



NCERT Solutions For Class 10 Chapter 5 Maths Arithmetic
Progressions Exercise 5.2

1. Find the missing variable from a, d, n and a_n , where a is the first term, d is the common difference and a_n is the nth term of AP.

(i) $a = 7, d = 3, n = 8$

(ii) $a = -18, n = 10, a_n = 0$

(iii) $d = -3, n = 18, a_n = -5$

(iv) $a = -18.9, d = 2.5, a_n = 3.6$

(v) $a = 3.5, d = 0, n = 105$

Ans. (i) $a = 7, d = 3, n = 8$

We need to find a_n here.

Using formula $a_n = a + (n - 1)d$

Putting values of a, d and n,

$$a_n = 7 + (8 - 1)3$$

$$= 7 + (7)3 = 7 + 21 = 28$$

(ii) $a = -18, n = 10, a_n = 0$

We need to find d here.

Using formula $a_n = a + (n - 1)d$

Putting values of a, a_n and n,

$$0 = -18 + (10 - 1)d$$

$$\Rightarrow 0 = -18 + 9d$$

$$\Rightarrow 18 = 9d \Rightarrow d = 2$$

(iii) $d = -3, n = 18, a_n = -5$

We need to find a here.

Using formula $a_n = a + (n - 1)d$

Putting values of d, a_n and n,

$$-5 = a + (18 - 1)(-3)$$

$$\Rightarrow -5 = a + (17)(-3)$$

$$\Rightarrow -5 = a - 51 \Rightarrow a = 46$$

(iv) $a = -18.9, d = 2.5, a_n = 3.6$

We need to find n here.

Using formula $a_n = a + (n - 1)d$

Putting values of d , a_n and n ,

$$3.6 = -18.9 + (n - 1)(2.5)$$

$$\Rightarrow 3.6 = -18.9 + 2.5n - 2.5$$

$$\Rightarrow 2.5n = 25 \Rightarrow n = 10$$

$$\text{(v)} a = 3.5, d = 0, n = 105$$

We need to find a_n here.

$$\text{Using formula } a_n = a + (n - 1)d$$

Putting values of d , n and a ,

$$a_n = 3.5 + (105 - 1)(0)$$

$$\Rightarrow a_n = 3.5 + 104 \times 0$$

$$\Rightarrow a_n = 3.5 + 0 \Rightarrow a_n = 3.5$$

2. Choose the correct choice in the following and justify:

(i) 30th term of the AP: 10, 7, 4... is

(A) 97

(B) 77

(C) -77

(D) -87

(ii) 11th term of the AP: -3, -12, 2... is

(A) 28

(B) 22

(C) -38

(D) $-48\frac{1}{2}$

Ans.(i) 10, 7, 4...

First term = $a = 10$, Common difference = $d = 7 - 10 = 4 - 7 = -3$

And $n = 30$ {Because, we need to find 30th term}

$$a_n = a + (n - 1)d$$

$$\Rightarrow a_{30} = 10 + (30 - 1)(-3) = 10 - 87 = -77$$

Therefore, the answer is (C).

(ii) -3, -1/2, 2...

First term = $a = -3$, Common difference = $d = -$

$$\frac{1}{2} - (-3) = 2 - \left(-\frac{1}{2}\right) = \frac{5}{2}$$

And $n = 11$ (Because, we need to find 11th term)

$$a_n = -3 + (11 - 1) \frac{5}{2} = -3 + 25 = 22$$

Therefore 11th term is 22 which means answer is (B).

3. In the following AP's find the missing terms:

(i) 2, __, 26

(ii) __, 13, __, 3

(iii) 5, __, __, $9\frac{1}{2}$

(iv) -4, __, __, __, __, 6

(v) __, 38, __, __, __, -22

Ans. (i) 2, __, 26

We know that difference between consecutive terms is equal in any A.P.

Let the missing term be x .

$$x - 2 = 26 - x$$

$$\Rightarrow 2x = 28 \Rightarrow x = 14$$

Therefore, missing term is 14.

(ii) __, 13, __, 3

Let missing terms be x and y .

The sequence becomes $x, 13, y, 3$

We know that difference between consecutive terms is constant in any A.P.

$$y - 13 = 3 - y$$

$$\Rightarrow 2y = 16 \Rightarrow y = 8$$

$$\text{And } 13 - x = y - 13$$

$$\Rightarrow x + y = 26$$

But, we have $y = 8$,

$$\Rightarrow x + 8 = 26 \Rightarrow x = 18$$

Therefore, missing terms are 18 and 8.

(iii) $5, _, _, 9\frac{1}{2}$

Here, first term = $a = 5$ And, 4th term = $a_4 = 9\frac{1}{2}$

Using formula $a_n = a + (n - 1)d$, to find nth term of arithmetic progression,

$$a_4 = 5 + (4 - 1)d$$

$$\Rightarrow \frac{19}{2} = 5 + 3d$$

$$\Rightarrow 19 = 2(5 + 3d)$$

$$\Rightarrow 19 = 10 + 6d$$

$$\Rightarrow 6d = 19 - 10$$

$$\Rightarrow 6d = 9 \Rightarrow d = \frac{3}{2}$$

Therefore, we get common difference = $d = \frac{3}{2}$

$$\text{Second term} = a + d = 5 + \frac{3}{2} = \frac{13}{2}$$

$$\text{Third term} = \text{second term} + d = \frac{13}{2} + \frac{3}{2} = \frac{16}{2} = 8$$

Therefore, missing terms are $\frac{13}{2}$ and 8

(iv) $-4, _, _, _, _, 6$

Here, First term = $a = -4$ and 6th term = $a_6 = 6$

Using formula $a_n = a + (n - 1)d$, to find nth term of arithmetic progression,

$$a_6 = -4 + (6 - 1)d$$

$$\Rightarrow 6 = -4 + 5d$$

$$\Rightarrow 5d = 10 \Rightarrow d = 2$$

Therefore, common difference = $d = 2$

$$\text{Second term} = \text{first term} + d = a + d = -4 + 2 = -2$$

$$\text{Third term} = \text{second term} + d = -2 + 2 = 0$$

$$\text{Fourth term} = \text{third term} + d = 0 + 2 = 2$$

$$\text{Fifth term} = \text{fourth term} + d = 2 + 2 = 4$$

Therefore, missing terms are $-2, 0, 2$ and 4 .

(v) $_, 38, _, _, _, -22$

We are given 2^{nd} and 6^{th} term.

Using formula $a_n = a + (n - 1)d$, to find n^{th} term of arithmetic progression,

$$a_2 = a + (2 - 1)d \text{ And } a_6 = a + (6 - 1)d$$

$$\Rightarrow 38 = a + d \text{ And } -22 = a + 5d$$

These are equations in two variables, we can solve them using any method.

Using equation ($38 = a + d$), we can say that $a = 38 - d$.

Putting value of a in equation ($-22 = a + 5d$),

$$-22 = 38 - d + 5d$$

$$\Rightarrow 4d = -60$$

$$\Rightarrow d = -15$$

Using this value of d and putting this in equation $38 = a + d$,

$$38 = a - 15 \Rightarrow a = 53$$

Therefore, we get $a = 53$ and $d = -15$

$$\text{First term} = a = 53$$

$$\text{Third term} = \text{second term} + d = 38 - 15 = 23$$

$$\text{Fourth term} = \text{third term} + d = 23 - 15 = 8$$

$$\text{Fifth term} = \text{fourth term} + d = 8 - 15 = -7$$

Therefore, missing terms are $53, 23, 8$ and -7 .

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