Mon
1.7.21

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

A $a = 11$

$d = 8 - 11 = -3$

$a_n = -150$

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

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

n is not a integer
-150 isn't term of AP

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

A. $a_{11} = 38$
$a_{16} = 73$
$a_n = a + (n-1)d \Rightarrow a_{11} = a + (11-1)d$
$38 = a + 10d$ — (1)
$a_{16} = a + (16-1)d$
$73 = a + 15d$ — (2)
Subtracting eq (1) from (2)
$35 = 5d$
$\Rightarrow d = 7$
$38 = a + 10(7) \Rightarrow 38 - 70 = a \Rightarrow a = -32$
$a_{31} = a(31-1)d$
$= -32 + 30(7) = -32 + 210 = 178$

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

A. $a_3 = 12$
$a_{50} = 106$
$a_3 = a + (3-1)d$
$12 = a + 2d$ — (1)
$a_{50} = a + (50-1)d$
$\Rightarrow 106 = a + 49d$ — (2)
On subtracting eq (1) from eq (2)
$\Rightarrow 94 = 47d \Rightarrow d = 2$

$12 = a + 2(2)$

$\Rightarrow a = 12 - 4 = 8$

$\Rightarrow a_{29} = a + (29-1)d$

$a_{29} = 8 + (28)2$

$a_{29} = 8 + 56 = 64$

9. If the 3rd & 9th terms of AP are 4 & -8 which term of this AP is zero?

A $a_3 = 4$

$a_9 = -8$

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

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

$4 = a + 2d$ ——— ①

$a_9 = a + (9-1)d$

$-8 = a + 8d$ ——— ②

Subtracting eq ① from eq ②

$\Rightarrow -12 = 6d \Rightarrow d = -2$

$4 = a + 2(-2) \Rightarrow 4 = a - 4 \Rightarrow a = 8$

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

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

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

$\Rightarrow n-1 = 4 \Rightarrow n = 5$.

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

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

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

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

$\Rightarrow 7d = 7$

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

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

A. AP: 3, 15, 27, 39, ...

$a = 3$, $d = 15 - 3 = 12$

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

$= 3 + (53)(12) = 3 + 636 = 639$

$= 132 + 639 = 771$

Let n^{th} term be 771

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

$\Rightarrow 768 = (n-1)12 \Rightarrow n-1 = 64 \Rightarrow n = 65$

$\therefore$ 65th term was 132 more than 54th term

12. Two APs have the same common difference. The difference between their 100th term is 100, what is the difference between their 1000th term?

A Let first term of these APs be a_1 & a_2 & common difference of these A.Ps be

For first AP

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

$= a_1 + 99d$

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

$a_{100} = a_1 + 999d$

For second AP

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

$= a_2 + 99d$

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

$= a_2 + 999d$

Difference between 100th term of AP: 100

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

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

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

$\Rightarrow a_1 + a_2 = 100$ ——— (1)

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Difference between 1000th term

$= a_{1000} - b_{1000}$

$= [a_1 + (1000 - 1)d] - [a_2 + (1000 - 1)d]$

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

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

$= a_1 - a_2$

So difference between 1000th term is 1000.