$256x^4-29184x^3+1470496x^2-36408864x+395155921$

The product of the two equations, is:

(((3/2*4+(((sqrt(6)*3sqrt(6)*(10)))/ 8)))) * (((1/2*sqrt(1-6)*(3+3*((sqrt(6)/6))^2-3*(1-6)-sqrt(3*2)*sqrt(6)*((sqrt(6)/6))))))

**Input:**

$$\left(\frac{3}{2}\times 4+\frac{1}{8}\left(\sqrt{6}\times 3\left(\sqrt{6}\times 10\right)\right)\right)$$
$$\left(\frac{1}{2}\sqrt{1-6}\left(3+3\left(\frac{\sqrt{6}}{6}\right)^2-3(1-6)-\sqrt{3\times 2}\,\sqrt{6}\times\frac{\sqrt{6}}{6}\right)\right)$$

**Result:**

$$\frac{57}{4} i \sqrt{5} \left(\frac{37}{2} - \sqrt{6}\right)$$

**Decimal approximation:**

511.43295612389588754825021437016839347976689601537585533335... $i$

511.432956…i

**Polar coordinates:**

$r \approx 511.433$ (radius), $\theta = 90°$ (angle)

511.433

**Alternate forms:**

$$\frac{1}{8} i \sqrt{5} \left(37 - 2\sqrt{6}\right) 57$$

- $$-\frac{57}{8} i \sqrt{5} \left(2\sqrt{6} - 37\right)$$

- $$\frac{57}{8} i \sqrt{5\left(1393 - 148\sqrt{6}\right)}$$

- **Minimal polynomial:**

$4096 x^4 + 2\,896\,548\,480 x^2 + 477\,401\,742\,725\,625$

-

We have also:

((((((((3/2*4+(((sqrt(6)*3sqrt(6)*(10)))/ 8)))) * (((1/2*sqrt(1-6)*(3+3*((sqrt(6)/6))^2-3*(1-6)-sqrt(3*2)*sqrt(6)*((sqrt(6)/6))))))))))^1/13

**Input:**

$$\left(\left(\frac{3}{2} \times 4 + \frac{1}{8}\left(\sqrt{6} \times 3\left(\sqrt{6} \times 10\right)\right)\right) \left(\frac{1}{2}\sqrt{1-6}\left(3 + 3\left(\frac{\sqrt{6}}{6}\right)^2 - 3(1-6) - \sqrt{3 \times 2}\sqrt{6} \times \frac{\sqrt{6}}{6}\right)\right)\right)^{\wedge}(1/13)$$

**Result:**

$$\frac{\sqrt[26]{-5}\ \sqrt[13]{57\left(\frac{37}{2}-\sqrt{6}\right)}}{2^{2/13}}$$

**Decimal approximation:**

1.6039479340215778797101464945208244424578309313151772087... +
0.1947545391341474698360007282651663428913754444848329756 2... $i$

**Polar coordinates:**

$r \approx 1.61573$ (radius), $\theta \approx 6.92308°$ (angle)

1.61573

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

**Alternate forms:**

$$\frac{1}{2}\ \sqrt[26]{5}\ \sqrt[13]{i\left(37-2\sqrt{6}\right)57}\ 2^{10/13}$$

- $$\frac{\sqrt[13]{57}\ \sqrt[26]{-5\left(1393-148\sqrt{6}\right)}}{2^{3/13}}$$

- $$\frac{\sqrt[26]{-5}\ \sqrt[13]{57\left(37-2\sqrt{6}\right)}}{2^{3/13}}$$

-

**Minimal polynomial:**

$$4096\,x^{52}+2\,896\,548\,480\,x^{26}+477\,401\,742\,725\,625$$

29/10^3+((((((((3/2*4+(((sqrt(6)*3sqrt(6)*(10)))/ 8)))) * (((1/2*sqrt(1-6)*(3+3*((sqrt(6)/6))^2-3*(1-6)-sqrt(3*2)*sqrt(6)*((sqrt(6)/6)))))))))))^1/13

Where 29 is a Lucas number

**Input:**

$$\frac{29}{10^3}+\left(\left(\frac{3}{2}\times 4+\frac{1}{8}\left(\sqrt{6}\times 3\left(\sqrt{6}\times 10\right)\right)\right)\right)$$
$$\left(\frac{1}{2}\sqrt{1-6}\left(3+3\left(\frac{\sqrt{6}}{6}\right)^2-3\,(1-6)-\sqrt{3\times 2}\,\sqrt{6}\times\frac{\sqrt{6}}{6}\right)\right)\right)\text{^}\,(1/13)$$

**Result:**

$$\frac{29}{1000}+\frac{\sqrt[26]{-5}\,\sqrt[13]{57\left(\frac{37}{2}-\sqrt{6}\right)}}{2^{2/13}}$$

**Decimal approximation:**

1.6329479340215778797101464945208244424578309313151772087... +
0.1947545391341474698360007282651663428913754444848329756 2... $i$

- **Polar coordinates:**

$r \approx 1.64452$ (radius), $\theta \approx 6.80129°$ (angle)

$1.64452 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934$ ...

**Alternate forms:**

$$\frac{500\,\sqrt[26]{-5}\;2^{10/13}\,\sqrt[13]{57\left(37-2\sqrt{6}\right)}+29}{1000}$$

- $$\frac{29}{1000}+\frac{\sqrt[26]{-5}\,\sqrt[13]{57\left(37-2\sqrt{6}\right)}}{2^{3/13}}$$

- $$\frac{29\times 2^{2/13}+500\,\sqrt[26]{-5}\;2^{12/13}\,\sqrt[13]{57\left(37-2\sqrt{6}\right)}}{1000\times 2^{2/13}}$$

And:

(29*2/10^3-2/10^3)+((((((((3/2*4+(((sqrt(6)*3sqrt(6)*(10)))/ 8)))) * (((1/2*sqrt(1-6)*(3+3*((sqrt(6)/6))^2-3*(1-6)-sqrt(3*2)*sqrt(6)*((sqrt(6)/6))))))))))))^1/13

**Input:**

$$\left(29\times\frac{2}{10^3}-\frac{2}{10^3}\right)+\left(\left(\frac{3}{2}\times4+\frac{1}{8}\left(\sqrt{6}\times3\left(\sqrt{6}\times10\right)\right)\right)\right.$$
$$\left.\left(\frac{1}{2}\sqrt{1-6}\left(3+3\left(\frac{\sqrt{6}}{6}\right)^2-3(1-6)-\sqrt{3\times2}\ \sqrt{6}\times\frac{\sqrt{6}}{6}\right)\right)\right)\verb|^|(1/13)$$

**Result:**

$$\frac{7}{125}+\frac{\sqrt[26]{-5}\ \sqrt[13]{57\left(\frac{37}{2}-\sqrt{6}\right)}}{2^{2/13}}$$

**Decimal approximation:**

1.659947934021577879710146494520824442457830931315177208 7... +
0.194754539134147469836000728265166342891375444484832975 62... $i$

**Polar coordinates:**

$r \approx 1.67133$ (radius), $\theta \approx 6.69167°$ (angle)

1.67133

We note that 1.67133... is a result practically equal to the value of the formula:

$$m_{p'} = 2\times\frac{\eta}{R}m_P = 1.6714213\times10^{-24}\text{ gm}$$

that is the holographic proton mass

**Alternate forms:**

$$\frac{1}{250}\left(125\ \sqrt[26]{-5}\ 2^{10/13}\ \sqrt[13]{57\left(37-2\sqrt{6}\right)}+14\right)$$

-

$$\frac{7}{125}+\frac{\sqrt[26]{-5}\ \sqrt[13]{57\left(37-2\sqrt{6}\right)}}{2^{3/13}}$$

-

$$\frac{7\times2^{2/13}+125\ \sqrt[26]{-5}\ \sqrt[13]{\frac{57}{2}\left(37-2\sqrt{6}\right)}}{125\times2^{2/13}}$$

Now, we have that:

b) *Potential dominated de Sitter solution*: in this case $x_{dS} = \Omega_{dS} = 0$ so that $z_{dS} = 1$ and thus $\omega_{dS} = -1$. From (3.43) and (3.44) one can check that in order for it to be a solution, $n$ and $m$ must satisfy:

$$n - m \leq -2\,, \tag{3.46}$$

and the solutions have $\tilde{\gamma}_{dS} = 1$. The eigenvalues corresponding to this solution are $(-3, 3)$, and therefore the solution is always a saddle point.

$\Gamma_0 \equiv h_0 V_0$

$= 8$

Thus we see that physical solutions exist only when the field is rolling down the throat, $S(x) = -1$, for the positive branch since otherwise either $z < 0$ or the matter energy density is negative since $z > 1$. It is difficult to find the most general solution for $x$. However, we can focus on the special case $\tilde{\gamma} = 0$, corresponding to an ultra relativistic regime, (d)(i) above. In this case we obtain the following fixed points:

$$z_{\pm} - \frac{1}{\sqrt{3\Gamma_0}}\left[S(x)\sqrt{1-\tilde{\gamma}^2} \pm \sqrt{1-\tilde{\gamma}^2 + 3\Gamma_0\left(1+\tilde{\gamma}x^2\right)}\right]\,. \tag{3.51}$$

1/sqrt(3*8)*(((-1*sqrt(1-0)+sqrt((1+3*8(1+0))))

**Input:**

$$\frac{1}{\sqrt{3\times 8}}\left(-\sqrt{1-0} + \sqrt{1+3\times 8\,(1+0)}\right)$$

**Result:**

$$\sqrt{\frac{2}{3}}$$

**Decimal approximation:**

- More digits

0.8164965809277260327324280249019637973219824935522233761442...

