

Qn.18**(March 2016)**If $5^2 \times 5^4 \times 5^6 \times \dots \times 5^{2n} = (0.04)^{-2}$. What is n ?**Sol**

$$5^{(2+4+6+8+\dots+2n)} = (0.04)^{-2}$$

$$5^{(2+4+6+8+\dots+2n)} = \left(\frac{4}{100}\right)^{-2}$$

$$5^{(2+4+6+8+\dots+2n)} = \left(\frac{100}{4}\right)^2$$

$$5^{(2+4+6+8+\dots+2n)} = 25^2$$

$$5^{(2+4+6+8+\dots+2n)} = (5^2)^2$$

$$5^{(2+4+6+8+\dots+2n)} = 5^4$$

$$2+4+6+8+\dots+2n = 4$$

$$2(1+2+3+4+\dots+n) = 4$$

$$1+2+3+4+\dots+n = 2$$

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

$$n(n+1) = 4$$

$$\Rightarrow 6 \times 7 = 42$$

$$n = 6$$

Qn.19**(March 2016)**

The sum of the first 'n' terms of an arithmetic sequence is $3n^2 + 2n$. Find the common difference and algebraic form of this sequence.

$$\text{Sum} = 3n^2 + 2n$$

$$x_1 = 5, x_1 + x_2 = 16$$

$$x_2 = 16 - 5 = 11$$

$$\text{Common difference} = 6$$

$$\text{Algebraic form} = dn + (f-d)$$

$$= 6n + (5-6)$$

$$= 6n - 1$$

Qn.20**(March 2015)**

First term of an arithmetic sequence is 10 and its common difference is 3. What are the first three terms of the sequence. Verify whether 100 is a term of this sequence.

Sol The first three terms of the sequence are 10, 13, 16,
 $100 - 10 = 90$ is a multiple of 3. So 100 is a term of this sequence.

Qn.21**(March 2015)**

Sum of the first n terms of an arithmetic sequence is $3n^2 + n$. Find the first term and common difference of this sequence.

$$\text{Sum} = 3n^2 + n$$

$$x_1 = 3 + 1 = 4$$

$$x_1 + x_2 = 3 \times 2^2 + 2 = 14$$

$$x_2 = 14 - 4 = 10$$

$$\text{Common difference} = 10 - 4 = 6$$

Qn.22**(March 2015)**

Consider the arithmetic sequence 9, 15, 21,

- Write the algebraic form of this sequence.
- Find the twenty fifth term of this sequence.
- Find the sum of terms from 25th to 50th of this sequence.
- Can the sum of some terms of this sequence be 2015? Why

Ans

a) Algebraic form $x_n = 6n + 3$

b) 25th term = $6 \times 25 + 3$
= 153

c) 50th term = $6 \times 50 + 3$
= 303

Number of terms = $(50 - 25) + 1$
= 26

Sum = $\frac{26}{2} (153 + 303) = 5928$

- d) Algebraic form $6n + 3$ all terms are the multiple of 3 but 2015 is not multiple of 3.

Qn.23**(Model 2015)**

Write an arithmetic sequence with common difference 6, using the terms of the arithmetic sequence 5, 8, 11, ...?

Ans

Sequence is 5, 11, 17,

Algebraic form = $6n - 1$

Qn.24**(Model 2015)**

In arithmetic sequence the sum of the first nine terms 279 and the sum of the first twenty terms is 1280 then,

- What is the 5th term of the sequence?
- What is the 16th term of the sequence?
- Write the sequence.

Ans

a) $x_5 = \frac{279}{9} = 31$

b) $\frac{9}{2} [x_1 + n_1 + 8d] = 279$

$2x_1 + 8d = 62 \dots(1)$

$\frac{20}{2} [x_1 + x_1 + 19d] = 1280$

$2x_1 + 19d = 128 \dots(2)$

eqn (2) - (1) $\Rightarrow 11d = 66$

$d = 6$

$x_{16} = x_5 + 11d = 31 + 66 = 97$

c)

$x_1 + 4d = 31$

$x_1 = 31 - 24 = 7$

The sequence is 7, 13, 19,

Qn.25**(March 2014)**

6, 11, 16, ... is an arithmetic sequence. What is its next term? What is the least three digit number that comes as a term of this sequence?

Ans

6, 11, 16, ...

next term = 21

Least three digit number in this sequence is 101.

Qn.26

(March 2014)

- a) The fifth term of an arithmetic sequence is 40 and 10th term is 20. What is the fifteenth term?
 b) How many terms of this sequence make the sum zero.

$$\text{Ans a) } x_5 + 4d = 40 \dots (1)$$

$$x_5 + 9d = 20 \dots (2)$$

$$\text{Eq. (2) - (1)} \Rightarrow 5d = -20$$

$$d = -4$$

$$x_{15} = 20 + 5 \times -4$$

$$= 20 - 20 = 0$$

$$x_1 = 56$$

$$x_n = 60 - 4n$$

$$\frac{n}{2} [56 + 60 - 4n] = 0$$

$$\frac{n}{2} [116 - 4n] = 0$$

$$58n - 2n^2 = 0$$

$$2n^2 = 58n$$

$$n = 29$$

- b) Sum of 29 terms is 0.

Qn.27

(March 2014)

- a) Write the algebraic expression of the arithmetic sequence 8, 11, 14, ...
 b) Is 121 a term of this sequence? Why?
 c) Prove that the square of any term of this sequence will not occur in this sequence.

$$\text{Ans a) } 8, 11, 14,$$

$$x_n = 3n + 5$$

- b) 121 is not a term in the sequence because the remainder of each term by common difference is 2. 121 is divided by 3 remainder is 1.
 c) Square of 11 is 121, 121 is not a term of this sequence.

Qn.28

(Model 2014)

n^{th} term of a sequence is $\frac{n^2 + n}{2}$ then

- a) Write the sequence
 b) Check whether this sequence is an arithmetic sequence.

$$\text{Ans a) } x_n = \frac{n^2 + n}{2}$$

$$n = 1 \quad x_1 = \frac{1+1}{2} = 1$$

$$n = 2 \quad x_2 = \frac{4+2}{2} = 3$$

$$n = 3 \quad x_3 = 6$$

The sequence is 1, 3, 6, ..


- b) The sequence is not an arithmetic sequence.

Qn.29

(Model 2014)

If $x+4$, $3x-2$, $4x-2$ are in arithmetic sequence, then

- Find the value of x
- Write the sequence
- Find the n th term of this sequence

 a) $x+4$, $3x-2$, $4x-2$ are in arithmetic sequence,

$$2(3x-2) = x+4+4x-2$$

$$6x-2 = 5x+2$$

$$x = 6$$


- The sequence is 10, 16, 22, ...
- $x_n = 6n + 4$

Qn.30

(Model 2014)

An arithmetic sequence has first term 18 and common difference 3.

- Write the sequence.
- Write the sequence by taking the terms of the above arithmetic sequence which are perfect squares.
- Is this new sequence an arithmetic sequence? why?

 a) 18, 21, 24, 27, ...

b) 36, 81, 121,

c) It is not an arithmetic sequence.