Questions with Answer Keys

MathonGo

Q1. If $a_1 + a_5 + a_{10} + a_{15} + a_{20} + a_{24} = 225$, then the sum of the first 24 terms of the

arithmetic progression a_1, a_2, a_3, \ldots is equal to

A. 450

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Ans: 900

Solution: $S=a_1+a_2+a_3+\ldots+a_{23}+a_{24}$ athongo ///. mathongo ///. mathongo ///.

 $S=rac{24}{2}(a_1+a_{24})=12(a_1+a_{24})$

Given that, $a_1 + a_5 + a_{10} + a_{15} + a_{20} + a_{24} = 225$ /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

 $\Rightarrow a_1+a_1+\cancel{Ad}+a_1+\cancel{Ad}+a_{24}-\cancel{Ad}+a_{24}-\cancel{Ad}+a_{24}=225$ mg which multiplies = multiplies =

 $\Rightarrow 3(a_1+a_{24}) = 225$

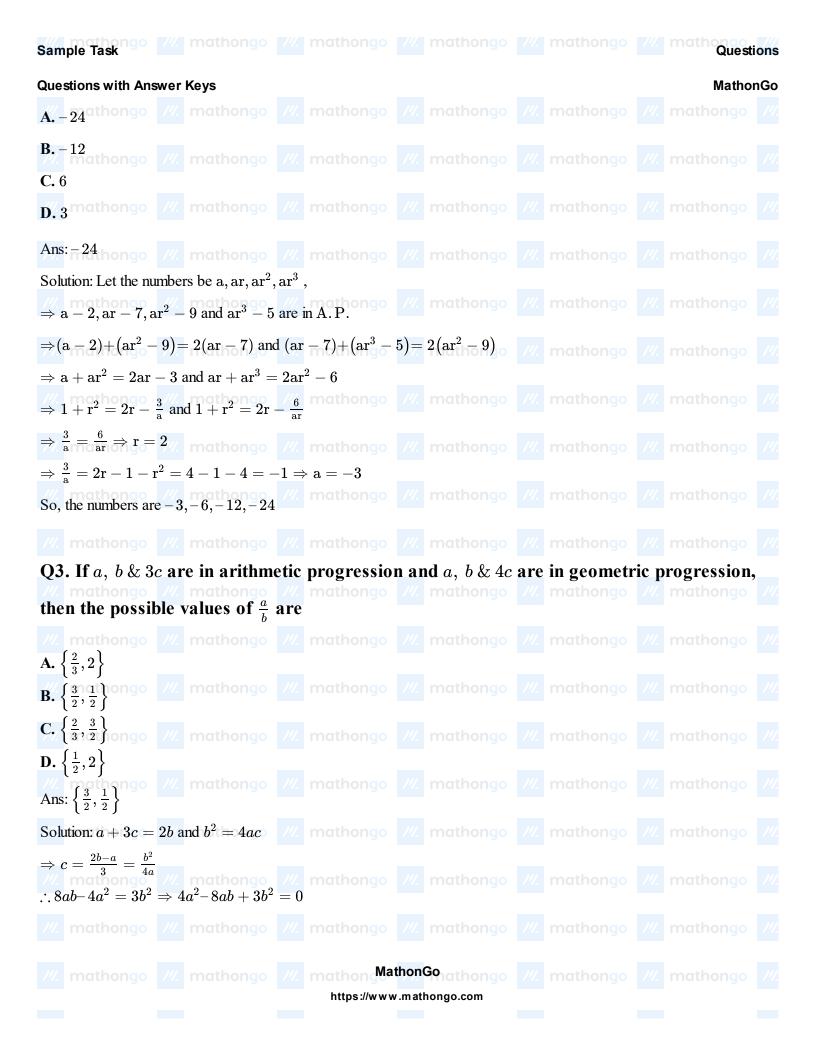
 $\Rightarrow a_1 + a_{24} = 75$

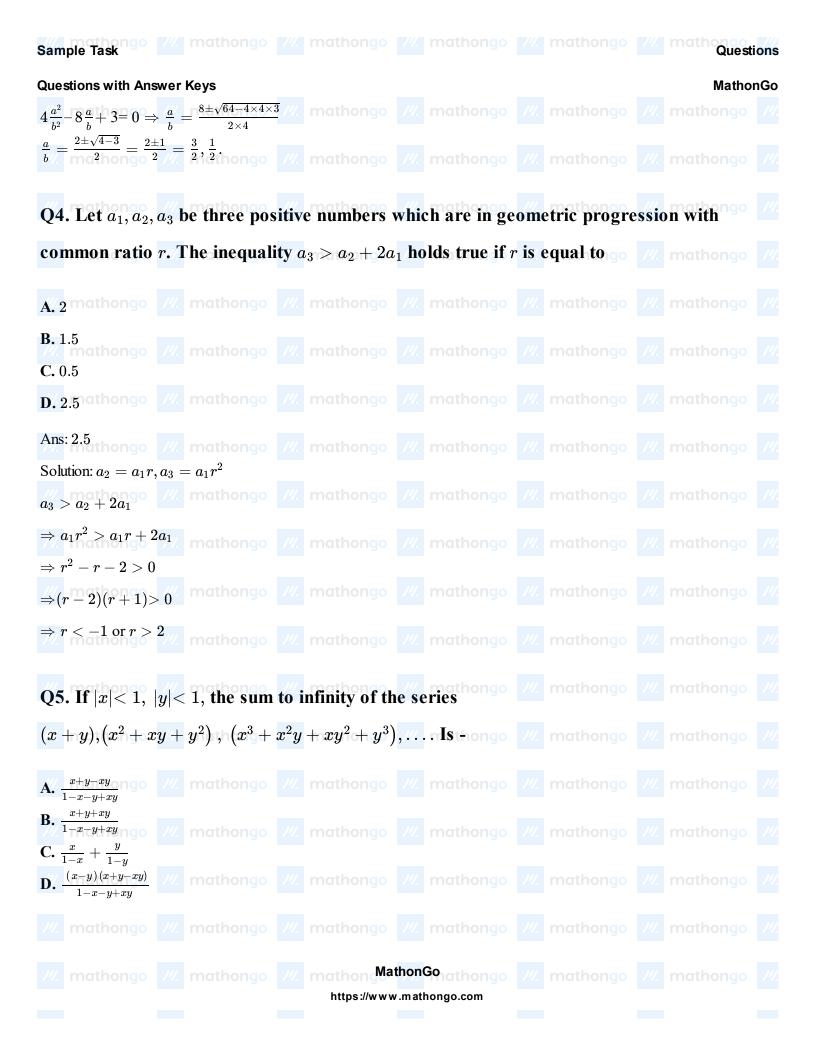
 \Rightarrow $S=12(a_1+a_{24})=12 imes75=900\%$ mathongo % mathongo % mathongo % mathongo %

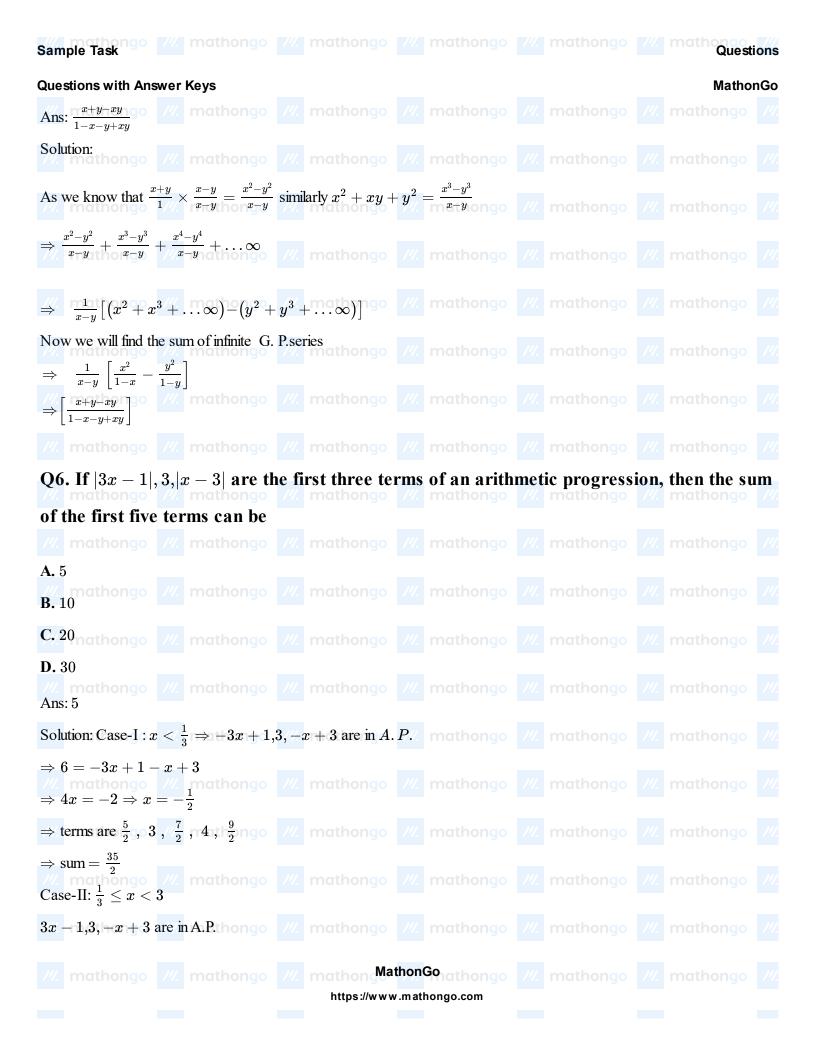
Q2. If 2, 7, 9 and 5 are subtracted respectively from four numbers in geometric

