

164. What is the sum of  $1\frac{1}{2} + 4\frac{1}{6} + 7\frac{1}{12} + 10\frac{1}{20} \dots \dots \dots$  Upto 20 terms?

[A]  $12410/21$

[B]  $12412/21$

[C]  $12433/21$

[D]  $11794/21$

$$\left(1 + \frac{1}{2}\right) + \left(4 + \frac{1}{6}\right) + \left(7 + \frac{1}{12}\right) + \left(10 + \frac{1}{20}\right) \dots \dots \dots \text{20 terms}$$

$$\left(1 + 4 + 7 + 10 \dots \dots \dots \text{20 terms}\right) + \left(\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \frac{1}{4 \times 5} + \dots \dots \dots + \frac{1}{20 \times 21}\right)$$

$$= 590 + \frac{1}{1} \left[ \frac{1}{1} - \frac{1}{21} \right]$$

$$= 590 + \frac{20}{21}$$



**165. What is the value of  $\frac{3^2+1}{3^2-1} + \frac{5^2+1}{5^2-1} + \frac{7^2+1}{7^2-1} + \dots + \frac{21^2+1}{21^2-1}$ ?**

$\frac{3^2+1}{3^2-1} + \frac{5^2+1}{5^2-1} + \frac{7^2+1}{7^2-1} + \dots + \frac{21^2+1}{21^2-1}$  का मान क्या है?

[A] 112/11

[B] 113/11

[C] 114/11

[D] 115/11

(SSC GD वरुण)

$$\left(\frac{3^2+1}{3^2-1}\right) + \left(\frac{5^2+1}{5^2-1}\right) + \left(\frac{7^2+1}{7^2-1}\right) + \dots + \left(\frac{21^2+1}{21^2-1}\right)$$

$$2 \left( \frac{1}{2 \times 4} + \frac{1}{4 \times 6} + \frac{1}{6 \times 8} + \dots + \frac{1}{20 \times 22} \right) + 10$$

$$= 2 \times \frac{1}{2} \left[ \frac{1}{2} - \frac{1}{22} \right] + 10$$

$$= \frac{5}{11} + 10 = \frac{115}{11}$$



166.  $\frac{1}{3 \times 4 \times 5} + \frac{1}{4 \times 5 \times 6} + \frac{1}{5 \times 6 \times 7} + \dots + \frac{1}{18 \times 19 \times 20} ?$

[A]  $\frac{23}{570}$

[B]  $\frac{21}{570}$

[C]  $\frac{7}{190}$

[D] none of these

$$= \frac{1}{2} \left[ \frac{1}{3 \times 4} - \frac{1}{19 \times 20} \right]$$

$$= \frac{1}{2} \left[ \frac{95 - 3}{3 \times 19 \times 20} \right]$$

$$= \frac{1}{2} \times \frac{92}{3 \times 19 \times 20} = \frac{23}{570}$$

$$\frac{(2-3)}{100}$$

# ✓



167.  $\frac{1}{1 \cdot 3 \cdot 5} + \frac{1}{1 \cdot 4} + \frac{1}{3 \cdot 5 \cdot 7} + \frac{1}{4 \cdot 7} + \frac{1}{5 \cdot 7 \cdot 9} + \frac{1}{7 \cdot 10} + \dots + 20$  terms

[A] ~~6179/15275~~

[B] ~~6070/14973~~

[C] ~~7191/15174~~

[D] ~~5183/16923~~

$$\left( \frac{1}{1 \cdot 3 \cdot 5} + \frac{1}{3 \cdot 5 \cdot 7} + \dots + \frac{1}{19 \cdot 21 \cdot 23} \right) + \left( \frac{1}{1 \cdot 4} + \frac{1}{4 \cdot 7} + \dots + \frac{1}{28 \cdot 31} \right)$$

$$= \frac{1}{4} \left[ \frac{1}{1 \cdot 3} - \frac{1}{21 \cdot 23} \right] + \frac{1}{3} \left[ \frac{1}{1} - \frac{1}{31} \right]$$

$$= \frac{1}{4} \times \left( \frac{16}{21 \cdot 23} \right) + \frac{1}{3} \times \frac{30}{31}$$

$$= \frac{40}{21 \cdot 23} + \frac{10}{31}$$



168.  $\frac{1}{1*2*3*4} + \frac{1}{2*3*4*5} + \dots + \frac{1}{15*16*17*18} = ?$

