

CLASS – 10

MATHEMATICS

Chapter – 5

Arithmetic Progressions

Part – 5

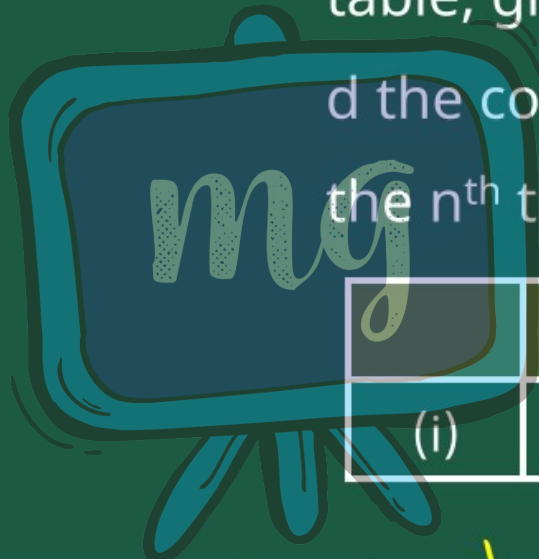
EXERCISE 5.2 (Q.1 – 3)

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EXERCISE 5.2

1. Fill in the blanks in the following table, given that a is the first term, d the common difference and a_n the n^{th} term of the AP:

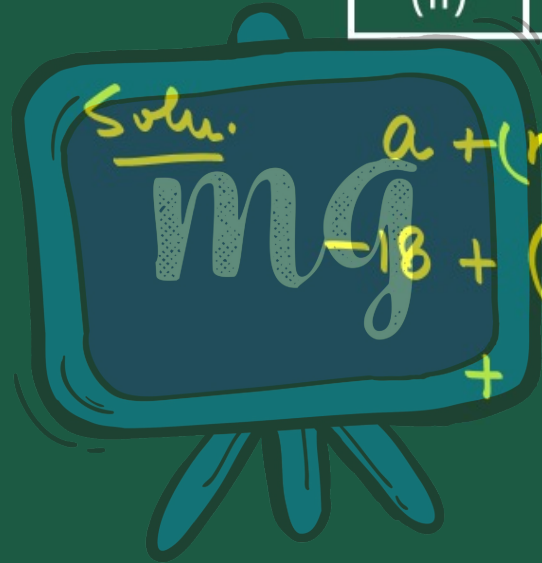


	a	d	n	a_n
(i)	7	3	8	28

Solve

$$\begin{aligned}
 a_n &= a + (n-1)d & | & 7 + 7 \times 3 \\
 &= 7 + (8-1)3 & | & 7 + 21 = 28
 \end{aligned}$$

	a	d	n	a_n
(ii)	-18	..2..	10	0



Solu.

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

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

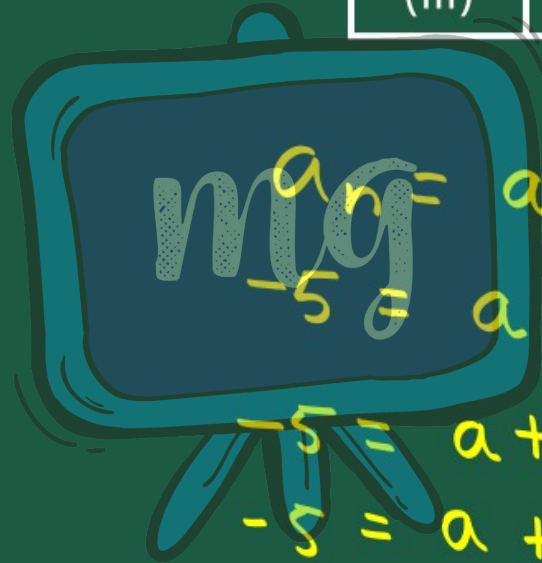
$$+ 9 \times d = 0 + 18$$

$$9d = 18$$

$$d = 18/9 = 2$$

$$\boxed{d = 2}$$

	a	d	n	a_n
(iii)	46	-3	18	-5



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

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

$$-5 = a + 17 \times -3$$

$$-5 = a + (-51)$$

$$51 - 5 = a$$

$$\boxed{46 = a}$$

	a	d	n	a_n
(iv)	-18.9	2.5	...10	3.6

Soln.

