

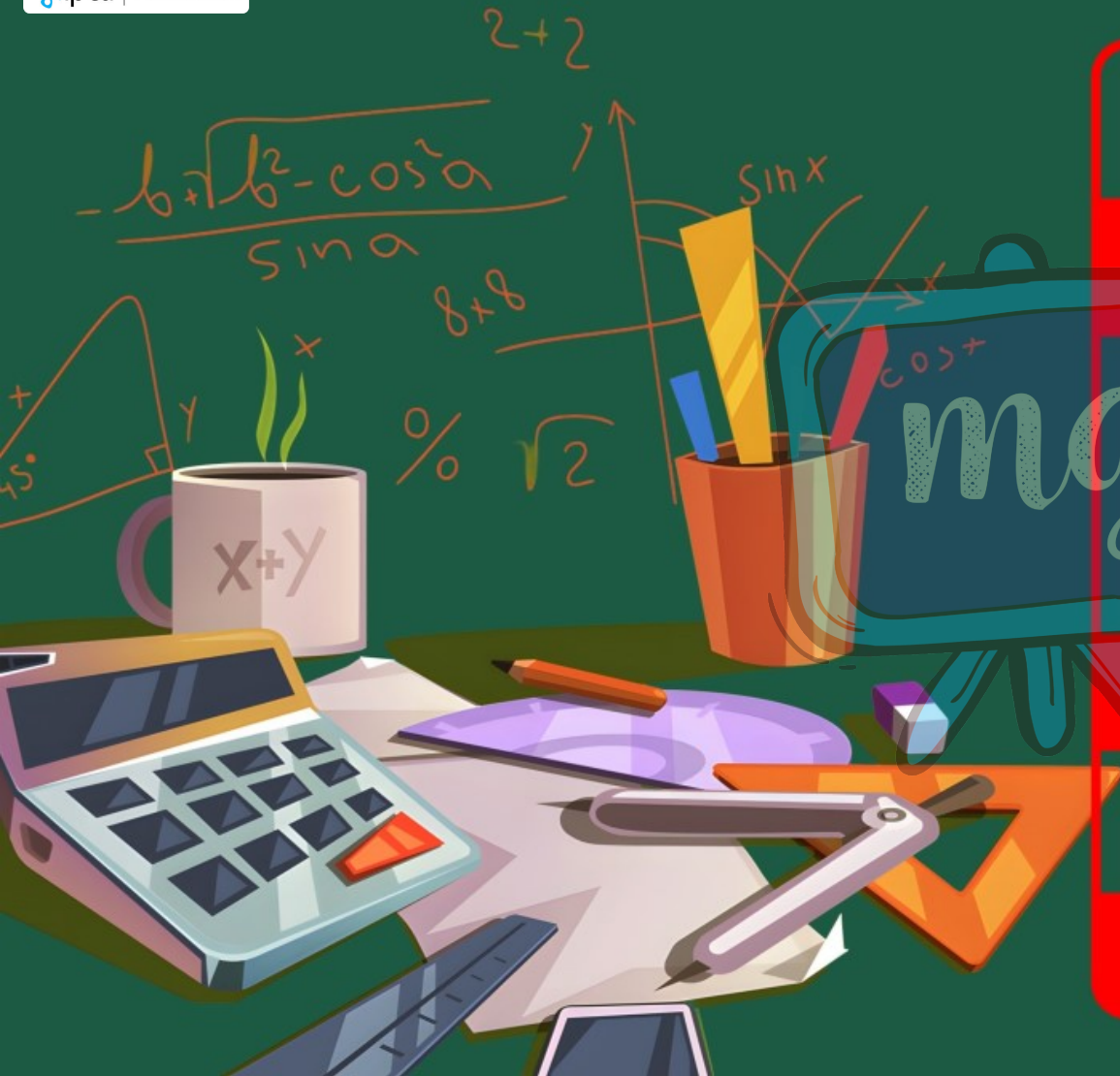
CLASS – 10 MATHEMATICS

CH – 5 Arithmetic Progressions

CBSE Board

Previous Year Questions – 3

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24. In an AP if $S_n = n(4n + 1)$ then find the AP.