[A]  $\frac{815}{14688}$

[C]  $\frac{713}{14688}$

[B]  $\frac{815}{7344}$

[D]  $\frac{713}{7344}$

$$= \frac{1}{3} \left[ \frac{1}{1 \times 2 \times 3} - \frac{1}{16 \times 17 \times 18} \right]$$

$$= \frac{1}{3} \left[ \frac{8/5}{16 \times 17 \times 18} \right]$$

$16 \times 17 \times 3$   
 $16 \times 5 = 80$





MISC SERIES



**169. The value of  $\frac{3}{1^2 * 2^2} + \frac{5}{2^2 * 3^2} + \frac{7}{3^2 * 4^2} + \frac{9}{4^2 * 5^2} + \dots + \frac{19}{9^2 * 10^2}$  is:**

**[A]**  $\frac{1}{100}$

**[B]**  $\frac{99}{100}$

**[C]** 1

**[D]**  $\frac{11}{100}$

#  $\frac{2^2 - 1^2}{1^2 * 2^2} + \frac{3^2 - 2^2}{2^2 * 3^2} + \frac{4^2 - 3^2}{3^2 * 4^2} + \dots + \frac{10^2 - 9^2}{9^2 * 10^2}$

$= \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{2^2} - \frac{1}{3^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots + \frac{1}{9^2} - \frac{1}{10^2}$

$= 1 - \frac{1}{100} = \frac{99}{100} \checkmark$



170.

$$\frac{\overset{30=5 \times 6}{(4 \times 7 + 2)} \overset{56}{(6 \times 9 + 2)} \text{-----} (100 \times 103 + 2)}{\underset{42}{(5 \times 8 + 2)} \underset{72}{(7 \times 10 + 2)} \text{-----} (99 \times 102 + 2)} = ?$$

[A] 510

[B] 640

[C] 500

[D] 615

$$\frac{5 \times 6 \times 7 \times 8 \times \dots \times 101 \times 102}{6 \times 7 \times 8 \times 9 \times \dots \times 100 \times 101} = 510$$



**171. Simplify**  $\frac{\left(1+\frac{27}{1}\right)\left(1+\frac{27}{2}\right)\left(1+\frac{27}{3}\right)\left(1+\frac{27}{4}\right)\dots\dots\dots\left(1+\frac{27}{49}\right)}{\left(1+\frac{49}{1}\right)\left(1+\frac{49}{2}\right)\left(1+\frac{49}{3}\right)\left(1+\frac{49}{4}\right)+\dots\dots\dots\left(1+\frac{49}{27}\right)}$ ?

[A] 1

[B] 2

[C] 3

[D] 21

H.W



172.

If  $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \frac{1}{5^2} + \frac{1}{6^2} + \dots = \frac{\pi^2}{6}$  Then

[A]  $\frac{\pi^2}{12}$

[B]  $\frac{\pi^2}{8}$  ✓

[C]  $\frac{\pi^2}{16}$

[D]  $\frac{\pi^2}{6}$

$$\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots = ?$$

$$? = \frac{\pi^2}{6} - \frac{\pi^2}{4} = \frac{3\pi^2}{12} - \frac{3\pi^2}{8} = \frac{3\pi^2}{24} - \frac{4.5\pi^2}{24} = -\frac{1.5\pi^2}{24}$$

$$? + \frac{1}{4} \left( \frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \dots \right) = \frac{\pi^2}{6}$$

$$? + \frac{1}{4} \times \frac{\pi^2}{6} = \frac{\pi^2}{6}$$



173. Evaluate  $\left(\frac{1}{3} + \frac{1}{4} + \dots + \frac{1}{2009}\right) \left(1 + \frac{1}{2} + \dots + \frac{1}{2008}\right) - \left(1 + \frac{1}{3} + \frac{1}{4} + \dots + \frac{1}{2009}\right)$

$\left(\frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{2008}\right)?$

$$\left(\frac{1}{3} + \frac{1}{4} + \dots + \frac{1}{2009}\right) \left(1 + \frac{1}{2} + \dots + \frac{1}{2008}\right) - \left(1 + \frac{1}{3} + \frac{1}{4} + \dots + \frac{1}{2009}\right) \left(\frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{2008}\right)$$

का मूल्यांकन कीजिये?

- [A]  $\frac{2007}{4018}$   
 [C]  $\frac{207}{4018}$

- [B]  $\frac{-2007}{4018}$   
 [D]  $\frac{-6055}{4018}$

$$= \frac{1}{2009} \cdot \frac{1}{2}$$

$$= \frac{-2007}{4018}$$

$$= x(1+y) - (1+x)y$$

$$= x - y = \left(\frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \dots + \frac{1}{2008} + \frac{1}{2009}\right) - \left(\frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \dots + \frac{1}{2009}\right)$$





# MISC



**174. If the product of three consecutive positive integers is 15600, then the sum of the squares of these integers is?**

यदि तीन लगातार धनात्मक पूर्णांक का गुणनफल 15600 है, तो इन पूर्णांकों के वर्ग का योग है?

