6> Check whether -150 is a term of the AP: 11, 8, 5, 2, ...

Sol:-

Given, $a = 11$

$d = a_2 - a_1$

$d = 8 - 11$

$d = -3$

$a_n = -150$

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

$-150 = 11 + (n-1)(-3)$

$-150 = 11 + (-3n) + 3$

$-150 = 14 - 3n$

$-150 - 14 = -3n$

$\frac{-164}{-3} = n$

$\therefore -150$ is not a term of this AP.

7) Find the 31st term of an AP whose 11th term 38 and the 16th term is 73.

Sol:- Given, $a_{11} = 38$ & $a_{16} = 73$

$$a_{11} = a + (n-1)d$$
$$38 = a + (11-1)d$$
$$38 = a + 10d \longrightarrow (i)$$

$$a_{16} = a + (n-1)d$$
$$73 = a + (16-1)d$$
$$73 = a + 15d \longrightarrow (ii)$$

Subtracting eq. (ii) & (i)

$$a + 15d = 73$$
$$a + 10d = 38$$
$$(-) \quad (-) \quad (-)$$
$$5d = 35$$
$$d = \frac{35}{5}$$
$$d = 7$$

Putting the value of d in eq. (i)

$$38 = a + 10d$$
$$38 = a + 10 \times 7$$
$$38 = a + 70$$
$$38 - 70 = a$$
$$-32 = a$$

$$a_{31} = a + (n-1)d$$
$$a_{31} = -32 + (31-1)7$$
$$= -32 + 30 \times 7$$
$$= -32 + 210$$
$$a_{31} = 178$$

$\therefore a_{31}$ is 178.

(8) An AP consists of 50 terms of which 3rd term is 12 and the last term is 106. Find the 29th term.

Soli- Given, $a_3 = 12$ & $a_{50} = 106$.

To find - a_{29}

$a_3 = a + (n-1)d$

$12 = a + (3-1)d$

$12 = a + 2d \longrightarrow (i)$

$a_{50} = a + (n-1)d$

$106 = a + (50-1)d$

$106 = a + 49d \longrightarrow (ii)$

Subtracting eq. (ii) & (i)

$a + 49d = 106$

$a + 2d = 12$

(−) (−) (−)

$47d = 94$

$d = \frac{94}{47}$

$d = 2$

Putting the value of d in eq. (i)

$12 = a + 2 \times 2$

$12 = a + 4$

$12 - 4 = a$

$8 = a$

$$a_{29} = a + (n-1)d$$
$$= 8 + (29-1)2$$
$$= 8 + 28 \times 2$$
$$= 8 + 56$$
$$= 64$$

$\therefore$ a_{29} is 64.

(9) If the 3rd and the 9th terms of an AP are 4 and -8 respectively, which term of this AP is zero?

Sol:-

Given, $a_3 = 4$ & $a_9 = -8$

$$a_n = a + (n-1)d$$
$$a_3 = a + (3-1)d$$
$$4 = a + 2d \longrightarrow (i)$$
$$a_9 = a + (n-1)d$$
$$-8 = a + (9-1)d$$
$$-8 = a + 8d \longrightarrow (ii)$$

Subtracting eq. (i) & (ii)

$$a + 2d = 4$$
$$(-)\ a + 8d = -8 \quad (-)\ (+)$$
$$-6d = 12$$
$$d = \frac{-12}{6}$$
$$d = -2$$

Putting the value d in eq. (i)

$$a + 2d = 4 \qquad a = 4 + 4$$
$$a + 2 \times -2 = 4 \qquad a = 8$$

$a_4 = a + 3d$
$= 8 + 3(-2)$
$= 8 + (-6)$
$= 2$

$a_5 = a + 4d$
$= 8 + 4(-2)$
$= 8 + (-8)$
$= 0$

∴ 5th term of this AP will be 0.

10) The 17th term of an AP exceeds its 10th term by 7. Find the common difference.

Sol:- Given that 17th term of an AP exceeds its 10th term by 7

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

$a_{17} = a + (17-1)d$

$a_{17} = a + 16d \rightarrow (i)$

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

$a_{10} = a + (10-1)d$

$a_{10} = a + 9d \rightarrow (ii)$

Subtracting eq. (i) & (ii)

$a + 16d - (a + 9d) = 7$

$a + 16d - a - 9d = 7$

$7d = 7$

$d = \frac{7}{7} 1$

∴ common difference is 1

11> Which term of the AP: 3, 15, 27, 39, ... will be 132 more than its 54th terms?

Sol:- Given, $a_1 = 3$, $d = a_2 - a_1$

$= 15 - 3$

$= 12$

$a_{54} = a + (n-1)d$

$= 3 + (54-1)12$

$= 3 + 53 \times 12$

$= 3 + 636$

$= 639$

ATQ, To find = 132 more than its 54th term.

$639 + 132$

$= 771 \rightarrow a_n$

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

$771 = 3 + (n-1)12$

$771 - 3 = (n-1)12$

$\frac{768}{12} = (n-1)$

$64 = n - 1$

$64 + 1 = n$

$65 = n$

So, 65th will be 132 more than its 54th terms.

12> Let 2 AP be a_1 & a_2

$a_{100} = a_1 + (100-1)d$

$a_{100} = a_2 + (100-1)d$

$a_{100} = a_2 + 99d$

1st AP => $a_{100} = a_1 + 99d$

2nd AP = $a_2 + 99d$

Subtracting 1st AP and 2nd AP

$$(a_1 + 99d) - (a_2 + 99d) = 100$$

$$a_1 + 99d - a_2 - 99d = 100$$

$$a_1 - a_2 = 100 \rightarrow (i)$$

$a_{1000} = a_1 + (1000-1)d$

1st AP $= a_1 + 999d$

$a_{1000} = a_2 + (1000-1)d$

2nd AP $= a_2 + 999d$

Subtracting 1st AP & 2nd AP.

$$(a_1 + 999d) - (a_2 + 999d)$$

$$a_1 + 999d - a_2 - 999d$$

$$a_1 - a_2 \rightarrow (ii)$$

Putting the value of $a_1 - a_2$ in eq. (ii)

$$\Rightarrow a_1 - a_2$$

$$\Rightarrow 100.$$

∴ Difference between 1000^{th} term is 100