(CBSE Term II, 2021-22)

Solu.

$$S_n = n(4n + 1)$$
$$S_1 = a_1$$
$$S_1 = 1(4(1) + 1)$$
$$= 1(5)$$
$$S_1 = 5$$
$$a_1 = 5$$

$$S_2 = a_1 + a_2$$

$$S_n = n(4n+1)$$

$$S_2 = 2(4(2)+1)$$

$$= 2(9)$$

$$S_2 = 18$$

$$a_1 + a_2 = 18$$

$$5 + a_2 = 18$$

$$a_2 = 18 - 5$$

$$a_2 = 13$$

$$d = a_2 - a_1$$
$$= 13 - 5$$

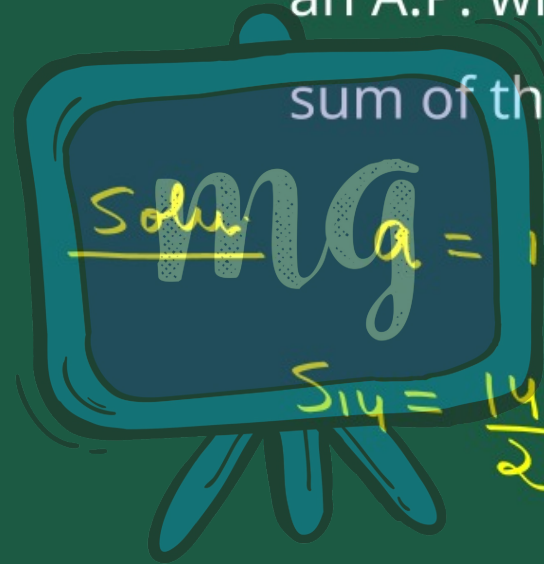
$$d = 8$$

Now the AP.

5, 13, 21, ...

25. Find the common difference 'd' of an A.P. whose first term is 10 and sum of the first 14 terms is 1505.

(CBSE Term II, 2021-22)



