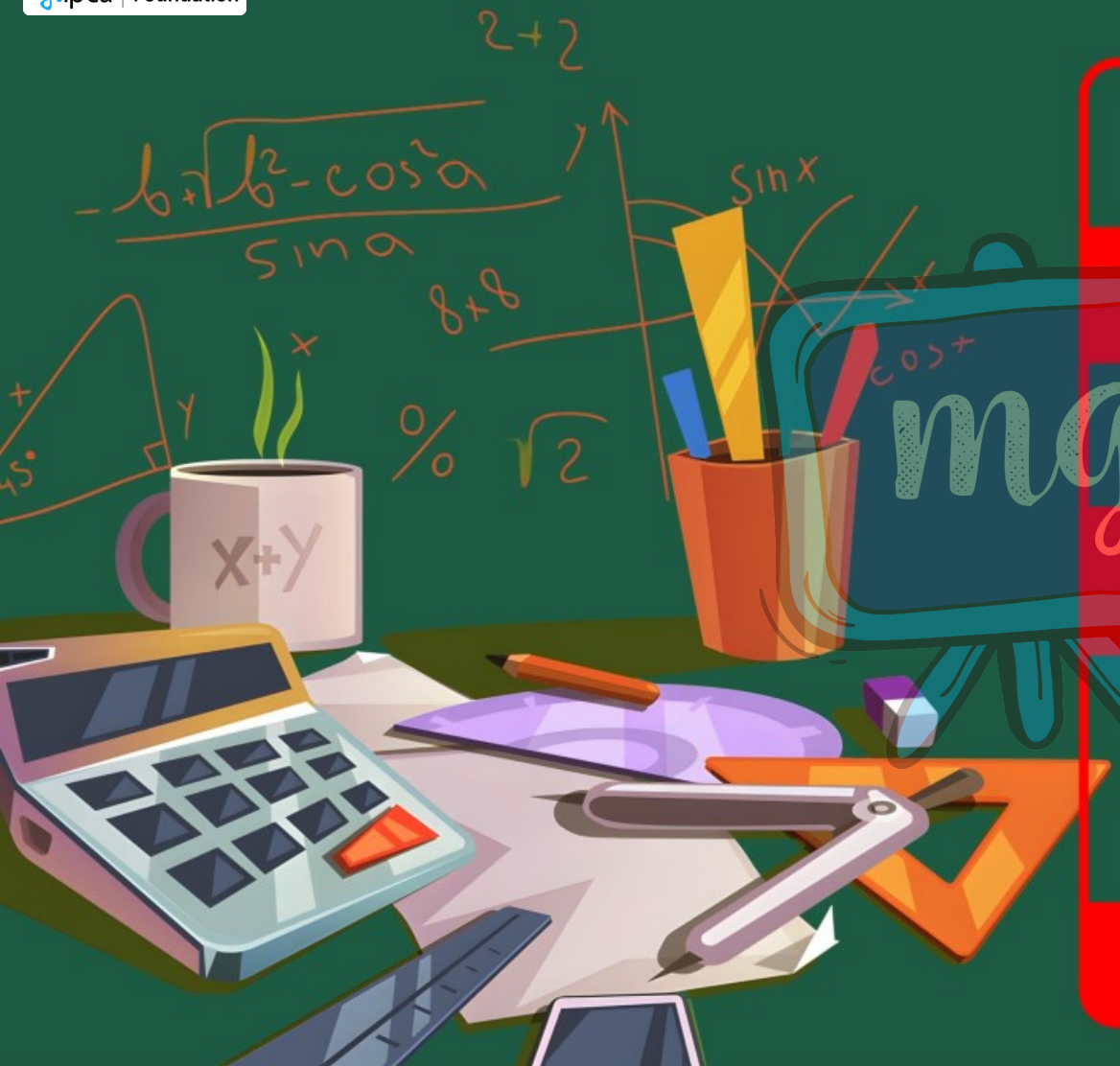
Under CSR Support by ipca | Foundation

missiongyan



CLASS – 10

MATHEMATICS

Chapter – 5

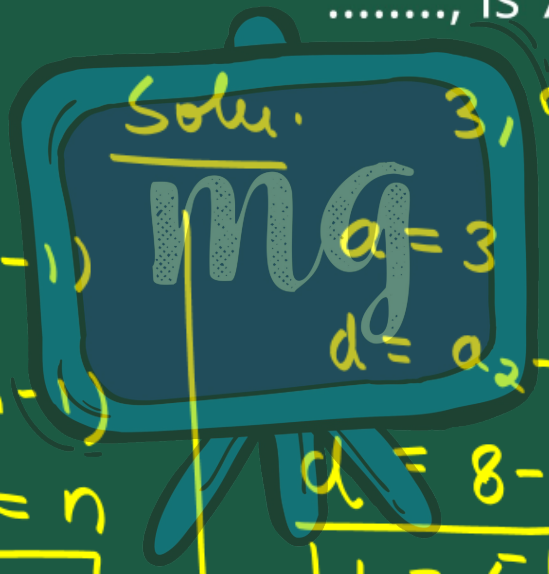
Arithmetic Progressions

Part – 6

EXERCISE 5.2 (Q.4 – 9)

Shubham Tiwari

4. Which term of the AP : 3, 8, 13, 18, ..., is 78?



Solu. 3, 8, 13, 18

$a = 3$

$d = a_2 - a_1$

$d = 8 - 3$

$d = 5$

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

$78 = 3 + (n-1)5$

$78 - 3 = (n-1)5$

$75 = (n-1)5$

$\frac{75}{5} = (n-1)$

$15 = (n-1)$

$15 + 1 = n$

$16 = n$

Hence the 16th terms of the given AP is 78.

5. Find the number of terms in each of the following APs :

(i) 7, 13, 19, . . . , 205

a_n

Sol. $a = 7$

$d = a_2 - a_1 = 13 - 7$

$= 6$

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

$205 = 7 + (n-1)\,6$

$205 = 7 + (n-1)\,6$

$205 - 7 = (n-1)\,6$

$198 = (n-1)\,6$

$\frac{198}{6} = (n-1)$

$33 = (n-1)$

$34 = n$

Hence there are 34 terms in the given AP.

(ii) $18, 15\frac{1}{2}, 13, \ldots, -47$

a_n

$d = a_2 - a_1$

$= 15\frac{1}{2} - 18$

$15 + \frac{1}{2} - 18$

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

$-2\frac{1}{2}$

$-\frac{5}{2}$

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

$-47 = 18 + (n-1)\left(-\frac{5}{2}\right)$

$-47 - 18 = (n-1)\left(-\frac{5}{2}\right)$

$-65 = (n-1)\,-\frac{5}{2}$

$+65 \quad +65$

$+\frac{5}{2} = (n-1)$

$n - 1 = 13 \times 2$

$n - 1 = 26$

$n = 27$

Hence there are 27 terms in the given A.P.

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

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

$-150 = 11 + (n-1)(8-11)$

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

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

$-161 = (n-1)(-3)$

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

$n - 1 = 53\frac{2}{3}$

n is always an integer

value hence $n = 54\frac{2}{3}$ can't

be a term of a given sequen

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

Solu: $a_{31} = ?$ | $a_{11} = 38$, $a_{16} = 73$

$a_{11} = a + 10d$

$38 = a + 10d$ — (1)

$a_{16} = 73$

$a + 15d = 73$ — (2)

eq (2) − eq (1)

