SOLUTION: 1-(1/4)+(1/9)-(1/16)+(1/25)-.....=?

Question 1061883: *1-(1/4)+(1/9)-(1/16)+(1/25)-.....=?*

(Scroll Down for Answer!)

Found 2 solutions by rothauserc, ikleyn:

Answer by rothauserc(4714) me  **(Show Source):**

You can put this solution on YOUR website!

1-(1/4)+(1/9)-(1/16)+(1/25)-.....=?

:

we can rewrite this as

:

summation i=1,...+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,...+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):
You can put this solution on YOUR website!

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1-(1/4)+(1/9)-(1/16)+(1/25)- . . . = ?

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Well known fact (after Euler) is

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

The sum of the even terms is

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

$(1/4)*(1 + (1/4) + (1/9) + \ldots) = \left(\dfrac{1}{4}\right)\cdot\left(\dfrac{\pi^2}{6}\right)$ (2)

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

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

RELATED QUESTIONS

1+1/4+1/9+1/16+.....=? (answered by **Edwin McCravy**)

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**)

1, -4, 9,... (answered by **Alan3354**)

(1/16)^-(1/4)... (answered by **jim_thompson5910**)

Write the following in summation notation: 1/12 + 1/13+ 1/14+ 1/15+1/16 3/4 +... (answered by **richard1234**)

solve the following; (-1/64)^-1/3 (16/81)^-3/4 (1/Radical32)^-2/5 - (1/25)^-4/3... (answered by **ewatrrr**)

1/4m+9=-16 (answered by **jim_thompson5910**)
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