$$\text{Solu. } a = 10 \quad | \quad S_{14} = 1505$$

$$S_{14} = \frac{14}{2} [2a + (14-1)d]$$

$$\left\{ S_n = \frac{n}{2} [2a + (n-1)d] \right.$$

$$S_{14} = 7[20 + 13d]$$

$$1505 = 7[20 + 13d]$$

$$\frac{1505}{7} = 20 + 13d$$

$$215 = 20 + 13d$$

$$215 - 20 = 13d$$

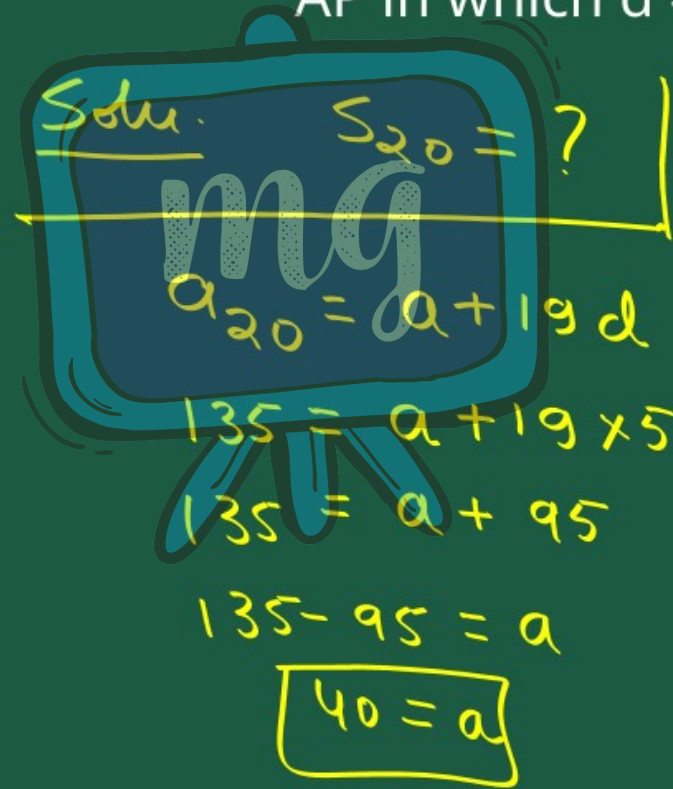
$$195 = 13d$$

$$\frac{195}{13} = d$$

$$\boxed{15 = d}$$

26. Find the sum of first 20 terms of an AP in which $d = 5$ and $a_{20} = 135$.

(CBSE Term II, 2021-22)



A hand-drawn chalkboard with a blue border and a large 'mg' watermark in the center. The board contains handwritten mathematical work in yellow. At the top left, 'Soln.' is written and underlined. To its right, 'S₂₀ = ?' is written. Below this, the formula for the nth term of an AP is written: 'a₂₀ = a + 19d'. This is followed by two equations: '135 = a + 19 × 5' and '135 = a + 95'. The final step shows '135 - 95 = a', with the result '40 = a' boxed in a yellow rectangle.

Soln. $S_{20} = ?$

$a_{20} = a + 19d$

$135 = a + 19 \times 5$

$135 = a + 95$

$135 - 95 = a$

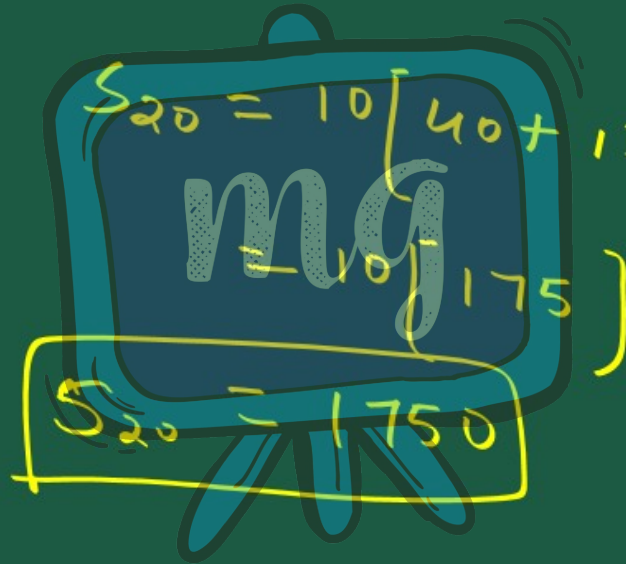
$40 = a$

$$a_{20} = 135$$

$$d = 5$$

$$S_{20} = \frac{20}{2} [a + a_{20}]$$

$$\left\{ S_n = \frac{n}{2} [a + r] \right\}$$


$$S_{20} = 10 [40 + 135]$$
$$= 10 [175]$$
$$S_{20} = 1750$$

27. Find the sum of first 20 terms of an A.P. whose n^{th} term is given as

$$a_n = 5 - 2n.$$

(CBSE Term II, 2021-22)

Solu. S_{20}

$$a_{20} = 5 - 2(20)$$
$$= 5 - 40$$

$a_{20} = -35$

$$a_n = 5 - 2n$$
$$a_1 = 5 - 2(1)$$
$$= 5 - 2$$

$a_1 = 3$

$$S_n = \frac{n}{2} [a + l]$$

$$S_{20} = \frac{20}{2} [3 - 35]$$

mg

$$= 10 [-32]$$

$$S_{20} = -320$$

28. If S_n the sum of first n terms of an A.P. is given by $S_n = 3n^2 - 4n$ find the

(CBSE Delhi 2019)

n^{th} term.