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

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

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

$$22.5 = (n-1)(2.5)$$

$$\frac{22.5}{2.5} = (n-1)$$

$$9 = (n-1)$$

$$9 + 1 = n$$

$$10 = n$$

	a	d	n	a_n
(v)	3.5	0	105	3.5.....

$$a_n = a + (n-1)d$$
$$a_n = 3.5 + (105-1)(0)$$
$$a_n = 3.5 + 0$$

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

Solu.

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

$$a_{30} = 10 + (30-1)(-3)$$

$$\begin{aligned} a_{30} &= 10 + 29 \times -3 \\ &= 10 - 87 \end{aligned}$$

$$a_{30} = -77$$

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

A. 97

B. 77

C. -77

D. -87

$$a = 10$$

$$\begin{aligned} d &= a_2 - a_1 \\ &= 7 - 10 \end{aligned}$$

$$d = -3$$

(ii) 11th term of the AP: $-3, -\frac{1}{2}, 2, \dots$

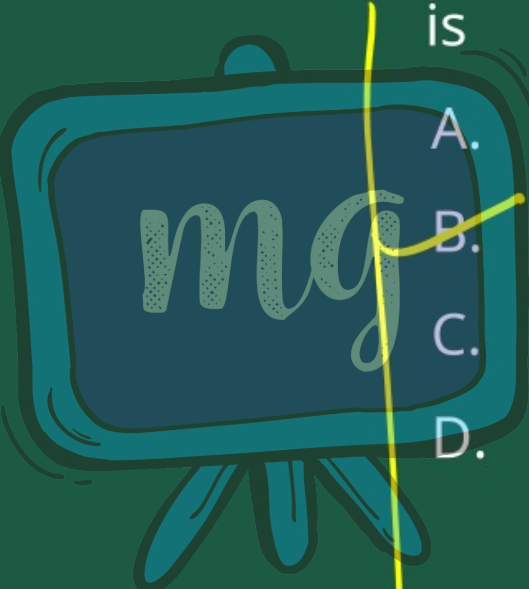
is

A. 28

B. 22

C. -38

D. $-48\frac{1}{2}$



A cartoon illustration of a blue chalkboard with a black border and a handle at the top. The letters 'mg' are written in a light blue, cursive font on the board. A yellow arrow points from the right side of the board towards option B. The board is supported by three blue legs.

$$a_{11} = a + 10d$$

$$a = -3, \quad d = a_2 - a_1$$

$$d = -\frac{1}{2} - (-3)$$

$$d = -\frac{1}{2} + 3$$

$$d = \frac{5}{2}$$

$$a_{11} = -3 + 10 \times \frac{5}{2}$$

$$a_{11} = -3 + 25$$

$$\boxed{a_{11} = 22}$$

3. In the following APs, find the missing terms in the boxes :

The image shows a handwritten solution for finding the missing term in an arithmetic progression. The problem is presented as (i) 2, \boxed{b} , 26, with terms labeled 1, 2, and 3 above them. The solution uses the property that the middle term of an AP is the average of the first and last terms, leading to the equation $2b = 2 + 26$ and the final answer $b = 14$.