0.81649658…. = $\mathbf{z_+}$

**Alternate form:**

$$\frac{\sqrt{6}}{3}$$

1/sqrt(3*8)*(((-1*sqrt(1-0)-sqrt((1+3*8(1+0))))

**Input:**

$$\frac{1}{\sqrt{3\times 8}}\left(-\sqrt{1-0}-\sqrt{1+3\times 8\,(1+0)}\right)$$

**Result:**

$$-\sqrt{\frac{3}{2}}$$

**Decimal approximation:**

$-1.224744871391589049098642037352945695982973740328335064\,21\ldots$

-1.224744871391589…. = **z-**

**Alternate form:**

$$-\frac{\sqrt{6}}{2}$$

The sum of two result is:

((((1/sqrt(3*8)*(((-1*sqrt(1-0)+sqrt((1+3*8(1+0))))))))) + (((((1/sqrt(3*8)*(((-1*sqrt(1-0)-sqrt((1+3*8(1+0))))))

**Input:**

$$\frac{1}{\sqrt{3\times 8}}\left(-\sqrt{1-0}+\sqrt{1+3\times 8\,(1+0)}\right)+\frac{1}{\sqrt{3\times 8}}\left(-\sqrt{1-0}-\sqrt{1+3\times 8\,(1+0)}\right)$$

**Result:**

$$\sqrt{\frac{2}{3}}-\sqrt{\frac{3}{2}}$$

**Decimal approximation:**

$-0.408248290463863016366214012450981898660991246776111688\,07\ldots$

-0.40824829046….

**Alternate forms:**

$$-\frac{\sqrt{6}}{6}$$

•

$$-\frac{1}{\sqrt{6}}$$

The difference is:

((((1/sqrt(3*8)*(((-1*sqrt(1-0)+sqrt((1+3*8(1+0)))))))))) - (((((1/sqrt(3*8)*(((-1*sqrt(1-0)-sqrt((1+3*8(1+0))))))))))

**Input:**

$$\frac{1}{\sqrt{3\times 8}}\left(-\sqrt{1-0}+\sqrt{1+3\times 8\,(1+0)}\right)-\frac{1}{\sqrt{3\times 8}}\left(-\sqrt{1-0}-\sqrt{1+3\times 8\,(1+0)}\right)$$

**Result:**

$$\sqrt{\frac{2}{3}}+\sqrt{\frac{3}{2}}$$

**Decimal approximation:**

2.041241452319315081831070062254909493304956233880558440360...

2.041241452319….

**Alternate forms:**

$$\frac{5\sqrt{6}}{6}$$

- $$\frac{5}{\sqrt{6}}$$

And:

(((sqrt(2/3) + sqrt(3/2)))) + (((sqrt(2/3) - sqrt(3/2))))

**Input:**

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

**Result:**

$$2\sqrt{\frac{2}{3}}$$

**Decimal approximation:**

1.632993161855452065464856049803927594643964987104446752288...

1.632993161855…

**Alternate form:**

$$\frac{2\sqrt{6}}{3}$$

-(11/10^3+4/10^3)+(((sqrt(2/3) + sqrt(3/2)))) + (((sqrt(2/3) - sqrt(3/2))))

**Input:**

$$-\left(\frac{11}{10^3}+\frac{4}{10^3}\right)+\left(\sqrt{\frac{2}{3}}+\sqrt{\frac{3}{2}}\right)+\left(\sqrt{\frac{2}{3}}-\sqrt{\frac{3}{2}}\right)$$

**Result:**

$$2\sqrt{\frac{2}{3}}-\frac{3}{200}$$

**Decimal approximation:**

1.617993161855452065464856049803927594643964987104446752288...

1.61799316185….

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

**Alternate forms:**

$$\frac{1}{600}\left(400\sqrt{6}-9\right)$$

- $$\frac{2\sqrt{6}}{3}-\frac{3}{200}$$

$$\frac{1}{200}\left(400\sqrt{\frac{2}{3}}-3\right)$$

**Minimal polynomial:**

$$120\,000\,x^2+3600\,x-319\,973$$

-

-(11/10^3+4/10^3-47/10^3-7/10^3)+(((sqrt(2/3) + sqrt(3/2)))) + (((sqrt(2/3) - sqrt(3/2))))

**Input:**

$$-\left(\frac{11}{10^3}+\frac{4}{10^3}-\frac{47}{10^3}-\frac{7}{10^3}\right)+\left(\sqrt{\frac{2}{3}}+\sqrt{\frac{3}{2}}\right)+\left(\sqrt{\frac{2}{3}}-\sqrt{\frac{3}{2}}\right)$$

**Exact result:**

$$\frac{39}{1000}+2\sqrt{\frac{2}{3}}$$

**Decimal approximation:**

1.671993161855452065464856049803927594643964987104446752288...

1.67199316185….

We note that 1.67199316... is a result practically equal to the value of the formula:

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

that is the holographic proton mass

The total equation of state parameter approaches minus unity as one increases $\Gamma_0$,

$$w_{DDM} = -\frac{\left(1-\sqrt{1+3\Gamma_0}\right)^2}{3\Gamma_0}. \qquad (3.53)$$

-(1-sqrt(1+3*8))^2 / (3*8)

**Input:**

$$-\frac{\left(1-\sqrt{1+3\times 8}\right)^2}{3\times 8}$$

**Exact result:**

$$-\frac{2}{3}$$

**Decimal approximation:**

-0.666666666666666666666666666666666666666666666666666666666...

-0.66666….

For

for $0 < \Gamma_0 < 1.$ = 0.83

we have that:

-(1-sqrt(1+3*0.83))^2 / (3*0.83)

**Input:**

$$-\frac{\left(1-\sqrt{1+3\times 0.83}\right)^2}{3\times 0.83}$$

**Result:**

$-0.302687\ldots$

For $\Gamma_0$ = 1/12 =0.083333…, we have that:

-(1-sqrt(1+3*(1/12)))^2 / (3*(1/12))

**Input:**

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

**Result:**

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

**Decimal approximation:**

$-0.0557280900008412143633053250748950582375265615538971029 1\ldots$

-0.05572809….

**Alternate forms:**

$4\sqrt{5}-9$

- $-\left(\sqrt{5}-2\right)^2$
-

**Minimal polynomial:**

$x^2+18x+1$

The inverse is:

-1/(-(1-sqrt(1+3*(1/12)))^2 / (3*(1/12))

**Input:**

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

**Exact result:**

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

**Decimal approximation:**

17.944271909999158785636694674925104941762473438446102897 08...

17.944271909…. result very near to the Lucas number 18

**Alternate forms:**

$$\frac{1}{(\sqrt{5}-2)^2}$$

- $9+4\sqrt{5}$
- $4\sqrt{5}+9$

**Minimal polynomial:**

$$x^2-18x+1$$

We note that:

(3571 + 322 + 29 )+8(((-1/(-(1-sqrt(1+3*(1/12)))^2 *1/ (3*(1/12))))))^(Pi)

**Input:**

$$(3571+322+29)+8\left(\frac{-1}{-\left(1-\sqrt{1+3\times\frac{1}{12}}\right)^2\times\frac{1}{3\times\frac{1}{12}}}\right)^{\pi}$$

**Exact result:**

$$3922+2^{3-2\pi}\left(\frac{1}{\left(1-\frac{\sqrt{5}}{2}\right)^2}\right)^{\pi}$$

**Decimal approximation:**

73490.749791643106411512908013401342543833104842261863727 37...

73490.74979….

**Alternate forms:**

$$3922 + 8\left(9 + 4\sqrt{5}\right)^{\pi}$$

- $$3922 + 2^{3-2\pi}\left(36 + 16\sqrt{5}\right)^{\pi}$$

- $$3922 + 2^{3-2\pi}\left(\frac{\sqrt{5}}{2} - 1\right)^{-2\pi}$$

**Series representations:**

$$(3571 + 322 + 29) + 8\left(\frac{-1}{-\frac{\left(1-\sqrt{1+\frac{3}{12}}\right)^2}{\frac{3}{12}}}\right)^{\pi} = 3922 + 2^{3-2\pi}\left(\frac{1}{\left(-1 + \sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2}\right)^{\pi}$$

- $$(3571 + 322 + 29) + 8\left(\frac{-1}{-\frac{\left(1-\sqrt{1+\frac{3}{12}}\right)^2}{\frac{3}{12}}}\right)^{\pi} =$$
$$3922 + 8\left(\frac{\sqrt{\pi}^2}{\left(2\sqrt{\pi} + \sum_{j=0}^{\infty}\operatorname{Res}_{s=-j} 4^s\,\Gamma\left(-\frac{1}{2} - s\right)\Gamma(s)\right)^2}\right)^{\pi}$$

$$(3571+322+29)+8\left(\frac{-1}{-\frac{\left(1-\sqrt{1+\frac{3}{12}}\right)^2}{\frac{3}{12}}}\right)^{\pi} =$$

$$3922+2^{3-2\pi}\left(\frac{1}{\left(-1+\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{5}{4}-z_0\right)^k z_0^{-k}}{k!}\right)^2}\right)^{\pi}$$

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

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

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

From:

**Excited D-branes and Supergravity Solutions**
Tsuguhiko Asakawa, Shinpei Kobayashi and So Matsuura
hep-th/0506221 - June 2005

**The boundary state corresponding to the NSNS-sector of *N* D*p*-branes in the limit of u → ∞**

From the following equations, we obtain:

$$|\,Bp';u\,\rangle_{\rm NS} = N\exp\left[\int d\widehat{\sigma}\left(-\frac{1}{4u^2}\mathbf{P}_i D\mathbf{P}_i\right)\right]|\,Bp\,\rangle_{\rm NS}$$

$= 2.2983717437\ldots{*}10^{59}$

$$\left| Bp';v \right\rangle_{NS} = \int [d\mathbf{X}^\mu] \exp\left\{ \int d\hat{\sigma} \left( -\frac{1}{4v^2} D\mathbf{X}^\mu D^2 \mathbf{X}^\mu \right) \right\} \left| \mathbf{X}^\mu, \mathbf{X}^i = 0 \right\rangle_{NS}$$

$= 2.0823329825883 * 10^{59}$

-(4181 - 233 - 21)+2*((((2.2983717437 *10^59) + (2.0823329825883 * 10^59))))^1/13

Where 4181, 233 and 21 are Fibonacci numbers

**Input interpretation:**

$$-(4181-233-21)+2\sqrt[13]{2.2983717437\times 10^{59}+2.0823329825883\times 10^{59}}$$

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

**Result:**

73490.8437525...