$S_n = 3n^2 - 4n$

$a_1 + a_2 + a_3 + \dots + a_n$

S_n

$a_n = ?$

$$S_n$$

$$a_1 + a_2 + a_3 + \dots + a_n$$

$$S_{n-1}$$

$$a_n = S_n - S_{n-1}$$

$$= (3n^2 - 4n) - [3[n-1]^2 - 4(n-1)]$$

$$= 3n^2 - 4n - [3(n^2 + 1 - 2n) - 4n + 4]$$

$$= \cancel{3n^2} - 4n - \cancel{3n^2} + 3 + 6n + 4n - 4$$

$$a_n = 6n - 7$$



29. The sum of first 15 terms of an A.P. is 750 and its first term is 15. Find its 20th term. (CBSE 2023)

$S_{15} = 750$ | $a = 15$ | $a_{20} = ?$
 $S_n = \frac{n}{2} [a + a_n]$
 $\frac{S_{15}}{15} = \frac{15}{2} [a + a_{15}]$
 $\frac{750}{15} = \frac{15}{2} [15 + a_{15}]$
 $50 = \frac{15}{2} [15 + a_{15}]$
 $100 = 15 + a_{15}$
 $100 - 15 = a_{15}$
 $85 = a_{15}$

$$a_{15} = a + 14d$$

$$85 = 15 + 14d$$

$$85 - 15 = 14d$$

$$70 = 14d$$

$$\frac{70}{14} = d$$

$$5 = d$$

$$a_{20} = a + 19d$$

$$a_{20} = 15 + 19 \times 5$$

$$a_{20} = 15 + 95$$

$$a_{20} = 110$$

30. Rohan repays his total loan of

₹1,18,000 by paying every month starting with the first instalment of ₹1,000. If he increase the instalment by ₹100 every month, what amount will be paid by him in the 30th instalment? What amount of loan has he paid after 30th instalment?

1000 - 1
1100 - 2
1200 - 3
1300 - 4
|
|
|

(CBSE 2023)

1000, 1100, 1200

$$a = 1000 \mid d = 100 \mid a_{30} = ?$$

$$a_{30} = a + 29d$$

$$= 1000 + 29(100)$$

$$= 1000 + 2900$$

$$a_{30} = 3900$$

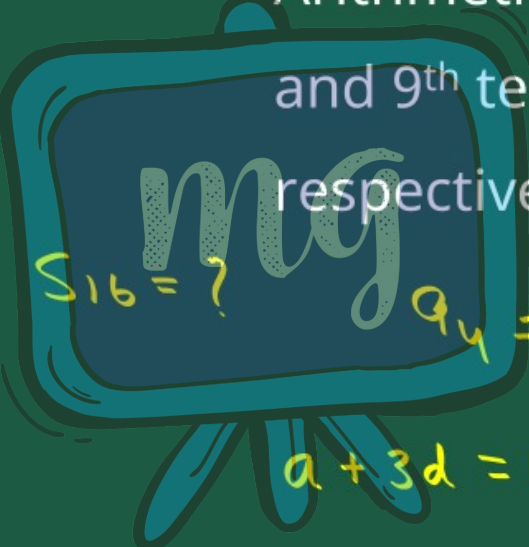
$$S_{30} = \frac{n}{2} [a + l]$$
$$= \frac{30}{2} [1000 + 3900]$$

$$= 15 [4900]$$

$$S_{30} = 73,500$$

On 30th installment he has paid 3900 Rs
and a sum 73,500 upto 30 installments.

