

SOLUTION: $1-(1/4)+(1/9)-(1/16)+(1/25)-\dots=?$

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Question 1061883: $1-(1/4)+(1/9)-(1/16)+(1/25)-\dots=?$

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$1-(1/4)+(1/9)-(1/16)+(1/25)-\dots=?$

:

we can rewrite this as

:

summation $i=1, \dots, \text{infinity}$ of $(-1)^{(i+1)} / i^2$

:

The approach is to break the sum into even and odd parts

:

we know that summation $i=1, \dots, \text{infinity}$ of $1/i^2 = \pi^2/6$

:

The even part is $(1/2)^2 + (1/4)^2$ plus $(1/6)^2$, etc. Factoring out $(1/4)$ shows that this even part sum is one fourth of the total sum. So, the odd part is $3/4$



of the sum. $3/4 - 1/4$ is a half, so the series converges to $\pi^2 / 12$:

Answer by [ikleyn\(31796\)](#)  (Show Source):

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$$1 - (1/4) + (1/9) - (1/16) + (1/25) - \dots = ?$$



Well known fact (after Euler) is

$$S = 1 + (1/4) + (1/9) + (1/16) + (1/25) + (1/36) + \dots = \frac{\pi^2}{6} \quad (1)$$

The sum of the even terms is

$$E = (1/4) + (1/16) + (1/36) + \dots =$$

$$(1/4) * (1 + (1/4) + (1/9) + \dots) = \left(\frac{1}{4}\right) * \left(\frac{\pi^2}{6}\right) \quad (2)$$

What the problem actually asks about is the difference $S - 2E = \frac{\pi^2}{6} - \left(\frac{2}{4}\right) * \frac{\pi^2}{6} = \left(\frac{2}{4}\right) * \left(\frac{\pi^2}{6}\right) = \left(\frac{1}{2}\right) * \left(\frac{\pi^2}{6}\right) = \frac{\pi^2}{12}$.

Answer. $\frac{\pi^2}{12}$.

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[1+\(1/4\)+\(1/9\)+\(1/25\)+.....=?](#) (answered by [rothauserc,math_helper,ikleyn](#))

[If 4+4=6 25+25=45 16+16=28 9+9=15 1+1=?](#) (answered by [ikleyn,Alan3354](#))

[1-4+9-16+----](#) (answered by [solver91311](#))

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[\(1/16\)^\(1/4\)...](#) (answered by [jim_thompson5910](#))

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