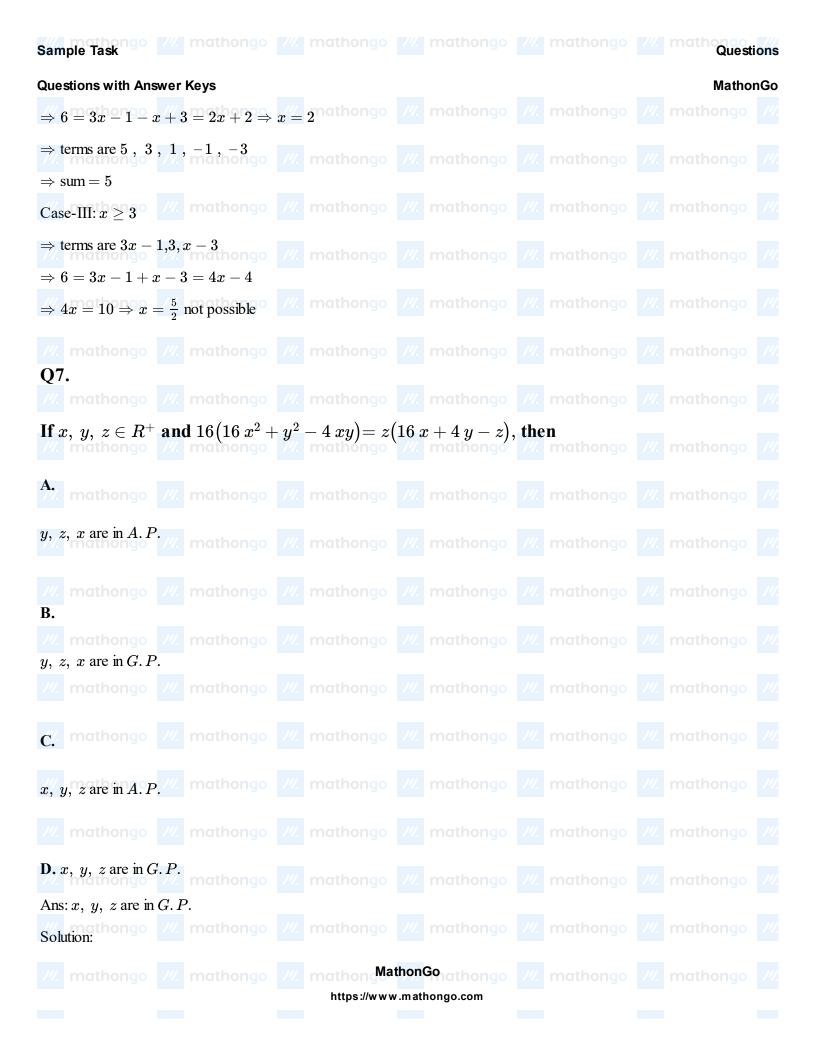
progression, then the resulting numbers are in arithmetic progression. The smallest of the

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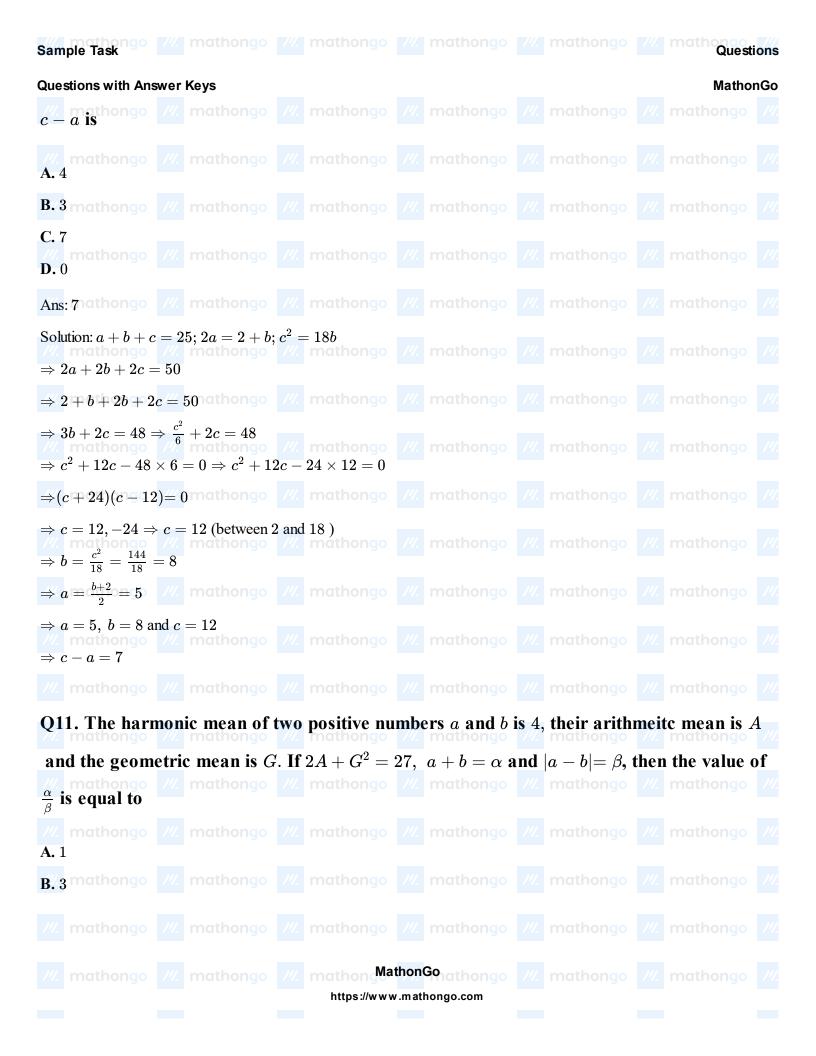