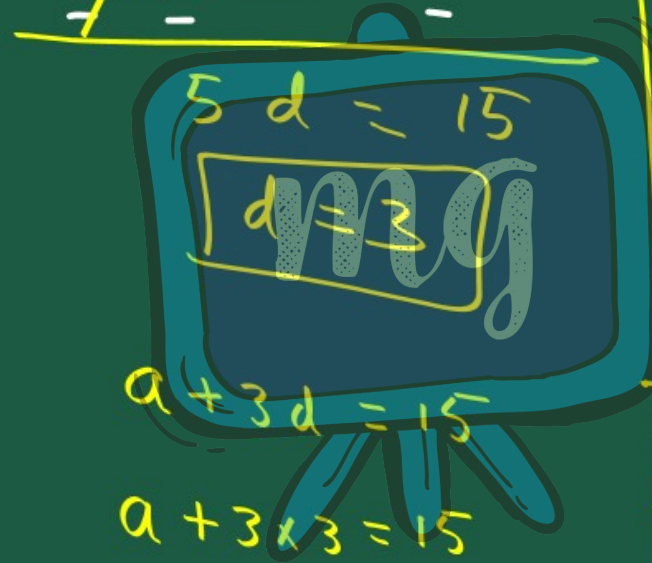
31. Find the sum of first 16 terms of an Arithmetic Progression whose 4th and 9th terms are 15 and 30 respectively. (CBSE 2020)



Handwritten solution on a chalkboard:

$$S_{16} = ? \quad a_4 = 15 \quad | \quad a_9 = 30$$
$$a + 3d = 15 \quad \text{--- (1)} \quad | \quad a + 8d = 30 \quad \text{--- (2)}$$
$$\text{eq (2) - eq (1)}$$

$$\begin{array}{r} a + 8d = 30 \\ a + 3d = 15 \\ \hline \end{array}$$



$$a + 3d = 15$$

$$a + 3 \times 3 = 15$$

$$a + 9 = 15$$

$$\boxed{a = 6}$$

$$S_n = \frac{n}{2} [2a + (n-1)d]$$

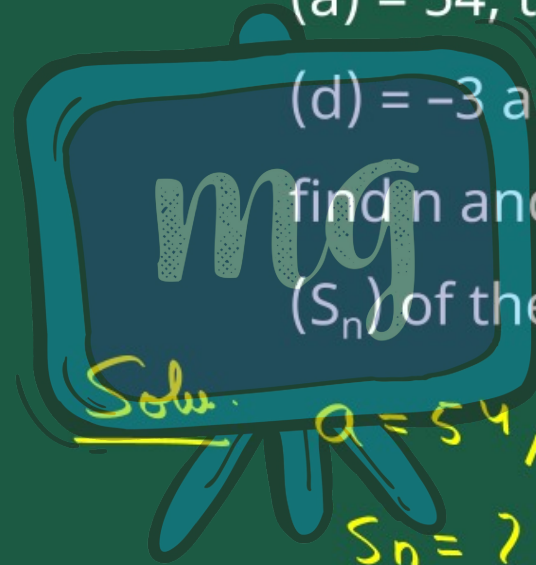
$$S_{16} = \frac{16}{2} [2 \times 6 + (16-1)3]$$

$$= 8 [12 + 45]$$

$$= 8 [57]$$

$$\boxed{S_{16} = 456}$$

32. In an A.P. given that the first term
(a) = 54, the common difference
(d) = -3 and the n^{th} term (a_n) = 0,
find n and the sum of first n terms
(S_n) of the A.P. (CBSE 2020)



Solu.

$$a = 54, d = -3 \mid a_n = 0$$

$$S_n = ? \mid n = ?$$

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

$$0 = 54 + (n-1)(-3)$$

$$-54 = (n-1)(-3)$$

$$\begin{array}{r} +54 \\ \hline +3 \end{array} = (n-1)$$

$$18 = (n-1)$$

$$18 + 1 = n$$

$$\boxed{19 = n}$$

$$S_{19} = \frac{19}{2} [2a + (19-1)d]$$

$$= \frac{19}{2} [2 \times 54 + 18(-3)]$$

$$= \frac{19}{2} [2 \times 54 - 54]$$

$$= \frac{19}{2} \times (54)$$

$$= 19 \times \frac{54}{2}$$

$$S_{19} = 19 \times 27$$