73490.8437525... result very near to the following ratio (A. Nardelli) concerning the general asymptotically flat solution of the equations of motion of the p-brane:

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

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

$$= 73491.78832548118710549159572042220548025195726563413398700\ldots =$$

$$= 73491.7883254\ldots$$

We have the following mathematical connections:

$$\left( (3571+322+29)+8\left( \frac{-1}{-\left(1-\sqrt{1+3\times\frac{1}{12}}\right)^2 \times \frac{1}{3\times\frac{1}{12}}} \right)^{\pi} \right) = 73490.74979 \Rightarrow$$

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

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

$= 73490.8437525.... \Rightarrow$

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

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

$= 73491.788325481187105491595720422205480251957265634133987 00...$

$= 73491.7883254... \Rightarrow$

$$\left(\begin{array}{c} I_{21} \ll \int_{-\infty}^{+\infty} \exp\left(-\left(\frac{t}{H}\right)^2\right) \left| \sum_{\lambda \leq P^{1-\varepsilon_2}} \frac{a(\lambda)}{\sqrt{\lambda}} B(\lambda) \lambda^{-i(T+t)} \right|^2 dt \ll \\ \ll H\left\{\left(\frac{4}{\varepsilon_2 \log T}\right)^{2r} (\log T)(\log X)^{-2\beta} + (\varepsilon_2^{-2r} (\log T)^{-2r} + \varepsilon_2^{-r} h_1^r (\log T)^{-r}) T^{-\varepsilon_1}\right\} \end{array}\right) /$$

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

From:

*A. A. Karatsuba*, **On the zeros of a special type of function connected with Dirichlet series**, Izv. Akad. Nauk SSSR Ser. Mat., 1991, Volume 55, Issue 3, 483–514

$$I_{21} \ll \int_{-\infty}^{+\infty} \exp\left(-\left(\frac{t}{H}\right)^2\right) \left| \sum_{\lambda \leq P^{1-\varepsilon_2}} \frac{a(\lambda)}{\sqrt{\lambda}} B(\lambda)\, \lambda^{-i(T+t)} \right|^2 dt \ll$$
$$\ll H\left( \sum_{\lambda \leq P^{1-\varepsilon_2}} \frac{|a(\lambda)|^2}{\lambda} \cdot \frac{4^r}{(\log P\lambda^{-1})^{2r}} + |W_2| \right) \ll H\left( \left(\frac{4}{\varepsilon_2 \log T}\right)^{2r} \sum_{\lambda \leq P} \frac{|a(\lambda)|^2}{\lambda} + |W_2| \right)$$
$$\ll H\left\{ \left(\frac{4}{\varepsilon_2 \log T}\right)^{2r} (\log T)(\log X)^{-2\beta} + \left(\varepsilon_2^{-2r} (\log T)^{-2r} + \varepsilon_2^{-r} h_1^r (\log T)^{-r}\right) T^{-\varepsilon_1} \right\} =$$

= 793139765.05275

$$\left( \begin{gathered} I_{21} \ll \int_{-\infty}^{+\infty} \exp\left(-\left(\frac{t}{H}\right)^2\right) \left| \sum_{\lambda \leq P^{1-\varepsilon_2}} \frac{a(\lambda)}{\sqrt{\lambda}} B(\lambda)\, \lambda^{-i(T+t)} \right|^2 dt \ll \\ \ll H\left( \sum_{\lambda \leq P^{1-\varepsilon_2}} \frac{|a(\lambda)|^2}{\lambda} \cdot \frac{4^r}{(\log P\lambda^{-1})^{2r}} + |W_2| \right) \ll H\left( \left(\frac{4}{\varepsilon_2 \log T}\right)^{2r} \sum_{\lambda \leq P} \frac{|a(\lambda)|^2}{\lambda} + |W_2| \right) \\ \ll H\left\{ \left(\frac{4}{\varepsilon_2 \log T}\right)^{2r} (\log T)(\log X)^{-2\beta} + \left(\varepsilon_2^{-2r} (\log T)^{-2r} + \varepsilon_2^{-r} h_1^r (\log T)^{-r}\right) T^{-\varepsilon_1} \right\} \end{gathered} \right) /$$

$$/(26 \times 4)^2 - 24 = \left( \frac{7.9313976505275 \times 10^8}{(26 \times 4)^2 - 24} \right) = 73493.30662089$$

Where (26*4)^2-24 or (6765 Fibonacci + 3571 + 322 + 123 +11) = 10792; and

$10792 = 2^3 * 19 * 71$

We have also:

$$\left( \begin{gathered} I_{21} \ll \int_{-\infty}^{+\infty} \exp\left(-\left(\frac{t}{H}\right)^2\right) \left| \sum_{\lambda \leq P^{1-\varepsilon_2}} \frac{a(\lambda)}{\sqrt{\lambda}} B(\lambda)\, \lambda^{-i(T+t)} \right|^2 dt \ll \\ \ll H\left\{ \left(\frac{4}{\varepsilon_2 \log T}\right)^{2r} (\log T)(\log X)^{-2\beta} + \left(\varepsilon_2^{-2r} (\log T)^{-2r} + \varepsilon_2^{-r} h_1^r (\log T)^{-r}\right) T^{-\varepsilon_1} \right\} \end{gathered} \right) /$$

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

And:

$$\left( \begin{array}{c} I_{21} \ll \int\limits_{-\infty}^{+\infty} \exp\left(-\left(\frac{t}{H}\right)^2\right) \left| \sum_{\lambda \le P^{1-\varepsilon_2}} \frac{a(\lambda)}{\sqrt{\lambda}} B(\lambda) \lambda^{-i(T+t)} \right|^2 dt \ll \\ \ll H\left( \sum_{\lambda \le P^{1-\varepsilon_2}} \frac{|a(\lambda)|^2}{\lambda} \cdot \frac{4^r}{(\log P\lambda^{-1})^{2r}} + |W_2| \right) \ll H\left( \left(\frac{4}{\varepsilon_2 \log T}\right)^{2r} \sum_{\lambda \le P} \frac{|a(\lambda)|^2}{\lambda} + |W_2| \right) \\ \ll H\left\{ \left(\frac{4}{\varepsilon_2 \log T}\right)^{2r} (\log T)(\log X)^{-2\beta} + (\varepsilon_2^{-2r} (\log T)^{-2r} + \varepsilon_2^{-r} h_1^r (\log T)^{-r}) T^{-\varepsilon_1} \right\} \end{array} \right) /$$

$$/ ((3^2 * 7)^2 + 59) - 22 = \left( \frac{7.9313976505275 \times 10^8}{63^2 + 59} - 22 \right) = 196884.595$$

$$/ (76 * 47 + 322 + 123 + 11) - 29 + 7 = \left( \frac{7.9313976505275 \times 10^8}{76 \times 47 + 322 + 123 + 11} - 29 + 7 \right) = 196884.595$$

Note that, 196884 is a fundamental number of the following ***j*-invariant**

$$j(\tau) = q^{-1} + 744 + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \cdots$$

(In mathematics, Felix Klein's ***j*-invariant** or ***j* function**, regarded as a function of a complex variable $\tau$, is a modular function of weight zero for SL(2, **Z**) defined on the upper half plane of complex numbers. Several remarkable properties of $j$ have to do with its $q$ expansion (Fourier series expansion), written as a Laurent series in terms of $q = e^{2\pi i\tau}$ (the square of the nome), which begins:

$$j(\tau) = q^{-1} + 744 + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \cdots$$

Note that $j$ has a simple pole at the cusp, so its $q$-expansion has no terms below $q^{-1}$.

