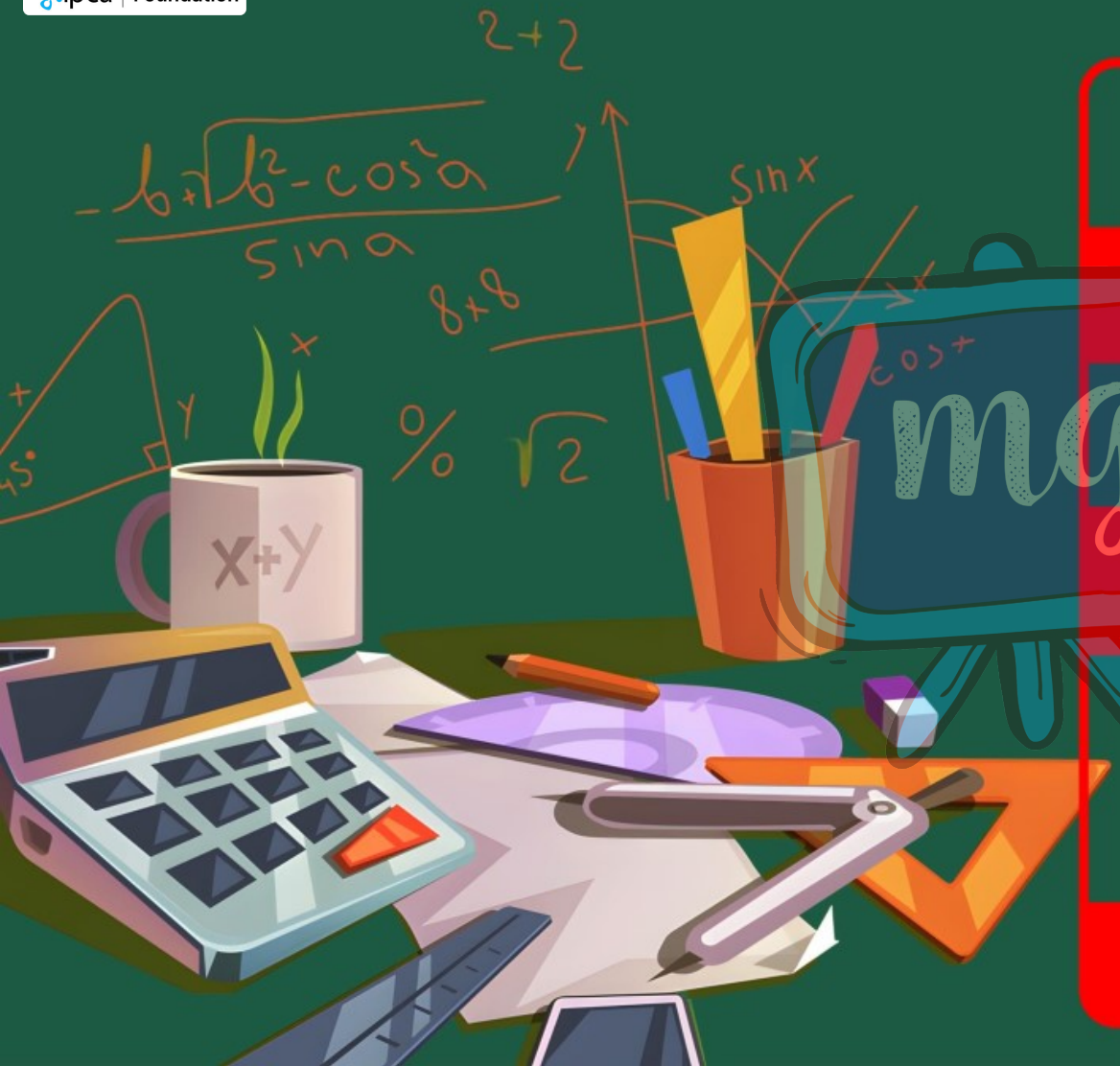
Under CSR Support by ipca | Foundation

missiongyan



CLASS – 10

MATHEMATICS

Chapter – 5

Arithmetic Progressions

Part – 8

EXERCISE 5.2 (Q.16 – 20)

Shubham Tiwari

16. Determine the AP whose third term is 16 and the 7th term exceeds the 5th term by 12.

Solution:

