FlexiPrep

CBSE Class 10-Mathematics: Chapter – 5 Arithmetic Progressions Part 5 (For CBSE, ICSE, IAS, NET, NRA 2022)

Question 22:

If there are $(2n + 1)$ terms in an AP, prove that the ratio of the sum of odd terms and the sum of even terms is $(n + 1)\, m$

Answer:

Let a, d be the I term & Cd of the AP.

$$\therefore \text{ak} = a + (k - 1)\, d$$

$$s_1 = \text{sum to odd terms}$$

$$s_1 = a_1 + a_3 + \ldots a_{2n+1}$$

$$s_1 = \frac{n+1}{2}[2a_1 + 2\,\text{nd}]$$

$$= \frac{n+1}{2}[2a_1 + 2\,\text{nd}]$$

$$s_2 = (n + 1)\,(a + \text{nd})$$

$$s_2 = \text{sum to even terms}$$

$$s_2 = a_2 + a_4 + \ldots a_{2n}$$

$$s_2 = \frac{n}{2}[a_2 + a_{2n}]$$

$$= \frac{n}{2}[a + d + a + (2n - 1)\, d]$$

$$= n\,[a + \text{nd}]$$

$$\therefore s_1 : s_2 \simeq= \frac{(n + 1)\,(a + \text{nd})}{n\,(a + \text{nd})}$$

$$= \frac{n+1}{n}$$

Question 23:

Find the sum of all-natural numbers amongst first one thousand numbers which are neither divisible 2 or by 5

Answer:

Sum of all-natural numbers in first 1000 integers which are not divisible by 2 i.e.. , sum of odd integers.

$1 + 3 + 5 + \ldots + 999$

$n = 500$

$S_{500} = \frac{500}{2}[1 + 999]$

$= 2{,}50{,}000$

No's which are divisible by 5

$5 + 15 + 25 \cdots + 995$

$n = 100$

$S_n = \frac{100}{2}[5 + 995]$

$= 50 \times 1000 = 5000$

$\therefore$ Required sum $= 250000 - 50{,}000$

$= 200000$

1 Mark Questions

Question 1:

The next term of the AP in $1^2, 5^2, 7^2, 73 \cdots$ is

(a) 97

(b) 92

(c) 99

(d) 95

Answer:

(a) 97

Question 2:

The 10^{th} term of the AP in $2,7,12, \cdots$ is

(a) 45

(b) 47

(c) 48

(d) 50

Answer:

(b) 47

Question 3:

If the sum of the circumferences of two circles with radii R_1 and R_2 is equal to the circumference of a circle of Radius R_1 , then

(a) $R_1 + R_2 = R$

(b) $R_1 + R_2 > R$

(c) $R_1 + R_2 < R$

(d) None of these

Answer:

(a) $R_1 + R_2 = R$

Question 4:

If the perimeter of a circle is equal to that of a square, then the ratio of their area is

(a) 22 : 7

(b) 14 : 11

(c) 7 : 22

(d) 11 : 14

Answer:

(c) 7 : 22