All the Fourier coefficients are integers, which results in several almost integers, notably Ramanujan's constant:

$$e^{\pi\sqrt{163}} \approx 640320^3 + 744.$$

The asymptotic formula for the coefficient of $q^n$ is given by

$$\frac{e^{4\pi\sqrt{n}}}{\sqrt{2}\, n^{3/4}},$$

as can be proved by the Hardy–Littlewood circle method)

From:

**An Update on Brane Supersymmetry Breaking**
*J. Mourad and A. Sagnotti* - arXiv:1711.11494v1 [hep-th] 30 Nov 2017

Now, we have that:

would imply that $\beta_S = 1$. The Weyl rescaling $G \to g\, e^{\phi/2}$ turns the action (2.23) into its Einstein–frame form

$$\mathcal{S} = \frac{1}{2\,k_{10}^2} \int d^{10}x\sqrt{-g}\Big\{-R - \frac{1}{2}\,(\partial\phi)^2 - \frac{1}{2\,(p+2)!}\, e^{-2\,\beta_E^{(p)}\,\phi}\,\mathcal{H}_{p+2}^2 - T\,e^{\gamma_E\,\phi}\Big\}\,, \quad (2.24)$$

where now $\gamma_E = \frac{3}{2}$ for the orientifold model and $\gamma_E = \frac{5}{2}$ for the heterotic $SO(16)\times SO(16)$ model, while $\beta_E = -\frac{1}{2}$ for the orientifold model and $\beta_E = \frac{1}{2}$ for the heterotic $SO(16)\times SO(16)$ model.

profile is present. Assuming also a constant dilaton profile, the vacuum equations reduce to

$$\begin{aligned}
T\,e^{\gamma_E\,\phi} &= -\,\frac{\beta_E^{(p)}\,h^2}{\gamma_E}\;e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}\,,\\
16\,k'\,e^{-2C} &= \frac{h^2\left(p\,+\,1-\frac{2\,\beta_E^{(p)}}{\gamma_E}\right)e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}}{(7\,-\,p)}\,,\\
(A')^2 &= k\,e^{-2A} + \frac{h^2}{16(p\,+\,1)}\left(7\,-\,p\,+\,\frac{2\,\beta_E^{(p)}}{\gamma_E}\right)e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}\,. \quad (3.8)
\end{aligned}$$

The first is the dilaton equation, which requires for consistency $\beta_E < 0$, a condition that translates into the presence of a *three–form* flux in the orientifold vacua and of a *seven–form* flux in the heterotic $SO(16) \times SO(16)$ case. This fact determines the available options: $AdS_3 \times S^7$ in the orientifold case and $AdS_7 \times S^3$ in the heterotic case. On the other hand, the choice of one or another of the possible values of $k$, 0 or +1 selects different slicing of the same $AdS$ spacetime. The case $k = 0$, in particular, captures $AdS$ in Poincaré – like coordinates, and the detailed solutions read

$$g_s \equiv e^{\phi} = \frac{12}{(2\,h\,T^3)^{\frac{1}{4}}}, \qquad R^4\,g_s^3 = \frac{144}{T^2}, \qquad (A')^2 = k\,e^{-2A} + \frac{6}{R^2} \tag{3.9}$$

for the orientifold case ($p = 1$) and

$$g_s \equiv e^{\varphi} = \left(\frac{5}{h^2\,\Lambda^2}\right)^{\frac{1}{4}}, \qquad R^4\,g_s^5 = \frac{1}{\Lambda^2}, \qquad (A')^2 = k\,e^{-2A} + \frac{1}{12\,R^2} \tag{3.10}$$

for the heterotic ($p = 5$) case, where the one–loop contribution $\Lambda$, rather than $T$, accompanies the potential of eq. (3.3). Both choices allow regions of large $h$–fluxes, where $g_s$ is small while the scale $R$ determining the radii of the internal sphere and of the AdS spacetime is large. All in all, these solutions would thus appear a reliable starting point, but problems lurk around the corner and for one matter we recently ran across [51], where the authors had reported on a violation of the Breitenlohner–Freedman bound [52] for one of these cases, the $AdS_3 \times S^7$ solution of eq. (3.9), which would also resonate with some recent literature [53]. These and other related issues are currently under investigation [50].

We have the following data:

$\gamma_E = 3/2$ or $5/2$ and $\beta_E = -1/2$ or $1/2$ $g_s$ = small = 0.30282212

R = large = R = 0.97536759 ; ($g_s$ = 0.30282212); p = 5 ; h = 0.02390591

144 / (((0.97536759)^4*0.30282212^3)) = $T^2$ = 5729.6279... = T = 75.69431

$e^{\phi}$ = 1.0000000000000000001783 (or 1.0000000217500002365 3)

12^4/ ((((2*75.69431^3*1.0000000000000000001783^4)))) =

h = 0.0239059102723394358 (or 0.0239059081925253325 9876) = 0.02390591

(**The Mass of the Dilaton** - *Haim Goldberg* - https://arxiv.org/pdf/hep-ph/9402300.pdf)

$m_{dilaton} \sim \Lambda^2/m_{Pl} \sim (m^2_{SUSY}\, m_{Pl})^{1/3} \sim 10^8$ GeV

**Input interpretation:**

convert $10^8$ GeV/$c^2$ to kilograms

**Result:**

$1.783\times10^{-19}$ kg (kilograms)

$1.783 * 10^{-19}$ kg

And

**Input interpretation:**

$\exp(1.783\times10^{-19})$

**Result:**

1.000000000000000000178300...

$1.0000000000000000001783... = e^{\Phi}$

From:

http://www.fmboschetto.it/tde4/superstringhe.htm

Another of the particles regulated by the string theory is the dilaton or the graviscalare, a particle of a scalar field always associated with gravity, which like graviton compares as excitations of closed bosonic strings, that is strings that have not ended. Like the tachyon, the dilaton would not be part of the Standard Model, but the proponents of the strings affirm that the string theory would not be coherent if this scalar particle did not exist. The dilatons involved alone in a typical scale of the Planck energy ($10^{19}$ GeV), for which producing them in the laboratory would be rather difficult; however, they represent states produced in great abundance in the early universe during the inflation phase, and still survive until today as fossil radiation of those remote eras, for which there is a fund of radiation distributed in an almost homogeneous and isotropic manner on cosmic scale, similar in many respects to the cosmic bottom of gravitational waves.

**Input interpretation:**

convert $10^{19}$ GeV/$c^2$ to kilograms

**Result:**

$1.783\times10^{-8}$ kg (kilograms)

$1.783 * 10^{-8}$ kg

Considering the Planck Energy, we obtain:

**Input interpretation:**

convert $1.22\times10^{19}$ GeV/$c^2$ to kilograms

**Result:**

$2.175\times10^{-8}$ kg (kilograms)

$2.175*10^{-8}$

exp(2.175×10^-8)

**Input interpretation:**

$\exp(2.175 \times 10^{-8})$

**Result:**

1.000000021750000236531251714851571824505411655348511293607...

1.000000021750000023653.....

For:

$\gamma_E = 5/2$; $\beta_E = 1/2$; R = 0.97536759 ; $g_s = 0.30282212$; p = 5 ; h = 0.02390591

$T^2 = 5729.6279... = T = 75.69431$; $e^{\phi} = 1.000000021750000023653$ we obtain:

Now, we analyze the above vacuum equations.

We have:

$$T\, e^{\gamma_E\, \phi} \;=\; -\,\frac{\beta_E^{(p)}\, h^2}{\gamma_E}\; e^{-2\,(8-p)\,C + 2\,\beta_E^{(p)}\,\phi}$$

Putting in the equation the value of $e^{\phi}$, we obtain

((-(-1/2*0.02390591^2)/(2.5)))*exp(-2*3+2*1/2*1.000000021750000023653)

**Input interpretation:**

$$-\frac{-\frac{0.02390591^2}{2}}{2.5}\exp\left(-2\times 3 + 2\times\frac{1}{2}\times 1.000000021750000023653\right)$$

**Result:**

$7.701372961990149693896994729258991701154747011686 2445... \times 10^{-7}$

$7.70137296199...*10^{-7}$

We have:

$$16\, k'\, e^{-2C} = \frac{h^2 \left(p + 1 - \frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{-2(8-p)C + 2\beta_E^{(p)}\phi}}{(7-p)}$$

1/2*(((((0.02390591^2((((5+1-(2*1/2)/2.5)))*exp(-2*3+2*1/2*1.00000002175000023653)))))

**Input interpretation:**

$$\frac{1}{2}\left(0.02390591^2\left(\left(5+1-\frac{2\times\frac{1}{2}}{2.5}\right)\exp\left(-2\times3+2\times\frac{1}{2}\times1.00000002175000023653\right)\right)\right)$$

**Result:**

0.000010781922146786209571455792620962588381616645816360742...

0.0000107819221467862...

**Result:**

$1.078192214678620957145579262096258838161664581 63\times10^{-5}$

$1.07819221467862...*10^{-5}$

And:

$$(A')^2 = k\,e^{-2A} + \frac{h^2}{16(p+1)}\left(7 - p + \frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{-2(8-p)C + 2\beta_E^{(p)}\phi}$$

exp(-2)+(((0.02390591^2/(16*6)))*((7-5+(2*1/2)/2.5))* exp(-2*3+2*1/2*1.00000002175000023653)))))

**Input interpretation:**

$$\exp(-2) + \frac{0.02390591^2}{16\times6}\left(7-5+\frac{2\times\frac{1}{2}}{2.5}\right)\exp\left(-2\times3+2\times\frac{1}{2}\times1.00000002175000023653\right)$$

**Result:**

0.1353353795038...

0.1353353795038...

Thence, the three results are: $7.70137296199...*10^{-7}$ $1.07819221467862...*10^{-5}$

0.1353353795038... Now. Multiplying these results and performing the following calculations, we obtain:

47^2-64+1/Pi^2*-(1-1.0000007913)/(7.70137296199*10^-7 * 1.07819221467862*10^-5 * 0.1353353795038)

Where 47 is a Lucas number and 1.0000007913 is the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{2\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{(\varphi-1)^5\sqrt[4]{5^3}}-1}}-\varphi} = 1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\frac{e^{-6\pi\sqrt{5}}}{1+\frac{e^{-8\pi\sqrt{5}}}{1+\dots}}}} \approx 1.0000007913$$

**Input interpretation:**

$$47^2 - 64 + \frac{1}{\pi^2}\left(-\frac{1-1.0000007913}{7.70137296199\times 10^{-7}\times 1.07819221467862\times 10^{-5}\times 0.1353353795038}\right)$$

**Result:**

73490.359019614750686290822103320832667545694389097231573 69...

73490.3590196...