$a_3 = 16$

$a + 2d = 16$

$a + 2(6) = 16$

$a + 12 = 16$

$a = 16 - 12$

$a = 4$

$a_7 = a_5 + 12$

$a_7 - a_5 = 12$

$a + 6d - (a + 4d) = 12$

$a + 6d - a - 4d = 12$

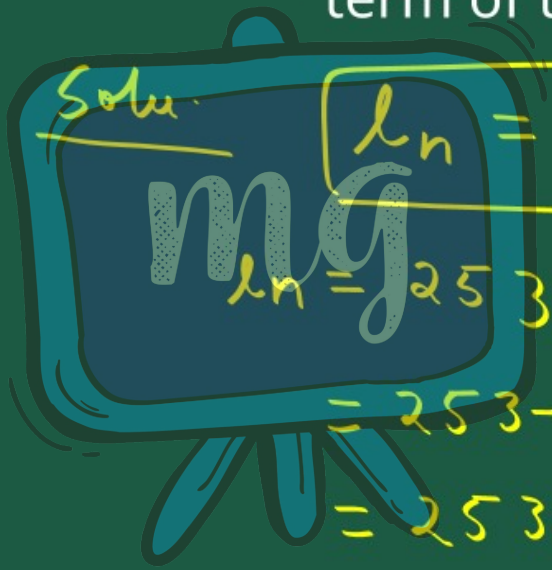
$2d = 12$

$d = 6$

Hence the AP is

4, 10, 16, 22 —

17. Find the 20th term from the last term of the AP : 3, 8, 13, . . ., 253.



Sol:

$l_n = l - (n-1)d$

$l_n = 253 - (n-1)(8-3)$

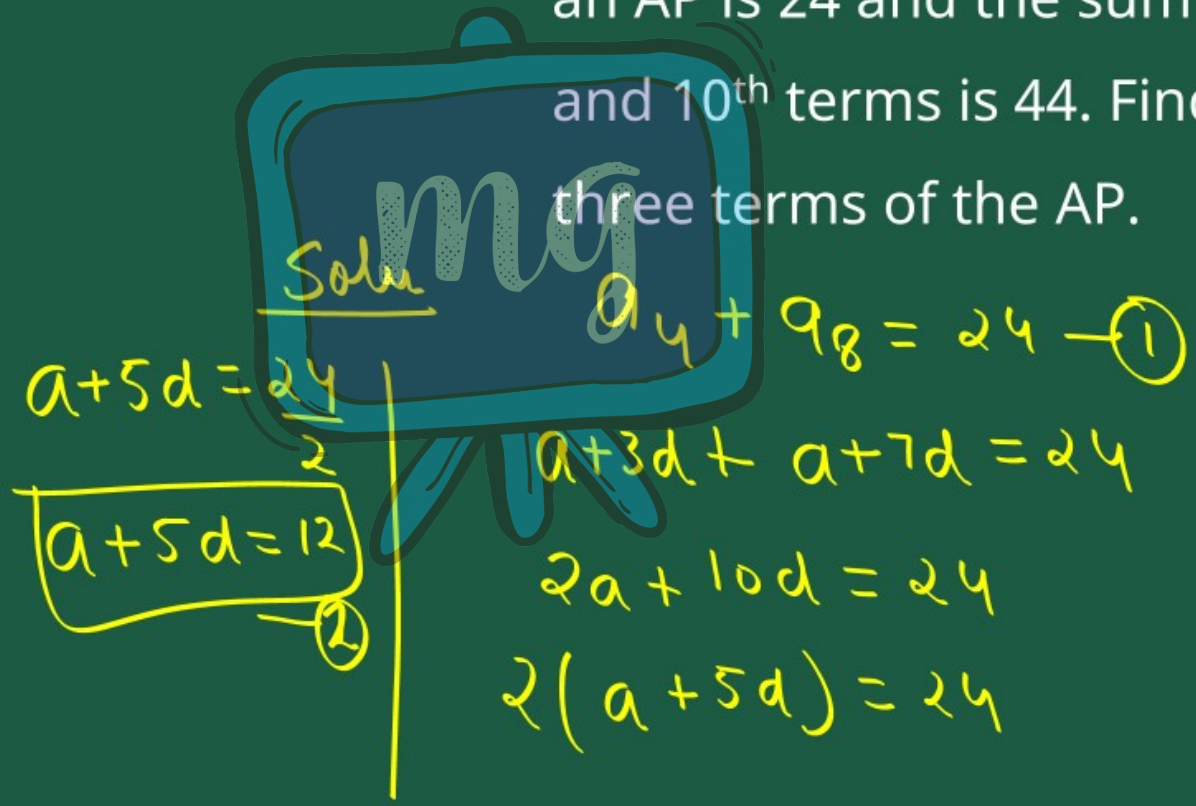
$= 253 - (20-1)5$

$= 253 - 19 \times 5$

$= 253 - 95$

$l_n = 158$

18. The sum of the 4^{th} and 8^{th} terms of an AP is 24 and the sum of the 6^{th} and 10^{th} terms is 44. Find the first three terms of the AP.