[A] 1777

[B] 1785

[C] 1875

[D] 1877

$$\begin{aligned}15600 &= 156 \times 100 \\ &= 12 \times 13 \times 25 \times 2 \times 2 \\ &= 24 \times 25 \times 26\end{aligned}$$

$$\begin{array}{r}576 \\ 625 \\ +676 \\ \hline 1877\end{array}$$



**175.** What is the value of  $\frac{1996^{2020} + 1996^{2019} + 1997}{1996^{2019} + 1}$  ?

$\frac{1996^{2020} + 1996^{2019} + 1997}{1996^{2019} + 1}$  का मान क्या है?

1996 = x  
माना

[A] 2020

[C] 1996

[B] 2019

[D] 1997

$$\frac{(x^{2020} + x^{2019}) + (x+1)}{x^{2019} + 1}$$

$$= \frac{x^{2019} \times (x+1) + (x+1)}{x^{2019} + 1}$$

$$= \frac{(x+1) \cdot (x^{2019} + 1)}{x^{2019} + 1}$$

$$= x+1 = 1997$$



176. If  $P = \frac{96}{95 \times 97}$ ,  $Q = \frac{97}{96 \times 98}$  and  $R = \frac{1}{97}$ , then which of the following is TRUE?

यदि  $P = \frac{96}{95 \times 97}$ ,  $Q = \frac{97}{96 \times 98}$  तथा  $R = \frac{1}{97}$  हैं, तो निम्नलिखित में से कौन सा सत्य है?

[A]  ~~$P < Q < R$~~

[B]  $R < Q < P$

[C]  ~~$Q < P < R$~~

[D]  ~~$R < P < Q$~~

(GIL  
MAINS  
20/7)

95 = x माता

$$P = \frac{(x+1)}{x \cdot (x+2)} = \frac{2}{1 \times 3} \approx 0.666 \dots$$

$$Q = \frac{(x+2)}{(x+1) \cdot (x+3)} = \frac{3}{2 \times 4} \approx 0.375$$

$$R = \frac{1}{(x+2)} = \frac{1}{3} \approx 0.333 \dots$$

Set  $x=1$



177. On one side of 1.01 km long road, 101 plants are planted at equal distance from each other. What is the total distance between 5 consecutive plants?

1.01 किमी लंबी सड़क के एक तरफ एक दूसरे से समान दूरी पर 101 पौधे लगाए गए हैं। लगातार 5 पौधों के बीच की कुल दूरी कितनी है?

[A] 40 m

[B] 40.4 m

[A] 50 m

[B] 50.5 m

(C.S.A.T)

$$\begin{aligned} \text{gap} &\rightarrow \frac{10100\text{m}}{100} \\ &= 101\text{m} \end{aligned}$$



$$4 \text{ gaps} \rightarrow 4 \times 101\text{m}$$



178. If  $847 \times 385 \times 675 \times 3025 = 3^a \times 5^b \times 7^c \times 11^d$ , then the value of  $ab - cd$  is:

यदि  $847 \times 385 \times 675 \times 3025 = 3^a \times 5^b \times 7^c \times 11^d$ , तो  $ab - cd$  का मान क्या होगा:

[A] 4

[C] 1

[B] 5

[D] 7

$$= 15 - 10$$

$$7 \times 11^2 \times 5 \times 7 \times 11 \times 5^3 \times 3^3 \times 5^2 \times 11^2$$

$$a = 3$$

$$b = 5$$

$$c = 2$$

$$d = 5$$



179. If  $I = a^2 + b^2 + c^2$ , where  $a$  and  $b$  are consecutive integers and  $c = ab$ , then  $I$  is

यदि  $I = a^2 + b^2 + c^2$  है जहां  $a$  और  $b$  कमागत पूर्णांक हैं और  $c = ab$  है तो  $I$  क्या है?

~~[A] An even number and it is not a square of an integer/एक सम संख्या और यह एक पूर्णांक का वर्ग नहीं है~~

~~[B] An odd number and it is not a square of an integer/एक विषम संख्या और एक पूर्णांक का वर्ग नहीं है।~~

[C] Square of an even integer/एक सम पूर्णांक का वर्ग

[D] Square of an odd integer/एक विषम पूर्णांक का वर्ग

$$T = a^2 + b^2 + (ab)^2$$

$$2^2 + 3^2 + 6^2 = 7^2$$

$$3^2 + 4^2 + 12^2 = 13^2$$

⋮