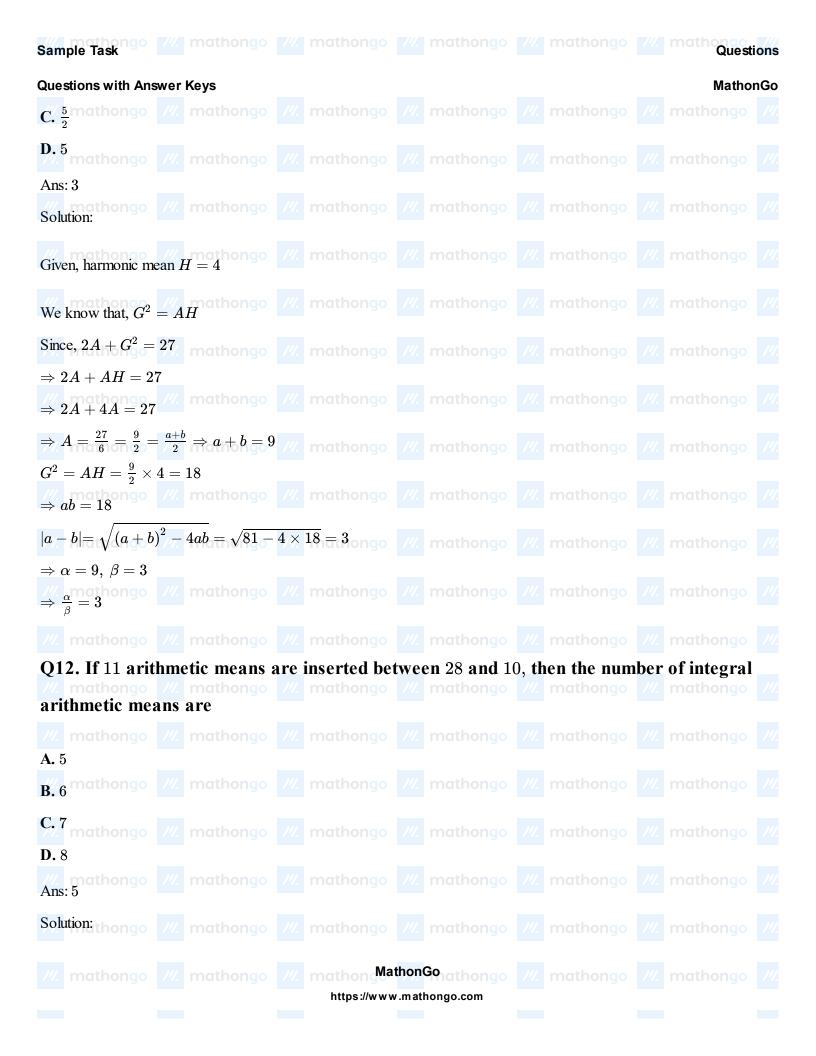


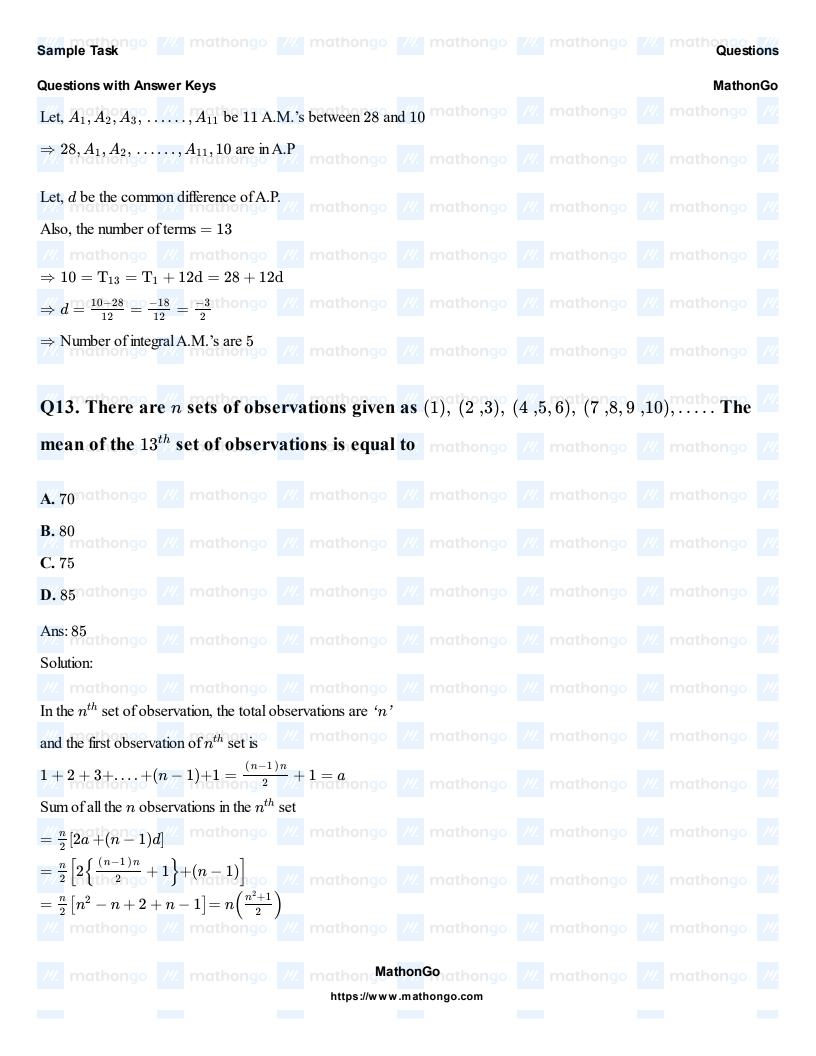




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Sample Task Mathongo Ma mathongo Ma mathongo Ma mathongo Ma mathongo Questions **Questions with Answer Keys** MathonGo Hence, for n = 13 /// mathongo /// mathongo /// mathongo /// mathongo Mean = $\frac{13^2+1}{2}$ = $\frac{170}{2}$ = 85 thongo /// mathongo /// mathongo /// mathongo Q14. The sum of the first 20 terms common between the series $3+7+11+15+\ldots$ and $1+6+11+16+\ldots$ mathongo ///. mathongo B. 4200thongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo **C.** 4220 **D.** 4020 Ans: 4020 ongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo Solution: $S_1 \equiv 3, 7, 11, 15, \ldots \Rightarrow c. d = 4 \Rightarrow d_1 = 4$ mathongo /// mathongo /// mathongo /// mathongo $S_2\equiv 1,\,6,\,11,\,16,......$ $\Rightarrow c.\,d=5\Rightarrow d_2\equiv 5$ thongo /// mathongo /// mathongo /// /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo \Rightarrow Every 5th term of S_1 and 4th term of S_2 will be same \Rightarrow Terms common to both AP will have a=11 and d=20Terms common to both AP will have a=11 and a=20 mathong // mathong // mathong // mathong // mathong Hence, $S_{20}=\frac{20}{2}[(2\times 11)+(20-1)\,20]$ mathongo /// mathongo /// mathongo = 10 imes 402// mathongo /// mathongo /// mathongo /// mathongo /// mathongo . mathongo ///. mathongo ///. mathong<mark>MathonGo</mark>iathongo ///. mathongo ///. mathongo ///. https://www.mathongo.com

