Arithmetic Progressions Ex 9.3 Q39

**Answer :**

Let $a$ be the first term and $d$ be the common difference.

We know that, $n^{th}$ term = $a_n = a + (n - 1)d$

According to the question,

$a_{19} = 3a_6$

$\Rightarrow a + (19 - 1)d = 3(a + (6 - 1)d)$

$\Rightarrow a + 18d = 3a + 15d$

$\Rightarrow 18d - 15d = 3a - a$

$\Rightarrow 3d = 2a$

$\Rightarrow a = \frac{3}{2}d$ .... (1)

Also, $a_9 = 19$

$\Rightarrow a + (9 - 1)d = 19$

$\Rightarrow a + 8d = 19$ ....(2)

On substituting the values of (1) in (2), we get

$\frac{3}{2}d + 8d = 19$

$\Rightarrow 3d + 16d = 19 \times 2$

$\Rightarrow 19d = 38$

$\Rightarrow d = 2$

$\Rightarrow a = \frac{3}{2} \times 2$ [From (1)]

$\Rightarrow a = 3$

Thus, the A.P. is 3, 5, 7, 9, .... .

Arithmetic Progressions Ex 9.3 Q40

**Answer :**

Let $a$ be the first term and $d$ be the common difference.

We know that, $n^{th}$ term = $a_n = a + (n - 1)d$

According to the question,

$a_9 = 6a_2$

$\Rightarrow a + (9 - 1)d = 6(a + (2 - 1)d)$

$\Rightarrow a + 8d = 6a + 6d$

$\Rightarrow 8d - 6d = 6a - a$

$\Rightarrow 2d = 5a$

$\Rightarrow a = \frac{2}{5}d$ .... (1)

Also, $a_5 = 22$

$\Rightarrow a + (5 - 1)d = 22$

$\Rightarrow a + 4d = 22$ ....(2)

On substituting the values of (1) in (2), we get

$\frac{2}{5}d + 4d = 22$

$\Rightarrow 2d + 20d = 22 \times 5$

$\Rightarrow 22d = 110$

$\Rightarrow d = 5$

$\Rightarrow a = \frac{2}{5} \times 5$ [From (1)]

$\Rightarrow a = 2$

Thus, the A.P. is 2, 7, 12, 17, .... .

**Answer :**

Let $a$ be the first term and $d$ be the common difference.

We know that, $n^{th}$ term = $a_n = a + (n - 1)d$

According to the question,

$a_{24} = 2a_{10}$
$\Rightarrow a + (24 - 1)d = 2(a + (10 - 1)d)$
$\Rightarrow a + 23d = 2a + 18d$
$\Rightarrow 23d - 18d = 2a - a$
$\Rightarrow 5d = a$
$\Rightarrow a = 5d$ .... (1)

Also,
$a_{72} = a + (72 - 1)d$
$= 5d + 71d$ [From (1)]
$= 76d$ ..... (2)

and
$a_{15} = a + (15 - 1)d$
$= 5d + 14d$ [From (1)]
$= 19d$ ..... (3)

On comparing (2) and (3), we get

$76d = 4 \times 19d$
$\Rightarrow a_{72} = 4 \times a_{15}$

Thus, $72^{nd}$ term of the given A.P. is 4 times its $15^{th}$ term.

********** END **********