Now, we have the following mathematical connection with the equations concerning the boundary state corresponding to the NSNS-sector of N Dp-branes in the limit of u → ∞ and with the Karatsuba's equation connected with the Dirichlet series:

$$\left(47^2+64+\frac{1}{\pi^2}\right)\times-\frac{1-1.0000007913}{\left(\begin{array}{l} -\dfrac{\beta_E^{(p)}\,h^2}{\gamma_E}\,e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}\,, \\ \dfrac{h^2\left(p\,+\,1\,-\,\frac{2\,\beta_E^{(p)}}{\gamma_E}\right)e^{-2\,(8-p)\,C+2\beta_E^{(p)}\,\phi}}{(7\quad p)}\,, \\ k\,e^{-2\,A}\,+\,\dfrac{h^2}{16(p\,+\,1)}\,\left(7\,-\,p\,+\,\dfrac{2\,\beta_E^{(p)}}{\gamma_E}\right)\,e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi} \\ \\ \\ \\ \end{array}\right)}$$

$= 73490.3590196... \Rightarrow$

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

$$-3927+2\sqrt[13]{2.2983717437\times10^{59}+2.0823329825883\times10^{59}}$$

$= 73490.8437525.... \Rightarrow$

$$\left(\begin{array}{c} J_{21}\ll\int\limits_{-\infty}^{+\infty}\exp\left(-\left(\frac{t}{H}\right)^2\right)\left|\sum\limits_{\lambda\leq P^{1-\varepsilon_2}}\frac{a(\lambda)}{\sqrt{\lambda}}\,B(\lambda)\,\lambda^{-i(T+t)}\right|^2dt\ll \\ \ll H\left\{\left(\frac{4}{\varepsilon_2\log T}\right)^{2r}(\log T)\,(\log X)^{-2\beta}\;+(\varepsilon_2^{-2r}\,(\log T)^{-2r}+\varepsilon_2^{-r}h_1^r\,(\log T)^{-r})\,T^{-\varepsilon_1}\right\}\end{array}\right)/$$

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

Now:

(4181+144+3)+1/5*1/Pi^12(1.0000007913)/(7.70137296199*10^-7 * 1.07819221467862*10^-5 * 0.1353353795038)

**Input interpretation:**

$$(4181 + 144 + 3) + \frac{1}{5} \times \frac{1}{\pi^{12}} \times \frac{1.0000007913}{7.70137296199 \times 10^{-7} \times 1.07819221467862 \times 10^{-5} \times 0.1353353795038}$$

**Result:**

196883.60925...

196883.60925...

Note that, 196884 is a fundamental number of the following ***j*-invariant**

$$j(\tau) = q^{-1} + 744 + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \cdots$$

(In mathematics, Felix Klein's ***j*-invariant** or ***j* function**, regarded as a function of a complex variable $\tau$, is a modular function of weight zero for SL(2, **Z**) defined on the upper half plane of complex numbers. Several remarkable properties of $j$ have to do with its $q$ expansion (Fourier series expansion), written as a Laurent series in terms of $q = e^{2\pi i\tau}$ (the square of the nome), which begins:

$$j(\tau) = q^{-1} + 744 + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \cdots$$

Note that $j$ has a simple pole at the cusp, so its $q$-expansion has no terms below $q^{-1}$.

All the Fourier coefficients are integers, which results in several almost integers, notably Ramanujan's constant:

$$e^{\pi\sqrt{163}} \approx 640320^3 + 744.$$

The asymptotic formula for the coefficient of $q^n$ is given by

$$\frac{e^{4\pi\sqrt{n}}}{\sqrt{2}\, n^{3/4}},$$

as can be proved by the Hardy–Littlewood circle method)

From:

**A superfield constraint for N = 2 → N = 0 breaking**
*E. Dudas, S. Ferrara and A. Sagnotti* - arXiv:1707.03414v1 [hep-th] 11 Jul 2017

We have, the low-energy effective lagrangian of sgoldstino and other fields. For ρ > 0, the quartic term gives a large mass to the scalar sgoldstino, and effectively imposes the constraint $X^2 = 0$ at scales below its mass.

$$\mathcal{L}_\rho = \int d^4\theta \left[\overline{X}X - \rho(\overline{X}X)^2\right] + \left(\int d^2\theta\, f X + \text{h.c.}\right)$$

For $X = 3$ and $\theta = \pi$, we perform the following calculations:

(integrate [Pi*3]x) + (integrate [Pi*3]x)

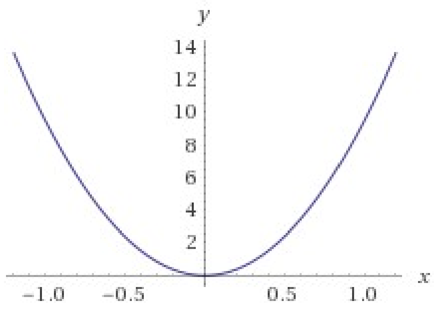
**Input:**

$$\int (\pi \times 3)\, x\, dx + \int (\pi \times 3)\, x\, dx$$

**Exact result:**

$3\pi x^2$

**Plot:**




(x from −1.2 to 1.2)

For x = 89 and subtracting $34^2$ and 5, where 5, 34 and 89 are Fibonacci number, we obtain:

(3 π 89^2)-34^2-5

**Input:**

$3\pi \times 89^2 - 34^2 - 5$

**Result:**

$23763\pi - 1161$

**Decimal approximation:**

73492.666227254256725587794716870827037177336437350639623 82...

73492.666227…

**Property:**

$-1161 + 23763\pi$ is a transcendental number

- **Alternate form:**

$3(7921\pi - 387)$

**Alternative representations:**

$$3\pi 89^2 - 34^2 - 5 = -5 - 34^2 + 540° 89^2$$

- $$3\pi 89^2 - 34^2 - 5 = -5 - 34^2 - 3i\log(-1)89^2$$

- $$3\pi 89^2 - 34^2 - 5 = -5 - 34^2 + 3\cos^{-1}(-1)89^2$$

**Series representations:**

$$3\pi 89^2 - 34^2 - 5 = -1161 + 95052\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

- $$3\pi 89^2 - 34^2 - 5 = -1161 + \sum_{k=0}^{\infty} -\frac{95052(-1)^k 1195^{-1-2k}\left(5^{1+2k} - 4 \times 239^{1+2k}\right)}{1+2k}$$

- $$3\pi 89^2 - 34^2 - 5 = -1161 + 23763\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k} + \frac{2}{1+4k} + \frac{1}{3+4k}\right)$$

**Integral representations:**

$$3\pi 89^2 - 34^2 - 5 = -1161 + 95052 \int_0^1 \sqrt{1-t^2}\, dt$$

•

$$3\pi 89^2 - 34^2 - 5 = -1161 + 47526 \int_0^1 \frac{1}{\sqrt{1-t^2}}\, dt$$

•

$$3\pi 89^2 - 34^2 - 5 = -1161 + 47526 \int_0^\infty \frac{1}{1+t^2}\, dt$$

For X = 1, we obtain:

(integrate [Pi]x) + (integrate [Pi]x)

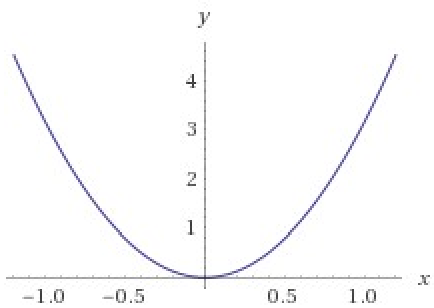
**Input:**

$$\int \pi x\, dx + \int \pi x\, dx$$

**Exact result:**

$\pi x^2$

**Plot:**




($x$ from −1.2 to 1.2)

For x = 248, and adding 3, 610, 843 and 2207, where 610 is a Fibonacci number and 3, 843 and 2207 are Lucas numbers, we obtain:

π 248^2+610+2207+843+3

**Input:**

$$\pi \times 248^2 + 610 + 2207 + 843 + 3$$

**Result:**

$$3663 + 61504\pi$$

**Decimal approximation:**

196883.514566386643338406418645222545389662706739166508413 2...

196883.514566

**Property:**

$3663 + 61504\pi$ is a transcendental number

**Alternative representations:**

$$\pi\, 248^2 + 610 + 2207 + 843 + 3 = 3663 + 180°\, 248^2$$

$$\pi\, 248^2 + 610 + 2207 + 843 + 3 = 3663 - i\left(\log(-1)\, 248^2\right)$$

$$\pi\, 248^2 + 610 + 2207 + 843 + 3 = 3663 + \cos^{-1}(-1)\, 248^2$$

**Series representations:**

$$\pi\, 248^2 + 610 + 2207 + 843 + 3 = 3663 + 246\,016 \sum_{k=0}^{\infty} \frac{(-1)^k}{1 + 2k}$$

$$\pi\, 248^2 + 610 + 2207 + 843 + 3 = 3663 + \sum_{k=0}^{\infty} -\frac{246\,016\,(-1)^k\, 1195^{-1-2k}\left(5^{1+2k} - 4 \times 239^{1+2k}\right)}{1 + 2k}$$

$$\pi\, 248^2 + 610 + 2207 + 843 + 3 = 3663 + 61\,504 \sum_{k=0}^{\infty} \left(-\frac{1}{4}\right)^k \left(\frac{1}{1 + 2k} + \frac{2}{1 + 4k} + \frac{1}{3 + 4k}\right)$$

**Integral representations:**

$$\pi\, 248^2 + 610 + 2207 + 843 + 3 = 3663 + 246\,016 \int_0^1 \sqrt{1 - t^2}\, dt$$

$$\pi\, 248^2 + 610 + 2207 + 843 + 3 = 3663 + 123\,008 \int_0^1 \frac{1}{\sqrt{1 - t^2}}\, dt$$

$$\pi\, 248^2 + 610 + 2207 + 843 + 3 = 3663 + 123\,008 \int_0^{\infty} \frac{1}{1 + t^2}\, dt$$