ngo 7// mathongo 7// mathongo 7// mathongo 7// mathongo 7// mathongo 7// **Questions with Answer Keys** MathonGo Q15. The sum to infinity of the series $1 + \frac{4}{5} + \frac{7}{5^2} + \frac{10}{5^3} + \dots$ is mathongo /// mathongo // math $B_{i}^{\prime}\frac{11}{5}$ nathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo C. $\frac{35}{16}$ $\frac{10}{8}$ mathongo $\frac{11}{11}$ mathongo $\frac{35}{16}$ athongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo Solution: $S = 1 + \frac{4}{5} + \frac{7}{5^2 \text{ at}} + \frac{10}{5^3 \text{ orgo}} + \dots + \infty \dots (1)$ mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo $\frac{S}{5} = 0 + \frac{1}{5} + \frac{4}{5} + \frac{7}{5} + \dots + \infty \dots (2)$ mathongo /// mathongo /// mathongo On subtracting both the eq (1) and (2), we get, $\frac{4}{5}S = 1 + \frac{3}{5} + \frac{3}{5^2} + \ldots + \infty$ mathongo /// mathongo /// mathongo /// mathongo /// mathongo $S'=\frac{35}{16}$ athongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

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A. 1.06

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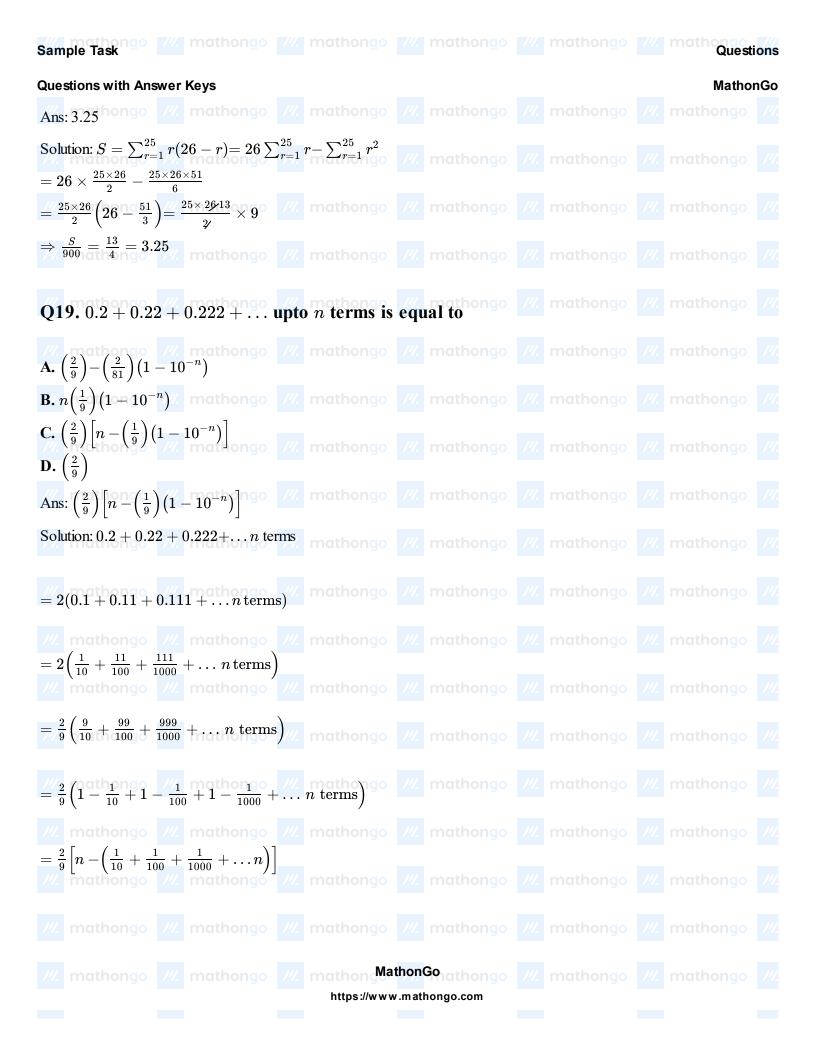
D. 4.06 ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