$a + 15d = 73$

$-\ a + 10d = 38$

$5d = 35$

$d = 35/5 = 7$

$a + 10d = 38$

$a + 10 \times 7 = 38$

$a + 70 = 38$

$a = 38 - 70$

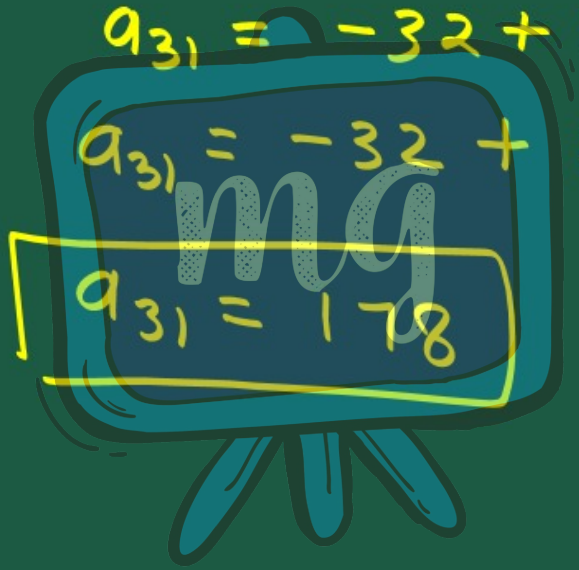
$a = -32$

$$a_{31} = a + 30d$$

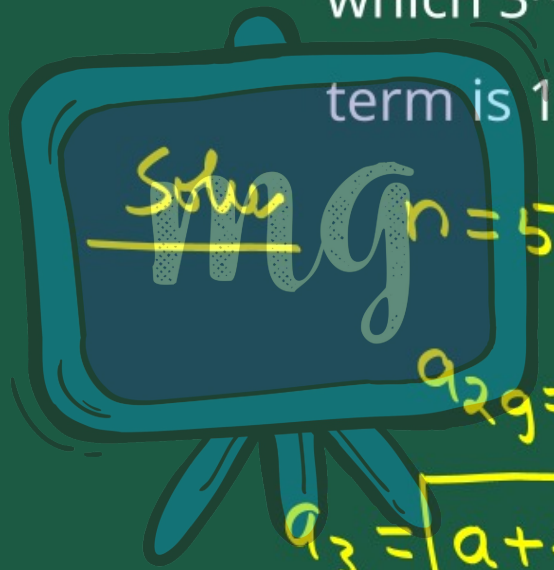
$$a_{31} = -32 + 30 \times 7$$

$$a_{31} = -32 + 210$$

$$\boxed{a_{31} = 178}$$



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



Solu

$n = 50$ | $a_3 = 12$, $a_{50} = 106$

$a_{29} = ?$

$a_3 = a + 2d = 12$ — (1)

$a + 49d = a_{50}$

$a + 49d = 106$ — (2)

eq (2) − eq (1)