Now, from:

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

We have that:

Hence

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

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

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

$$\begin{aligned} 64G_{37}^{24} &= e^{\pi\sqrt{37}} + 24 + 276e^{-\pi\sqrt{37}} + \cdots, \\ 64G_{37}^{-24} &= \qquad\qquad 4096e^{-\pi\sqrt{37}} - \cdots, \end{aligned}$$

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 obtain:

24+exp(Pi*sqrt(22))-24+4372*exp(-Pi*sqrt(22))

**Input:**

$$24 + \exp\left(\pi \sqrt{22}\right) - 24 + 4372 \exp\left(-\pi \sqrt{22}\right)$$

**Exact result:**

$$4372 e^{-\sqrt{22} \pi} + e^{\sqrt{22} \pi}$$

**Decimal approximation:**

$$2.508951999999984708667376515764845630439391276233220 44\ldots \times 10^6$$

2508951.999

**Property:**

$4372 e^{-\sqrt{22} \pi} + e^{\sqrt{22} \pi}$ is a transcendental number

- 

**Alternate form:**

$$e^{-\sqrt{22} \pi} \left(4372 + e^{2 \sqrt{22} \pi}\right)$$

- 

**Series representations:**

$$24 + \exp\left(\pi \sqrt{22}\right) - 24 + 4372 \exp\left(-\pi \sqrt{22}\right) = 4372 \exp\left(-\pi \sqrt{21} \sum_{k=0}^{\infty} 21^{-k} \binom{\frac{1}{2}}{k}\right) + \exp\left(\pi \sqrt{21} \sum_{k=0}^{\infty} 21^{-k} \binom{\frac{1}{2}}{k}\right)$$

- 

$$24 + \exp\left(\pi \sqrt{22}\right) - 24 + 4372 \exp\left(-\pi \sqrt{22}\right) = 4372 \exp\left(-\pi \sqrt{21} \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{21}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right) + \exp\left(\pi \sqrt{21} \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{21}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)$$

- 

$$24+\exp\left(\pi\sqrt{22}\right)-24+4372\exp\left(-\pi\sqrt{22}\right)=$$
$$4372\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(22-z_0)^k z_0^{-k}}{k!}\right)+$$
$$\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(22-z_0)^k z_0^{-k}}{k!}\right) \text{ for not } ((z_0\in\mathbb{R} \text{ and } -\infty<z_0\le 0))$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

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

24+exp(Pi*sqrt(37))-24+4096*exp(-Pi*sqrt(37))

**Input:**

$$24+\exp\left(\pi\sqrt{37}\right)-24+4096\exp\left(-\pi\sqrt{37}\right)$$

**Exact result:**

$$4096\,e^{-\sqrt{37}\,\pi}+e^{\sqrt{37}\,\pi}$$

**Decimal approximation:**

$$1.9914864799999861410298571241035664809877469214994640\ldots\times10^{8}$$

199148647.999…

**Property:**

$4096\,e^{-\sqrt{37}\,\pi}+e^{\sqrt{37}\,\pi}$ is a transcendental number

- **Alternate form:**

$$e^{-\sqrt{37}\,\pi}\left(4096+e^{2\sqrt{37}\,\pi}\right)$$

- **Series representations:**

$$24+\exp\left(\pi\sqrt{37}\right)-24+4096\exp\left(-\pi\sqrt{37}\right)=$$
$$4096\exp\left(-\pi\sqrt{36}\sum_{k=0}^{\infty}36^{-k}\binom{\frac{1}{2}}{k}\right)+\exp\left(\pi\sqrt{36}\sum_{k=0}^{\infty}36^{-k}\binom{\frac{1}{2}}{k}\right)$$

- $$24+\exp\left(\pi\sqrt{37}\right)-24+4096\exp\left(-\pi\sqrt{37}\right)=$$
$$4096\exp\left(-\pi\sqrt{36}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{36}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)+\exp\left(\pi\sqrt{36}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{36}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

- $$24+\exp\left(\pi\sqrt{37}\right)-24+4096\exp\left(-\pi\sqrt{37}\right)=$$
$$4096\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(37-z_0)^k z_0^{-k}}{k!}\right)+$$
$$\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(37-z_0)^k z_0^{-k}}{k!}\right)\quad\text{for not }((z_0\in\mathbb{R}\text{ and }-\infty<z_0\leq 0))$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

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

24+exp(Pi*sqrt(58))-24+4372*exp(-Pi*sqrt(58))

**Input:**

$$24+\exp\left(\pi\sqrt{58}\right)-24+4372\exp\left(-\pi\sqrt{58}\right)$$

**Exact result:**

$$4372\,e^{-\sqrt{58}\,\pi}+e^{\sqrt{58}\,\pi}$$

**Decimal approximation:**

$$2.4591257751999999999999999840828126993120096487668508\ldots\times 10^{10}$$

24591257751.9999…

**Property:**

$4372\, e^{-\sqrt{58}\,\pi} + e^{\sqrt{58}\,\pi}$ is a transcendental number

- 

**Alternate form:**

$e^{-\sqrt{58}\,\pi}\left(4372 + e^{2\sqrt{58}\,\pi}\right)$

**Series representations:**

$$24 + \exp\left(\pi\sqrt{58}\right) - 24 + 4372\exp\left(-\pi\sqrt{58}\right) = 4372\exp\left(-\pi\sqrt{57}\sum_{k=0}^{\infty} 57^{-k}\binom{\frac{1}{2}}{k}\right) + \exp\left(\pi\sqrt{57}\sum_{k=0}^{\infty} 57^{-k}\binom{\frac{1}{2}}{k}\right)$$

- 

$$24 + \exp\left(\pi\sqrt{58}\right) - 24 + 4372\exp\left(-\pi\sqrt{58}\right) = 4372\exp\left(-\pi\sqrt{57}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{57}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right) + \exp\left(\pi\sqrt{57}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{57}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

- 

$$24 + \exp\left(\pi\sqrt{58}\right) - 24 + 4372\exp\left(-\pi\sqrt{58}\right) = 4372\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(58-z_0)^k z_0^{-k}}{k!}\right) + \exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(58-z_0)^k z_0^{-k}}{k!}\right) \quad \text{for not } \left(\left(z_0 \in \mathbb{R} \text{ and } -\infty < z_0 \le 0\right)\right)$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

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

From these equations, we can to obtain:

4372*exp(-Pi*sqrt(22)) = 2508951.9999999847086-24-exp(Pi*sqrt(22))+24

**Input interpretation:**

$$4372 \exp\left(-\pi \sqrt{22}\right) = 2.5089519999999847086 \times 10^6 - 24 - \exp\left(\pi \sqrt{22}\right) + 24$$

**Result:**

True

4372*exp(-Pi*sqrt(22))

**Input:**

$$4372 \exp\left(-\pi \sqrt{22}\right)$$

**Exact result:**

$$4372 e^{-\sqrt{22} \pi}$$

**Decimal approximation:**

0.0017425602415018473216431584679629805413650140141331955 97...

0.0017425602415…

**Property:**

$4372 e^{-\sqrt{22} \pi}$ is a transcendental number

- 

**Series representations:**

$$4372 \exp\left(-\pi \sqrt{22}\right) = 4372 \exp\left(-\pi \sqrt{21} \sum_{k=0}^{\infty} 21^{-k} \binom{\frac{1}{2}}{k}\right)$$

- 

$$4372 \exp\left(-\pi \sqrt{22}\right) = 4372 \exp\left(-\pi \sqrt{21} \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{21}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)$$

- 

$$4372 \exp\left(-\pi \sqrt{22}\right) = 4372 \exp\left(-\frac{\pi \sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 21^{-s}\, \Gamma\left(-\frac{1}{2}-s\right) \Gamma(s)}{2\sqrt{\pi}}\right)$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

4096*exp(-Pi*sqrt(37)) = 199148647.9999986141-24-exp(Pi*sqrt(37))+24

**Input interpretation:**

$$4096 \exp\left(-\pi \sqrt{37}\right) = 1.991486479999986141 \times 10^{8} - 24 - \exp\left(\pi \sqrt{37}\right) + 24$$

**Result:**

True

4096*exp(-Pi*sqrt(37))

**Input:**

$$4096 \exp\left(-\pi \sqrt{37}\right)$$

**Exact result:**

$$4096\, e^{-\sqrt{37}\, \pi}$$

**Decimal approximation:**

0.000020567551128945909432772762874258484079974327397718231...

0.000020567551128….