Solution: thongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

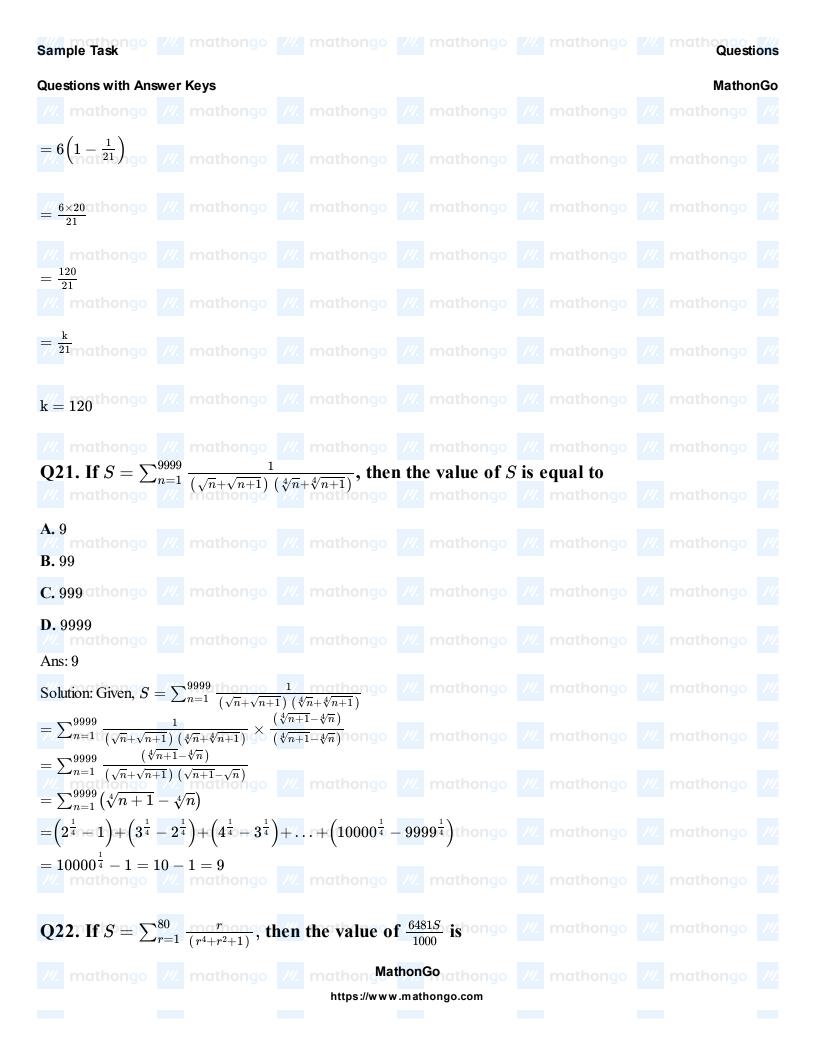
 $S = \frac{7}{17}$ thus $\frac{77}{17^2}$ thus $\frac{777}{17^3}$ thus though the mathon $\frac{77}{17}$ mathon $\frac{77}{17^3}$ thus $\frac{77}{17^3$

