

Qn.2 The measures of an angles of a right angled triangles is arithmetic sequence. Find the measures of angles?

Ans Let the angles be $x - y, x, x + y$

$$x - y + x + x + y = 180$$

$$3x = 180^\circ$$

$$x = 60^\circ$$

The angles are $30^\circ, 60^\circ, 90^\circ$

Qn.3

Write down the sequence of natural numbers ending in 1. What is the algebraic expression for this sequence.

Ans The sequence is 1, 11, 21, 31,

$$d = 10$$

$$x_n = 10n + (1 - 10)$$

$$= 10n - 9$$

Qn.4

The sequence 1, 3, 6, 10 is the sequence of triangular numbers. What is the algebraic expression for this sequences 1, 3, 6, 10,

Ans $1 = 1, 3 = 1 + 2, 6 = 1 + 2 + 3$

$$10 = 1 + 2 + 3 + 4$$

$$x_n = \frac{n(n+1)}{2}$$

Qn.5

The sum of the first 'n' terms of the arithmetic sequence is $3n^2 + n$.

- Find the first term and common difference.
- Write down the algebraic expression of the sequence.
- Find the sum of 10th term to 30th term of the sequence.

Ans Sum = $3n^2 + n$

$$x_1 = 3 + 1 = 4$$

$$x_2 = 3 \times 2^2 + 2 = 12 + 2 = 14$$

$$x_1 + x_2 = 14$$

$$x_2 = 14 - 4 = 10$$

The sequence is 4, 10, 16, ...

$$x_n = dn + (f - d)$$

$$= 6n + (4 - 6)$$

$$= 6n - 2$$

$$\text{Sum of 30 terms} = 3 \times 30^2 + 30$$

$$= 2700 + 30$$

$$= 2730$$

$$\text{Sum of first 9 terms} = 3 \times 9^2 - 9$$

$$= 252$$

$$\text{Sum of 10th term to 30th term}$$

$$= 2730 - 252$$

$$= 2478$$

Qn.6

10th term of an arithmetic sequence is 15 and 15th term of an arithmetic sequence is 10.

- Find the first term and common difference?
- Write down the sequence.
- What is the algebraic expression for this sequence.

Ans i) $5d = 10 - 15 = -5$

$$d = \frac{-5}{5} = -1$$

$$x_1 + 9d = 15$$

$$x_1 = 15 - 9d$$

$$= 15 + 9$$

$$= 24$$

ii) The sequence is 24, 23, 22, ...

iii) Algebraic expression $x_n = 25 - n$

Qn.7

The sum of the first 13 terms of an arithmetic sequence is 416. Find its 7th term?

Ans Sum $x_n = \frac{n}{2}[x_1 + x_n]$

$$\frac{13}{2}[x_1 + x_1 + 12d] = 416$$

$$\frac{13}{2}[2x_1 + 12d] = 416$$

$$13[2x_1 + 12d] = 416 \times 2$$

$$2x_1 + 12d = \frac{416 \times 2}{13}$$

$$x_1 + 6d = \frac{416}{13} = 32$$

$$7^{\text{th}} \text{ term} = x_1 + 6d = 32$$

Qn.8

Form a sequence of numbers between 400 and 900 which leaves a remainder 3 on dividing by 5. Find the total number of terms in this sequence.

Find also the sum of all the terms of this sequence.

Ans The sequence is 403, 408, 413, 898.

$x_1 = 403$, common difference = 5

$$x_1 + (n-1)5 = 898$$

$$(n-1)5 = 898 - 403$$

$$5n - 5 = 495$$

$$5n = 500$$

$$n = \frac{500}{5} = 100$$

Sum of all terms in the sequence

$$= \frac{n}{2}[x_1 + x_n]$$

$$= 50 \times 1301$$

$$= 65050$$

Qn.9

Five times of fifth term of an arithmetic sequence is equal to ten times of the 10th term.

- Find the 15th term
- Find the product of 15th term. Let first term be 'f' and common difference be 'd'.



$$5(f+4d) = 10(f+9d)$$

$$5f+20d = 10f + 90d$$

$$5f-10f = 90d - 20d$$

$$-5f = 70d$$

$$5f+70d = 0$$

$$5(f+14d) = 0$$

$$f+14d = 0$$

$$15^{\text{th}} \text{ term} = 0$$

The product of 15^{th} term = 0

Qn.10

25 is a term of an arithmetic sequence of 2 as common difference. What will be the next perfect square in this arithmetic sequence?



Number in the sequence after 25 is 27, 29, 31, ...

27 is the odd number

The next perfect square odd number = 49

There 49 is the next perfect square in the sequence.

Qn.11

The sum of 2^{nd} term and 30^{th} term of an arithmetic sequence is 50. Find the sum of 15^{th} term and 17^{th} term.



$$2^{\text{nd}} \text{ term} + 30^{\text{th}} \text{ term} = 50$$

$$15^{\text{th}} \text{ term} + 17^{\text{th}} \text{ term} = 50$$

Qn.12

$x-5$, $x-3$, $2x-2$ are the three consecutive terms of an arithmetic sequence.

- Find the value of x .
- Find the common difference.
- Write down the sequence.
- Find the 20^{th} term of the sequence.



i) $x-5$, $x-3$, $2x-2$ are the three consecutive terms in arithmetic sequence.

$$2(x-3) = x-5 + 2x-2$$

$$2(x-3) = 3x-7$$

$$2x-6 = 3x-7$$

$$x = 1$$

- Common difference = $x-3-(x-5)$
 $= x-3-x+5$
 $= 2$

iii) The sequence = $-4, 2, 0, 2, \dots$

- 20th term = $-4 + 19 \times 2$
 $= -4 + 38$
 $= 34$

Qn.13

The sum of first 'n' terms of an arithmetic sequence is $5n^2+3n$.

- Find the common difference?
- Write down the sequence.
- What is the algebraic form for this sequence.

Ans i) Sum = $5n^2 + 3n$

$$x_1 = 5 + 3 \\ = 8$$

$$x_1 + x_2 = 5 \times 2^2 + 3 \times 2 \\ = 20 + 6 \\ = 26$$

$$x_2 = 26 - 8 \\ = 18$$

$$\text{Common difference} = 18 - 8 \\ = 10$$

ii) Sequence = 8, 18, 28,

$$\text{iii) Algebraic expression} = dn + (f-d) \\ = 10n + (8-10) \\ = 10n - 2$$

Qn.14

Check whether 123 is a term of the sequence 11, 22, 33, give reason.

Ans Algebraic express of the sequence $x_n = 11n$

$$11n = 123$$

$$n = \frac{123}{11} = 11.2$$

n is not a natural number. Therefore 123 is not a term of the arithmetic sequence 11, 22, 33, ...

Qn.15

Write three arithmetic sequence with 90 as the sum of first five terms?

Ans 14, 16, 18, 20, 22

16, 17, 18, 19, 20

12, 15, 18, 21, 24

Qn.16

The 8th term of an arithmetic sequence is 67 and 18th term is 147.

i) Find the common difference.

ii) Find 25th term.

iii) Write down the sequence.

Ans i) 18th term = 8th term + 10 × common difference

$$67 + 10d = 147$$

$$10d = 80$$

$$d = 8$$

ii) 25th term = 18th term + 7d

$$= 147 + 7 \times 8$$

$$= 147 + 56$$

$$= 203$$

iii) First term = 8th term - 7d

$$= 67 - 56 = 11$$

The sequence = 11, 19, 27.