$$a_6 + a_{10} = 44$$

$$a+5d + a+9d = 44$$

$$2a + 14d = 44$$

$$2[a+7d] = 44$$

$$a+7d = \frac{44}{2}$$

$$a+7d = 22 \quad \text{---} (3)$$

$a + 7d = 22$

$a + 5d = 12$

$2d = 10$

$d = 5$

$a + 5d = 12$

$a + 5 \times 5 = 12$

$a + 25 = 12$

$a = 12 - 25$

$a = -13$

$a = -13 = -13$

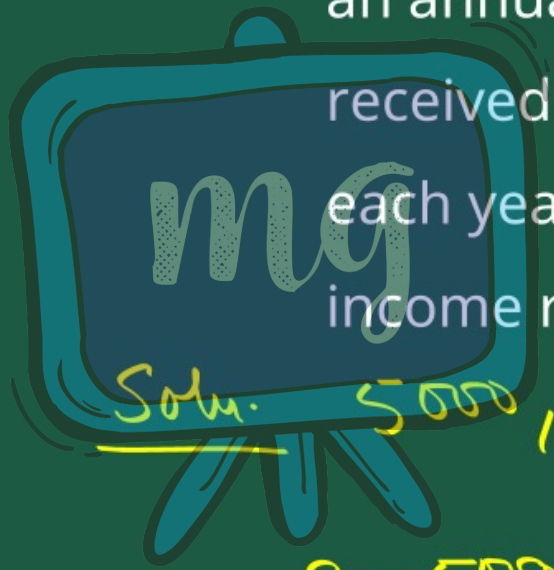
$a+d = -13+5 = -8$

$a+2d = -13+5\times 2 = -3$

Hence the first 3 terms of the AP is

$-13, -8, -3$

19. Subba Rao started work in 1995 at an annual salary of ₹ 5000 and received an increment of ₹ 200 each year. In which year did his income reach ₹ 7000?



Soln. 5000, 5200, 5400 - - - - 7000

$a = 5000$

$d = 200$

$a_n = 7000$

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

$$7000 = 5000 + (n-1)(200)$$

$$7000 - 5000 = (n-1)\,200$$

$$2000 = (n-1)\,200$$

$$\frac{2000}{200} = n-1$$

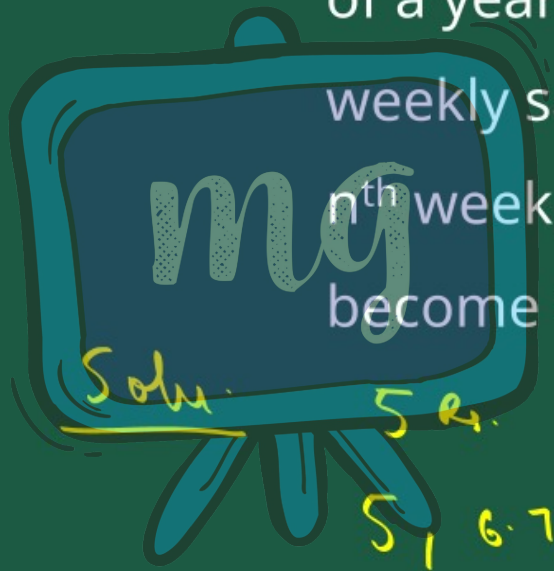
$$10 = n-1$$

$$10 + 1 = n$$

$$11 = n$$

Hence on 11th year his annual salary will become 7000 Rs.

20. Ramkali saved ₹ 5 in the first week of a year and then increased her weekly savings by ₹ 1.75. If in the n^{th} week, her weekly savings become ₹ 20.75, find n.



Sol:- 5 Rs. 1.75

5, 6.75, ---- 20.75

$a = 5$ | $a_n = 20.75$

$d = 1.75$ | $n = ?$

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

$$20.75 = 5 + (n-1)(1.75)$$

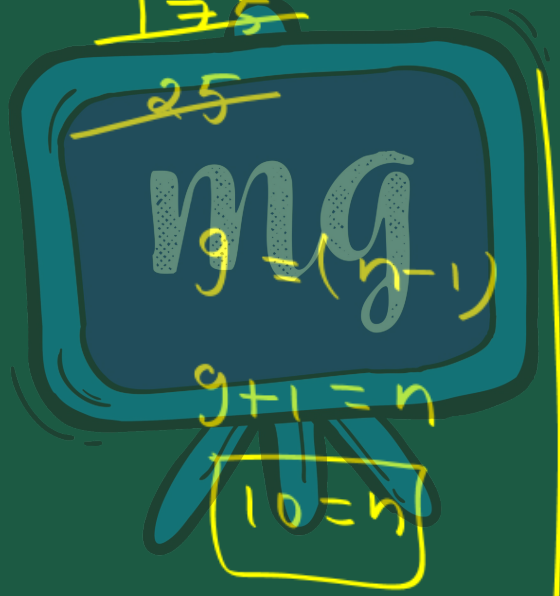
$$20.75 - 5 = (n-1)\,1.75$$

$$15.75 = (n-1)\,1.75$$

$$\frac{15.75}{1.75} = (n-1)$$

$$\frac{1575}{175} = (n-1)$$

$$\begin{array}{r} 225 \\ 1575 \\ \hline 1350 \\ 25 \end{array}\ \Big)^{9} = (n-1)$$



Hence on 10th week her weekly saving will Reach 20.75 Rs.