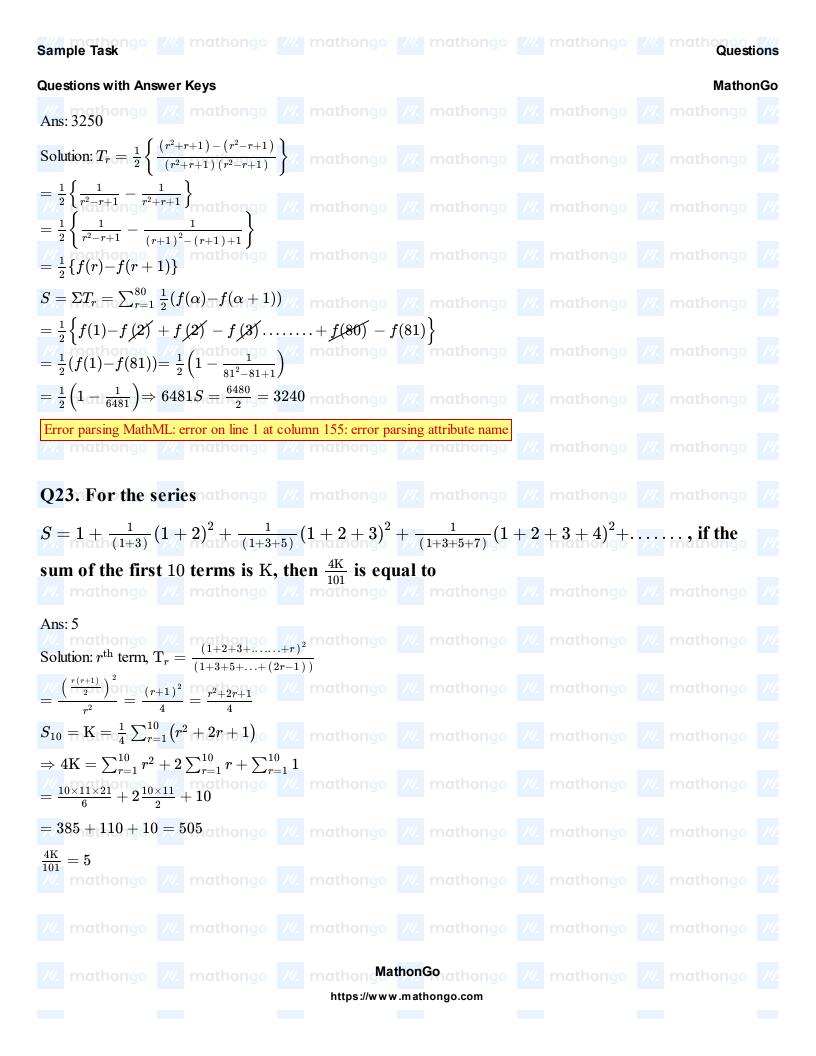
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Sample Task Mathongo **Questions with Answer Keys** MathonGo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo $=\frac{2}{9}\left[n-\frac{1}{10}\times\frac{10}{9}\cdot\left(\frac{10^n-1}{10^n}\right)\right]$ hongo /// mathongo /// mathongo /// mathongo $= \frac{1}{9} \begin{bmatrix} nath_{0} & ngo \\ n - \frac{1}{9} & (1 - 10^{-n}) \end{bmatrix}$ mathongo /// mathongo /// mathongo /// mathongo **Q20.** If the sum $\frac{3}{1^2} + \frac{5}{1^2 + 2^2} + \frac{7}{1^2 + 2^2 + 3^2} + \dots + \frac{1}{1^2 + 2^2 + 3^2} + \dots + \frac{1}{1^2$ to $^{\circ}$ mathongo $^{\circ}$ mathongo $^{\circ}$ mathongo $^{\circ}$ mathongo $^{\circ}$ mathongo $^{\circ}$ mathongo $^{\circ}$ mathongo **D.** 180 ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo Solution: $S_{20} = \frac{3}{1^2} + \frac{5}{1^2 + 2^2} + \frac{7}{1^2 + 2^2 + 3^2} + \dots + \text{up to } 20 \text{ terms at hongo}$ /// mathongo $=\sum_{\rm r=1}^{20}\frac{\rm mathongo}{1^2+2^2+3^2+\dots r^2}$ mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo $=\sum_{r=1}^{20} \frac{2r+1}{\frac{r}{6}(r+1)(2r+1)} \text{ mathongo } \text{ mathongo }$ $=6\sum_{r=1}^{20}\left(\frac{1}{r}-\frac{1}{r+1}\right)$ mathongo /// mathongo /// mathongo /// mathongo /// mathongo $= 6\left\{ \left[\frac{1}{1} + \frac{1}{2} \right] + \left[\frac{1}{2} - \frac{1}{3} \right] + \left[\frac{1}{3} - \frac{1}{4} \right] + \dots + \left[\frac{1}{20} + \frac{1}{21} \right] \right\}$ mathongo /// mathongo /// mathongo ///. https://www.mathongo.com





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Q24. Let the sum $\sum_{n=1}^{9} \frac{1}{n\left(n+1\right)\left(n+2\right)}$, written in the rational form be $\frac{p}{q}$ (where p and q

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Ans: 8

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 $=\frac{1}{2}\left(\frac{1}{2} - \frac{1}{110}\right) = \frac{1}{2}\left(\frac{55-1}{110}\right) = \frac{27}{110}$ mathongo /// mathongo /// mathongo ///

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If $S_n = (1^2-1+1)(1!) + (2^2-2+1)(2!) + \ldots + (n^2-n+1)(n!)$, then S_{50} is:

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B. $1 + 49 \times 51!$

D. 50 × 51! - 1 //. mathongo //. mathongo //. mathongo //. mathongo //.

Ans: 1+49 imes 51!