**Property:**

$4096\, e^{-\sqrt{37}\, \pi}$ is a transcendental number

- **Series representations:**

$$4096 \exp\left(-\pi \sqrt{37}\right) = 4096 \exp\left(-\pi \sqrt{36} \sum_{k=0}^{\infty} 36^{-k} \binom{\frac{1}{2}}{k}\right)$$

- $$4096 \exp\left(-\pi \sqrt{37}\right) = 4096 \exp\left(-\pi \sqrt{36} \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{36}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)$$

- $$4096 \exp\left(-\pi \sqrt{37}\right) = 4096 \exp\left(-\frac{\pi \sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 36^{-s}\, \Gamma\left(-\frac{1}{2}-s\right) \Gamma(s)}{2 \sqrt{\pi}}\right)$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

4372*exp(-Pi*sqrt(58)) = 24591257751.9999999999999998408-24-exp(Pi*sqrt(58))+24

**Input interpretation:**

$$4372 \exp\left(-\pi \sqrt{58}\right) = 2.45912577519999999999999998408 \times 10^{10} - 24 - \exp\left(\pi \sqrt{58}\right) + 24$$

**Result:**

True

4372*exp(-Pi*sqrt(58))

**Input:**

$$4372 \exp\left(-\pi \sqrt{58}\right)$$

**Exact result:**

$$4372 e^{-\sqrt{58}\,\pi}$$

**Decimal approximation:**

$$1.7778675837125193463785428426005833784836289559896768\ldots \times 10^{-7}$$

**Decimal form:**

0.00000017778675837125193463785428426005833784836289559896768

0.00000017778675837…

**Property:**

$4372 e^{-\sqrt{58}\,\pi}$ is a transcendental number

- **Series representations:**

$$4372 \exp\left(-\pi \sqrt{58}\right) = 4372 \exp\left(-\pi \sqrt{57} \sum_{k=0}^{\infty} 57^{-k} \binom{\frac{1}{2}}{k}\right)$$

-

$$4372 \exp\left(-\pi \sqrt{58}\right) = 4372 \exp\left(-\pi \sqrt{57} \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{57}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)$$

-

$$4372 \exp\left(-\pi \sqrt{58}\right) = 4372 \exp\left(-\frac{\pi \sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 57^{-s}\, \Gamma\left(-\frac{1}{2}-s\right) \Gamma(s)}{2\sqrt{\pi}}\right)$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

Now, from the following vacuum equations:

$$T\,e^{\gamma_E\,\phi} \;=\; -\,\frac{\beta_E^{(p)}\,h^2}{\gamma_E}\;e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}$$

$$16\,k'\,e^{-2C} \;-\; \frac{h^2\left(p\;+\;1\;-\;\frac{2\,\beta_E^{(p)}}{\gamma_E}\right)e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}}{(7\;-\;p)}$$

$$(A')^2 \;=\; k\,e^{-2A} \;+\; \frac{h^2}{16(p\;+\;1)}\;\left(7\;-\;p\;+\;\frac{2\,\beta_E^{(p)}}{\gamma_E}\right)\;e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}$$

we substitute to the exp in the equations, the result obtained from the Ramanujan's modular equation, i.e.

$$4096\,e^{-\pi\sqrt{18}}$$

and obtain:

((-(-1/2*0.02390591^2)/(2.5)))* 4096*e^(-Pi*sqrt(37))

**Input interpretation:**

$$-\frac{-\frac{0.02390591^2}{2}}{2.5}\times 4096\,e^{-\pi\sqrt{37}}$$

**Result:**

$$2.35084\ldots\times 10^{-9}$$

2.35084… * $10^{-9}$

**Series representations:**

$$\frac{\left(4096\,e^{-\pi\sqrt{37}}\right)\left(-\left(-0.0239059^2\right)\right)}{2\times 2.5} = 0.468167\,e^{-\pi\sqrt{36}\,\sum_{k=0}^{\infty}36^{-k}\binom{1/2}{k}}$$

•

$$\frac{\left(4096\, e^{-\pi \sqrt{37}}\right)\left(-\left(-0.0239059^2\right)\right)}{2 \times 2.5} = 0.468167 \exp\left(-\pi \sqrt{36} \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{36}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)$$

- $$\frac{\left(4096\, e^{-\pi \sqrt{37}}\right)\left(-\left(-0.0239059^2\right)\right)}{2 \times 2.5} = 0.468167 \exp\left(-\frac{\pi \sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 36^{-s}\, \Gamma\left(-\frac{1}{2} - s\right) \Gamma(s)}{2 \sqrt{\pi}}\right)$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

With 18 as value within the square root, we obtain:

((-(-1/2*0.02390591^2)/(2.5)))* 4096*e^(-Pi*sqrt(18))

**Input interpretation:**

$$-\frac{-\frac{0.02390591^2}{2}}{2.5} \times 4096\, e^{-\pi \sqrt{18}}$$

**Result:**

$7.61802... \times 10^{-7}$

7.61802….*$10^{-7}$

**Series representations:**

$$\frac{\left(4096\, e^{-\pi \sqrt{18}}\right)\left(-\left(-0.0239059^2\right)\right)}{2 \times 2.5} = 0.468167\, e^{-\pi \sqrt{17} \sum_{k=0}^{\infty} 17^{-k} \binom{1/2}{k}}$$

- 

$$\frac{\left(4096\, e^{-\pi\sqrt{18}}\right)\left(-\left(-0.0239059^2\right)\right)}{2\times 2.5} = 0.468167 \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

- $$\frac{\left(4096\, e^{-\pi\sqrt{18}}\right)\left(-\left(-0.0239059^2\right)\right)}{2\times 2.5} = 0.468167 \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

1/2*(((((0.02390591^2((((5+1-(2*1/2)/2.5)))* 4096*e^(-Pi*sqrt(37))

**Input interpretation:**

$$\frac{1}{2}\left(0.02390591^2\left(\left(\left(5+1-\frac{2\times\frac{1}{2}}{2.5}\right)\times 4096\, e^{-\pi\sqrt{37}}\right)\right)\right)$$

**Result:**

$3.291177\ldots \times 10^{-8}$

$3.291177\ldots * 10^{-8}$

**Series representations:**

$$\frac{1}{2}\times 0.0239059^2\left(\left(5+1-\frac{2}{2\times 2.5}\right)4096\, e^{-\pi\sqrt{37}}\right) = 6.55433\, e^{-\pi\sqrt{36}\sum_{k=0}^{\infty}36^{-k}\binom{1/2}{k}}$$

- 

$$\frac{1}{2} \times 0.0239059^2 \left(\left(5+1-\frac{2}{2\times 2.5}\right) 4096\, e^{-\pi\sqrt{37}}\right) = 6.55433 \exp\left(-\pi\sqrt{36} \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{36}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)$$

- $$\frac{1}{2} \times 0.0239059^2 \left(\left(5+1-\frac{2}{2\times 2.5}\right) 4096\, e^{-\pi\sqrt{37}}\right) = 6.55433 \exp\left(-\frac{\pi \sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 36^{-s}\, \Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

With 18 as value within the square root, we obtain:

1/2*(((((0.02390591^2((((5+1-(2*1/2)/2.5)))* 4096*e^(-Pi*sqrt(18))

**Input interpretation:**

$$\frac{1}{2}\left(0.02390591^2\left(\left(5+1-\frac{2\times\frac{1}{2}}{2.5}\right)\times 4096\, e^{-\pi\sqrt{18}}\right)\right)$$

**Result:**

0.00001066522...

**Result:**

$1.0665220000 \times 10^{-5}$

$1.066522\ldots * 10^{-5}$

**Series representations:**

$$\frac{1}{2}\times 0.0239059^2\left(\left(5+1-\frac{2}{2\times 2.5}\right)4096\,e^{-\pi\sqrt{18}}\right)=6.55433\,e^{-\pi\sqrt{17}\sum_{k=0}^{\infty}17^{-k}\binom{1/2}{k}}$$

- $$\frac{1}{2}\times 0.0239059^2\left(\left(5+1-\frac{2}{2\times 2.5}\right)4096\,e^{-\pi\sqrt{18}}\right)=6.55433\exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

- $$\frac{1}{2}\times 0.0239059^2\left(\left(5+1-\frac{2}{2\times 2.5}\right)4096\,e^{-\pi\sqrt{18}}\right)=6.55433\exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

exp(-2)+(((0.02390591^2/(16*6)))*((7-5+(2*1/2)/2.5))* 4096*e^(-Pi*sqrt(37))

**Input interpretation:**

$$\exp(-2)+\frac{0.02390591^2}{16\times 6}\left(7-5+\frac{2\times\frac{1}{2}}{2.5}\right)\times 4096\,e^{-\pi\sqrt{37}}$$

**Result:**

0.135335283530468...

0.13533528…

**Alternative representations:**

$$\exp(-2)+\frac{\left(7-5+\frac{2}{2.5\times2}\right)0.0239059^2\times4096\,e^{-\pi\sqrt{37}}}{16\times6}=\exp(-2)+\frac{\left(7-5+\frac{2}{2.5\times2}\right)0.0239059^2\times4096\,z^{-\pi\sqrt{37}}}{16\times6}\quad\text{for } z=e$$

- 

$$\exp(-2)+\frac{\left(7-5+\frac{2}{2.5\times2}\right)0.0239059^2\times4096\,e^{-\pi\sqrt{37}}}{16\times6}=\exp(-2)+\frac{\left(7-5+\frac{2}{2.5\times2}\right)0.0239059^2\times4096\,w^a}{16\times6}\quad\text{for } a+\frac{\sqrt{37}\,\pi}{\log(w)}=0$$

- 

$$\exp(-2)+\frac{\left(7-5+\frac{2}{2.5\times2}\right)0.0239059^2\times4096\,e^{-\pi\sqrt{37}}}{16\times6}=\exp(-2)+\frac{4096}{96}\times0.0239059^2\left(2+\frac{1}{2.5}\right)\left(1+\frac{2}{-1+\coth\left(-\frac{\pi\sqrt{37}}{2}\right)}\right)$$

$\log(x)$ is the natural logarithm

$\coth(x)$ is the hyperbolic cotangent function

**Series representations:**

$$\exp(-2)+\frac{\left(7-5+\frac{2}{2.5\times2}\right)0.0239059^2\times4096\,e^{-\pi\sqrt{37}}}{16\times6}=\exp(-2)+0.0585208\sum_{k=0}^{\infty}\frac{\left(-\pi\sqrt{37}\right)^k}{k!}$$

- 

$$\exp(-2)+\frac{\left(7-5+\frac{2}{2.5\times2}\right)0.0239059^2\times4096\,e^{-\pi\sqrt{37}}}{16\times6}=\exp(-2)+0.0585208\sum_{k=-\infty}^{\infty}I_k\left(-\pi\sqrt{37}\right)$$

- 

$$\exp(-2) + \frac{\left(7-5+\frac{2}{2.5\times 2}\right) 0.0239059^2 \times 4096\, e^{-\pi\sqrt{37}}}{16\times 6} = \exp(-2) + 0.0585208 \sum_{k=-\infty}^{\infty} (-1)^k I_k\left(\pi\sqrt{37}\right)$$

$n!$ is the factorial function

$I_n(z)$ is the modified Bessel function of the first kind

With 18 as value within the square root, we obtain:

exp(-2)+(((0.02390591^2/(16*6)))*((7-5+(2*1/2)/2.5))* 4096*e^(-Pi*sqrt(18))

**Input interpretation:**

$$\exp(-2) + \frac{0.02390591^2}{16\times 6}\left(7-5+\frac{2\times\frac{1}{2}}{2.5}\right)\times 4096\, e^{-\pi\sqrt{18}}$$

**Result:**

0.1353353784618...

