

Chapter-Arithmetic Progressions

Question bank

Q1.

Let $\{a_n\}$ be a non-constant arithmetic progression. $a_1 = 1$ and the following holds true: for any $n \geq 1$, the value of $\frac{a_{2n} + a_{2n-1} + \dots + a_{n+1}}{a_n + a_{n-1} + \dots + a_1}$ remains constant (does not depend on n). Find a_{15}

Q2.

If the m th term of an AP is a and its n th term is b , show that the sum of its $(m + n)$ terms is

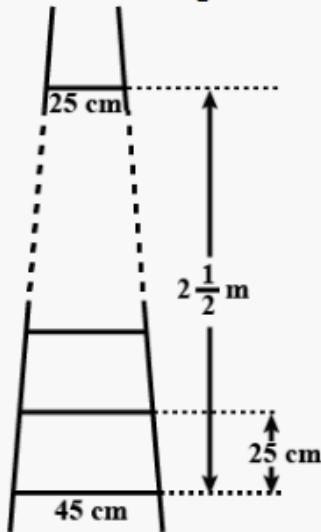
$$\frac{(m+n)}{2} \left\{ a + b + \frac{(a-b)}{(m-n)} \right\}$$

Q3.

An AP consists of 37 terms. The sum of the three middle most terms is 225 and the sum of the past three terms is 429. Find the AP.

Q4.

A ladder has rungs 25 cm apart. The rungs decrease uniformly in length from 45 cm at the bottom to 25 cm at the top. If the top and the bottom rungs are $2\frac{1}{2}$ m apart, what is the length of the wood required for the rungs



Q5.

Balls are arranged in rows to form an equilateral triangle. The first row consists of one ball, the second row of two balls and so on. If 669 more balls are added then all the balls can be arranged in the shape of a square and each of the sides then contains 8 balls less than each side of the triangle did. Determine the initial numbers of balls.

Q6.

If m times the m^{th} term of an A.P. is equal to n times n^{th} term, show that the $(m + n)^{\text{th}}$ term of the A.P. is zero.

Q7.

In an AP, if the p^{th} term is $1/q$ and q^{th} term is $1/p$. Find the sum of first pq term.

Q8.

Show that the sum of $(m + n)^{\text{th}}$ and $(m - n)^{\text{th}}$ terms of an A.P. is equal to twice the m^{th} terms.

Q9.

Show that the sum of an AP whose first term is a , the second term b and the last term is c is equal to $\frac{(a + c)(b + c - 2a)}{2(b - a)}$

Q10.

Find $\left(4 - \frac{1}{n}\right) + \left(7 - \frac{2}{n}\right) + \left(10 - \frac{3}{n}\right) + \dots$ upto n terms.