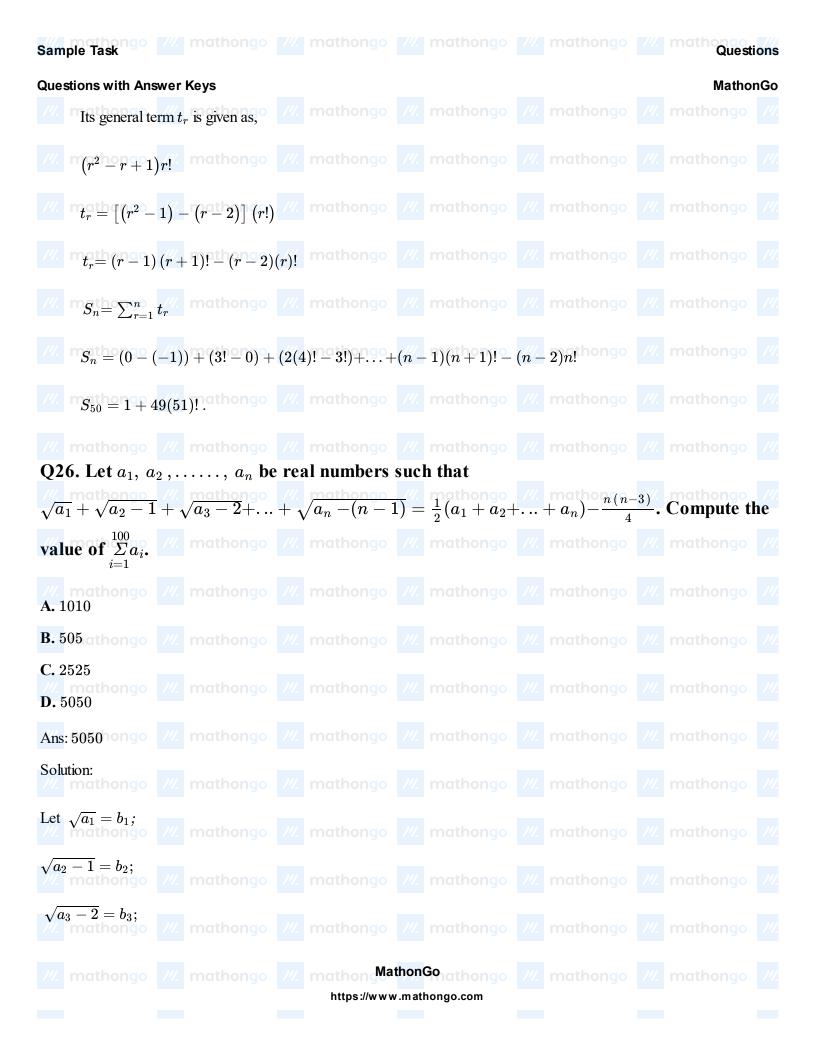
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 $S_n = \left(1^2-1+1
ight)\left(1!
ight)+\left(2^2-2+1
ight)\left(2!
ight)+\cdots+\left(n^2-n+1
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Questions with Answer Keys

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$$\sqrt[n]{a_n-(n-1)}=b_n'''$$
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$$\therefore \text{LHS} = b_1 + b_2 + \ldots + b_n = \frac{1}{2} \left[b_1^2 + \left(b_2^2 + 1 \right) + \left(b_3^2 + 2 \right) + \ldots + \left(b_n^2 + (n-1) \right) \right] - \frac{n(n-3)}{4}$$

$$\therefore \Sigma b_i = \frac{1}{2} \left[\left(b_1^2 + b_2^2 + b_3^2 + \ldots + b_n^2 \right) + (1 + 2 + 3 + \ldots + (n-1)) \right] - \frac{n(n-3)}{4}$$
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$$\Rightarrow 2\Sigma b_i = \Sigma b_i^2 + rac{n(n-1)}{2}$$
 at $\frac{n(n-3)}{2}$ ///. mathongo ///. mathongo ///. mathongo ///.

$$\Rightarrow 2\Sigma b_i^{ath} = \Sigma b_i^2 + n'''$$
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$$\therefore \Sigma b_i^2 = 2\Sigma b_i + \Sigma 1 = 0$$
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$$...^n (b_i^{ath} \hat{1})^2 = 0$$
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$$b_1''$$
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$$b_2'''$$
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$$b_3-1=0 \Rightarrow b_3^2=a3-2=1 \Rightarrow a_3=3$$
 and so on. 4 mathongo 4 mathongo 4 mathongo 4

Hence,
$$a_n = n$$
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$$\therefore \sum_{i=1}^{100} a_i = 1+2+3+...+100 = 5050$$
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Q27. Let $a_1, a_2, a_3, \ldots, a_{11}$ be real numbers satisfying $a_1 = 15, 27 - 2a_2 > 0$ and mathons $a_1 = 15, 27 - 2a_2 > 0$ and mathons $a_2 = 15, 27 - 2a_2 > 0$ and mathons $a_1 = 15, 27 - 2a_2 > 0$

$$a_k = 2a_{k-1} - a_{k-2} \ orall \ k = 3, 4, \dots, 11.$$
 If $\frac{a_1^2 + a_2^2 + \dots + a_{11}^2}{11} = 90$, then the value of $\frac{a_1 + a_2 + \dots + a_{11}}{11}$ is

equal to