0.13533537…

**Alternative representations:**

$$\exp(-2) + \frac{\left(7-5+\frac{2}{2.5\times 2}\right) 0.0239059^2 \times 4096\, e^{-\pi\sqrt{18}}}{16\times 6} = \exp(-2) + \frac{\left(7-5+\frac{2}{2.5\times 2}\right) 0.0239059^2 \times 4096\, z^{-\pi\sqrt{18}}}{16\times 6} \text{ for } z = e$$

- 

$$\exp(-2) + \frac{\left(7-5+\frac{2}{2.5\times 2}\right) 0.0239059^2 \times 4096\, e^{-\pi\sqrt{18}}}{16\times 6} = \exp(-2) + \frac{\left(7-5+\frac{2}{2.5\times 2}\right) 0.0239059^2 \times 4096\, w^{a}}{16\times 6} \text{ for } a = -\frac{3\sqrt{2}\,\pi}{\log(w)}$$

- 

$$\exp(-2) + \frac{\left(7 - 5 + \frac{2}{2.5 \times 2}\right) 0.0239059^2 \times 4096 \, e^{-\pi \sqrt{18}}}{16 \times 6} =$$

$$\exp(-2) + \frac{4096}{96} \times 0.0239059^2 \left(2 + \frac{1}{2.5}\right) \left(1 + \frac{2}{-1 + \coth\left(-\frac{\pi \sqrt{18}}{2}\right)}\right)$$

$\log(x)$ is the natural logarithm

$\coth(x)$ is the hyperbolic cotangent function

**Series representations:**

$$\exp(-2) + \frac{\left(7 - 5 + \frac{2}{2.5 \times 2}\right) 0.0239059^2 \times 4096 \, e^{-\pi \sqrt{18}}}{16 \times 6} =$$

$$\exp(-2) + 0.0585208 \sum_{k=0}^{\infty} \frac{\left(-\pi \sqrt{18}\right)^k}{k!}$$

•

$$\exp(-2) + \frac{\left(7 - 5 + \frac{2}{2.5 \times 2}\right) 0.0239059^2 \times 4096 \, e^{-\pi \sqrt{18}}}{16 \times 6} =$$

$$\exp(-2) + 0.0585208 \sum_{k=-\infty}^{\infty} I_k\left(-\pi \sqrt{18}\right)$$

•

$$\exp(-2) + \frac{\left(7 - 5 + \frac{2}{2.5 \times 2}\right) 0.0239059^2 \times 4096 \, e^{-\pi \sqrt{18}}}{16 \times 6} =$$

$$\exp(-2) + 0.0585208 \sum_{k=-\infty}^{\infty} (-1)^k I_k\left(\pi \sqrt{18}\right)$$

$n!$ is the factorial function

$I_n(z)$ is the modified Bessel function of the first kind

Note that, the obtained results, are very near to the solutions of the vacuum equations concerning the Brane Supersymmetry Breaking.

From the following vacuum equations:

$$T\,e^{\gamma_E\,\phi} = -\frac{\beta_E^{(p)}\,h^2}{\gamma_E}\,e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}$$

$$16\,k'\,e^{-2C} = \frac{h^2\left(p+1-\frac{2\,\beta_E^{(p)}}{\gamma_E}\right)e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}}{(7-p)}$$

$$(A')^2 = k\,e^{-2A} + \frac{h^2}{16(p+1)}\left(7-p+\frac{2\,\beta_E^{(p)}}{\gamma_E}\right)e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}$$

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 $p$, $C$, $\beta_E$ and $\phi$ correspond to the exponents of $e$ (i.e. of exp). Thence we obtain for p = 5 and $\beta_E = 1/2$:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

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+$\phi$ 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:**

$1.6272016226072509292942156739117979541838581136954016... \times 10^{-6}$

1.6272016… * $10^{-6}$

**Property:**

$e^{-3\sqrt{2}\,\pi}$ is a transcendental number

**Series representations:**

$$e^{-\pi\sqrt{18}} = e^{-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{1/2}{k}}$$

- $$e^{-\pi\sqrt{18}} = \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

- $$e^{-\pi\sqrt{18}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

Now, we have the following calculations:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

$$e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10^{-6}$$

from which:

$$\frac{1}{4096} e^{-6C+\phi} = 1.6272016\ldots * 10^{-6}$$

$$0.000244140625\, e^{-6C+\phi} = e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10^{-6}$$

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:**

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096 \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{\frac{1}{2}}{k}\right)$$

- $$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096 \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty} \frac{\left(-\frac{1}{17}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)$$

- $$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096 \exp\left(-\frac{\pi\sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

$\binom{n}{m}$ is the binomial coefficient

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

Now:

$$e^{-6C+\phi} = 0.0066650177536$$

$$\exp\left(-\pi\sqrt{18}\right)\times\frac{1}{0.000244140625} =$$

$$e^{-\pi\sqrt{18}}\times\frac{1}{0.000244140625}$$

$$= 0.00666501785…$$

From:

ln(0.00666501784619)

**Input interpretation:**

$\log(0.00666501784619)$

$\log(x)$ is the natural logarithm

**Result:**

$-5.010882647757\ldots$

-5.010882647757…

**Alternative representations:**

$$\log(0.006665017846190000) = \log_e(0.006665017846190000)$$

- $$\log(0.006665017846190000) = \log(a)\log_a(0.006665017846190000)$$

- $$\log(0.006665017846190000) = -\text{Li}_1(0.993334982153810000)$$

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

$\text{Li}_n(x)$ is the polylogarithm function

**Series representations:**

$$\log(0.006665017846190000) = -\sum_{k=1}^{\infty} \frac{(-1)^k (-0.993334982153810000)^k}{k}$$

- $$\log(0.006665017846190000) = 2 i \pi \left\lfloor \frac{\arg(0.006665017846190000 - x)}{2 \pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

- $$\log(0.006665017846190000) = \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2 \pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2 \pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - z_0)^k z_0^{-k}}{k}$$

$\arg(z)$ is the complex argument

$\lfloor x \rfloor$ is the floor function

$i$ is the imaginary unit

**Integral representation:**

$$\log(0.00666501784619000) = \int_1^{0.00666501784619000} \frac{1}{t}\,dt$$

In conclusion:

$$-6C + \phi = -5.010882647757\ \ldots$$

and for C = 1, we obtain:

$\phi = -5.010882647757 + 6 =$ **$0.989117352243$** $= \boldsymbol{\phi}$

Indeed, if we put this value of dilaton in the previous three vacuum equations, we obtain:

((-(-1/2*0.02390591^2)/(2.5)))*exp(-2*3+2*1/2*0.989117352243)

**Input interpretation:**

$$-\frac{-\frac{0.02390591^2}{2}}{2.5}\exp\left(-2\times 3+2\times\frac{1}{2}\times 0.989117352243\right)$$

**Result:**

$7.61802\ldots \times 10^{-7}$

$7.61802\ldots * 10^{-7}$

1/2*(((((0.02390591^2((((5+1-(2*1/2)/2.5)))*exp(-2*3+2*1/2*0.989117352243)))))

**Input interpretation:**

$$\frac{1}{2}\left(0.02390591^2\left(\left(5+1-\frac{2\times\frac{1}{2}}{2.5}\right)\exp\left(-2\times 3+2\times\frac{1}{2}\times 0.989117352243\right)\right)\right)$$

**Result:**

0.00001066522...

**Result:**

$1.0665220000 \times 10^{-5}$

1.066522... * $10^{-5}$

exp(-2)+(((0.02390591^2/(16*6)))*((7-5+(2*1/2)/2.5))* exp(-2*3+2*1/2*0.989117352243)))))

**Input interpretation:**

$$\exp(-2) + \frac{0.02390591^2}{16 \times 6} \left(7 - 5 + \frac{2 \times \frac{1}{2}}{2.5}\right) \exp\left(-2 \times 3 + 2 \times \frac{1}{2} \times 0.989117352243\right)$$

**Result:**

0.1353353784618...

0.1353353...

Note that, from the inverse, multiplying by 7/32, we obtain:

7/32 * 1/((((((exp(-2)+(((0.02390591^2/(16*6)))*((7-5+(2*1/2)/2.5))* exp(-2*3+2*1/2*0.989117352243))))))))

**Input interpretation:**

$$\frac{7}{32} \times \frac{1}{\exp(-2) + \frac{0.02390591^2}{16 \times 6} \left(7 - 5 + \frac{2 \times \frac{1}{2}}{2.5}\right) \exp\left(-2 \times 3 + 2 \times \frac{1}{2} \times 0.989117352243\right)}$$

**Result:**

1.616354884334...

1.61635488... result very near to the value without exponent of Planck length $1.616252 \times 10^{-35}$ m

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