$a + 49d = 106$

$-\ a + 2d = -\ 12$

$47d = 94$

$d = \frac{94}{47} = 2$

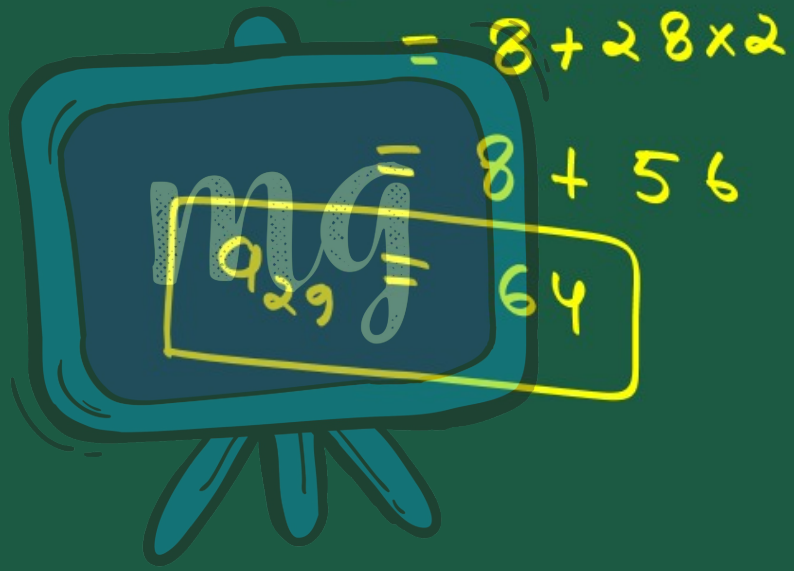
$a + 2d = 12$

$a + 2 \times 2 = 12$

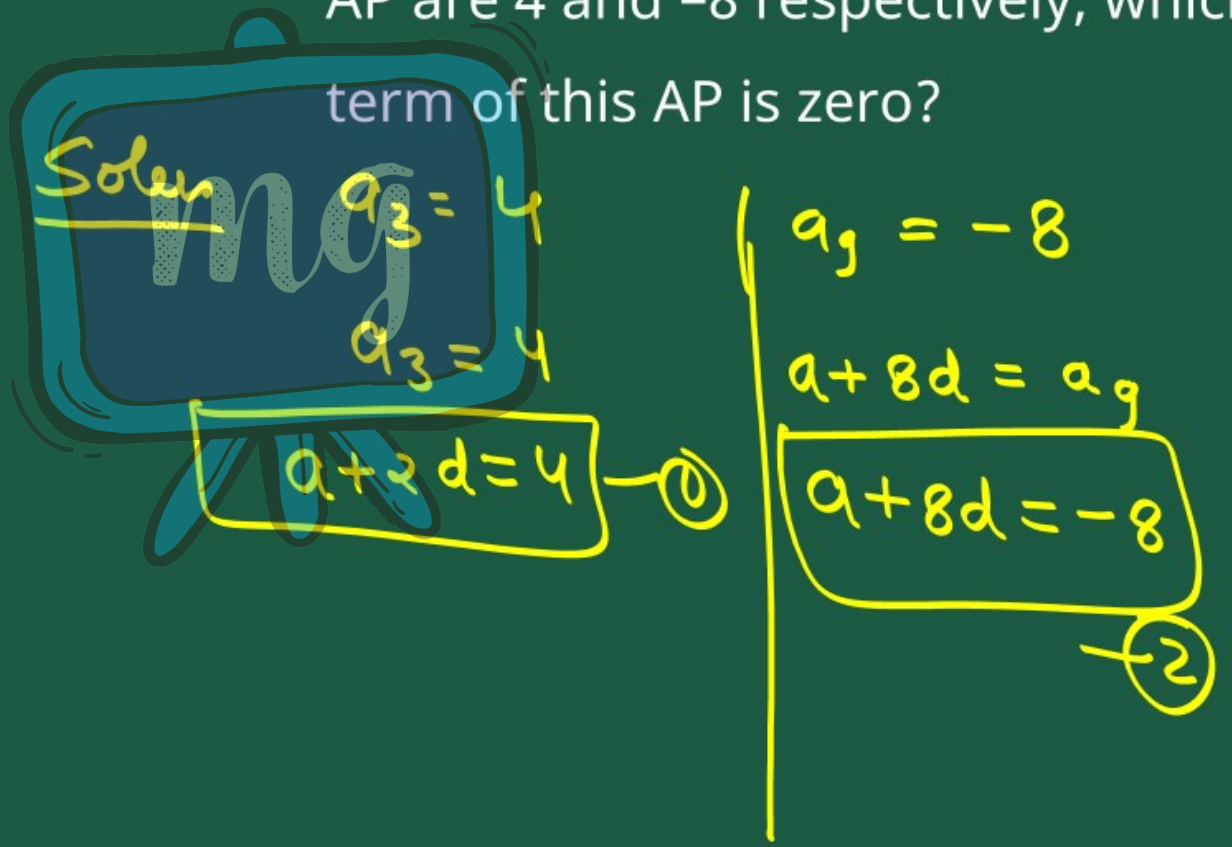
$a + 4 = 12$

$a = 12 - 4$

$\boxed{a = 8}$



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



eq ② − eq ①

$a + 8d = -8$

$a + 2d = 4$

$6d = -12$

$d = -2$

$a + 2d = 4$

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

$a - 4 = 4$

$a = 4 + 4$

$a = 8$

$a_n = 0$

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

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

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

$(n-1) = \frac{-8}{-2}$

$(n-1) = 4$

$n-1 = 4$

$n = 4+1$

$\boxed{n = 5}$

Hence the 5th term of the given A.P is zero.