(6) AP - 11, 8, 5, 2. ...

$a = 11$, $d = 8 - 11 = (-3)$, $a_n = (-150)$, $n = ?$

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

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

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

$(n-1) = \frac{-161}{-3}$

$n = \frac{-161}{-3} + \frac{1}{-3}$

$n = \frac{(-161)+(3)}{3} = \frac{164}{3}$

NO, -150 is not in A.P of 11, 8, 5, 2...

(7) Given -

11^{th} term = 38, and 16^{th} term = 73

31^{st} term = ?

$a + 10d = 38$ $\quad a_{11} = 38$

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

$38 = a + (11-1)d$

$a_{31} = 38$

$\Rightarrow a + 10d = 38 \quad -(i)$

$a_{16} = 73$

$\Rightarrow a + 15d = 73 \quad -(ii)$

$a_{31} = a + 30d$

$a + 30d$

73

-38

35

By subtracting eq. (i) from (ii)

$a + 15d = 73$

$\ominus \; 10d = \ominus 38$

$5d = 35$

$d = \frac{35}{5} = 7$

So, ~~a_{31}~~ $= a + 30d$

$a \times 30 \times 7$

~~210~~

From eq. (i)

$a + 10d = 38$

$a + 10 \times 7 = 38$

$a = 38 - 70$

$a = (-32)$

$a_{31} = (-32) + 30 \times 7$

$a_{31} = -32 + 210$

$\therefore a_{31} = 178.$

(8) $n = 50.$

3rd term $= 13$

$a_n = 106.$

The 29th term $=$

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

$a_3 = a + 2d = 12 \quad —(i)$

$a_{50} = a + 49d = 106 \quad —(ii)$

subtracting eq (i) from (ii)

$a + 49d = 106$

$a + 2d = 12$

$a_{29} = a + 28$

$a + 3d = 12$

$a + 49d = 10$

$47d = 8$

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

(9) 3rd ⇒ (+4)
9th ⇒ (-8)

$a_3 = 4$, $a_9 = -8$, $a_n = 0$, $n = ?$

$a_3 = a + (3-1)d$

$a + 2d = 4 \quad \text{---(i)}$

$a_9 = a + 8d = -8 \quad \text{---(ii)}$

Subtracting eq (i) from (ii)

$a + 8d = -8$

$(-)\ a + 2d = (-4)$

$6d = -12$

$d = \frac{-12}{6} = (-2)$

$a_3 = a + (3-1)-2$

$4 = a + (-4)$

$a = 4 + 4$

$\therefore a = 8$

$\Rightarrow a + (n-1)d = 0$

$\Rightarrow 8 + (n-1)-2 = 0$

$\Rightarrow (n-1)-2 = 0 - 8 = -8$

$\Rightarrow n-1 = \frac{-8}{-2} = 4$

$n = 4 + 1 = 5$

So, 5th term will be AP is zero.

(10) We can write the 17th term as

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

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

$a_{17} = a + 16d$ ——(i)

Similarly, the 10th term will be -

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

$a_{10} = a + 9d$ ——(ii)

A/Q

$a_{17} - a_{10} = 7$

$(a + 16d) - (a + 9d) = 7$ [From eq. (i) and (ii)]

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

$\Rightarrow 7d = 7$

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

So, the common A.P is 1.

(11) Given AP - 3, 15, 27, 39 . . . .

Here,

$a = 3, d = 15 - 3, n = 54, a_n = ?$

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

$a_{54} = 3 + (54-1)12$

$a_{54} = 3 + 636$

$a_{54} = 639$

Q2. $a_n = 639 + 132$

$a_n = 771, \ a = 3, \ d = 12, \ n = ?$

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

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

$\Rightarrow \frac{771 - 3}{12} = (n-1)$

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

$\Rightarrow n = 64 + 1 = 65$

So, n is the 65th term of AP will be 132m or more than its 54th term.

(12) Let the 1st A.P be 'a,' and 2nd be 'a₂'

1st A.P	2nd
$a_{100} = a_1 + 99d$ ...(i)	$a_{1000} = a_2 + 99d$ ...(ii)

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

$\Rightarrow a_1 - a_2 = 100$ —(i)

The 'd' betw 1st their = 100 times 2nd

$\Rightarrow a_{100}0 = a_1 + (1000-1)d$

$\Rightarrow a_1 + 999d$

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

$\Rightarrow a_2 + 999d$

$\therefore a_1 - a_2 = 100$ —(From eq(i))