(i) 1 2 3
2, \boxed{b} , 26

a, b, c

$b - a$ | $c - b$

$b - a = c - b$

$b + b = a + c$

$\boxed{2b = a + c}$

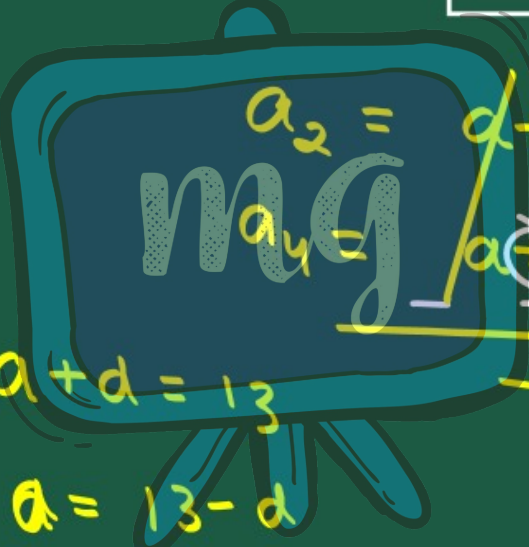
$2b = 2 + 26$

$2b = 28$

$\boxed{b = 14}$

$\boxed{b = 14}$

(ii) $\overset{1}{\boxed{18}}, \overset{2}{13}, \overset{3}{\boxed{8}}, \overset{4}{3}$


$$\begin{aligned} a_2 &= a + d = 13 \quad \text{--- (1)} \\ a_4 &= a + 3d = 3 \quad \text{--- (2)} \end{aligned}$$

$$\begin{aligned} a + d &= 13 \\ -2d &= 10 \end{aligned}$$
$$\boxed{d = -5}$$
$$\begin{aligned} a &= 13 - d \\ a &= 13 - (-5) \\ &= 13 + 5 = 18 \end{aligned}$$

$$\begin{array}{r} 3 \rightarrow 4.5 \\ 1 \rightarrow 1.5 \end{array}$$

$$(iii) \begin{array}{cccc} 1 & 2 & 3 & 4 \\ 5, & \boxed{13\frac{1}{2}}, & \boxed{8} & , 9\frac{1}{2} \end{array}$$

$$3d = 9$$

$$a_1 = a = 5$$

$$d = \frac{3}{2}$$

$$a_4 = a + 3d = \frac{19}{2}$$

$$\frac{13}{2} + \frac{3}{2}$$

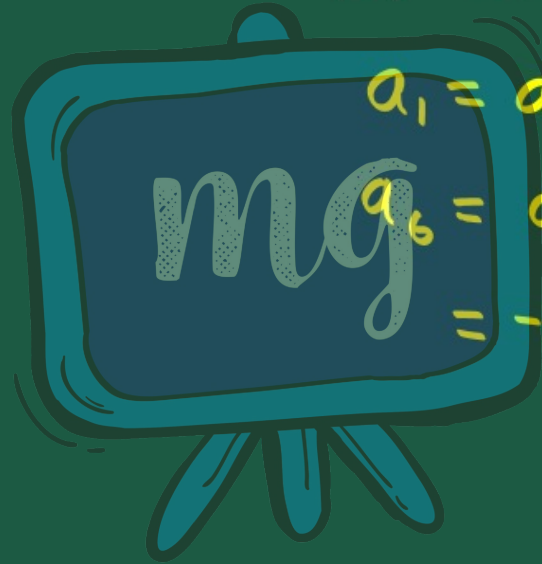
$$= 5 + 3d = \frac{19}{2}$$

$$\frac{16}{2} = 8$$

$$3d = \frac{19}{2} - 5 = \frac{9}{2}$$

r

$$(iv) \begin{matrix} 1 & 2 & 3 & 4 & 5 & 6 \\ -4, & \boxed{-2}, & \boxed{0}, & \boxed{2}, & \boxed{4}, & 6 \end{matrix}$$



$$a_1 = a = -4$$

$$a_6 = a + 5d = 6$$

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

$$5d = 10$$

$$\boxed{d = 2}$$

$$(v) \quad \begin{matrix} 1 & 2 & 3 & 4 & 5 & 6 \\ \boxed{53} & , 38, & \boxed{23} & , & \boxed{8} & , & \boxed{-7} & , -22 \end{matrix}$$

Solu.

$$a_2 = 38 \quad | \quad a_6 = -22$$

$$a + d = 38$$

$$a - 15 = 38$$

$$a = 38 + 15$$

$$\boxed{a = 53}$$

$$a + d = 38$$

$$a + 5d = -22$$

$$-4d = 60$$

$$\boxed{d = -15}$$