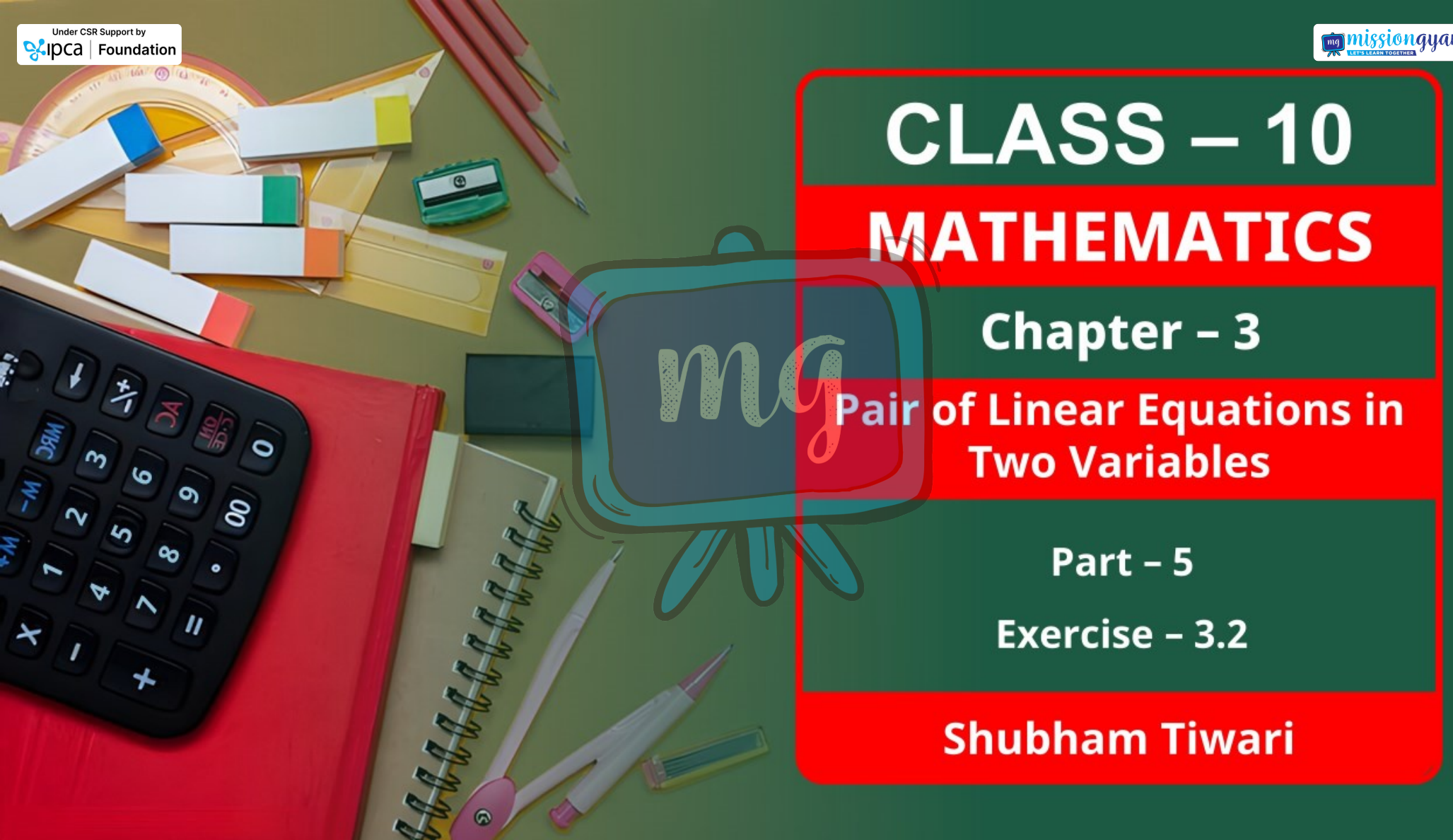

CLASS – 10

MATHEMATICS

Chapter – 3

Pair of Linear Equations in Two Variables

Part – 5

Exercise – 3.2

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Under CSR Support by ipca | Foundation

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EXERCISE – 3.2

1. Solve the following pair of linear equations by the substitution method.

(i) $x + y = 14$ — (1)

$x - y = 4$ — (2)

Soln $x - y = 4$

$x = 4 + y$ — (3)

From eq (3) Substituting the value of x in eq (1).

$x + y = 14$

$x = 4 + y$

$4 + y + y = 14$

$x = 4 + 5$

$2y = 14 - 4$

$x = 9$

$2y = 10$

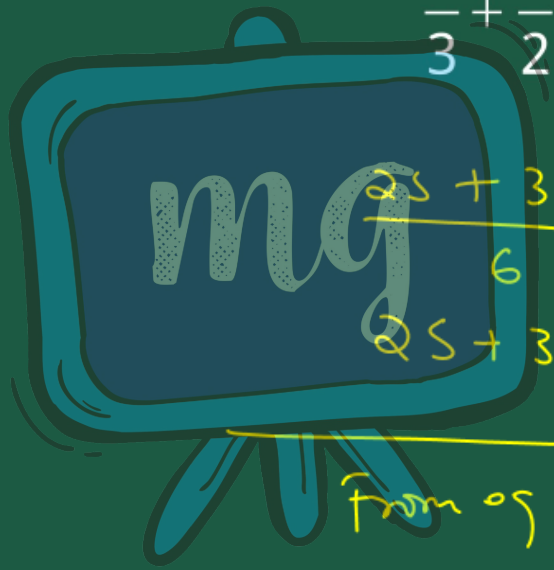
$y = 10/2 = 5$

$y = 5$

Let's place the value of y in eq. (3)

(ii) $s - t = 3$ — (1)

$\frac{s}{3} + \frac{t}{2} = 6$ — (2)



$\frac{2s + 3t}{6} = 6$

$2s + 3t = 36$ — (3)

From eq (1)

$s = t + 3$ — (4)

By substituting the value of s into eq. (3)

$2s + 3t = 36$

$2(t+3) + 3t = 36$

$2t + 6 + 3t = 36$

$5t + 6 = 36$

$5t = 36 - 6$

$5t = 30$

$t = \frac{30}{5} = 6$

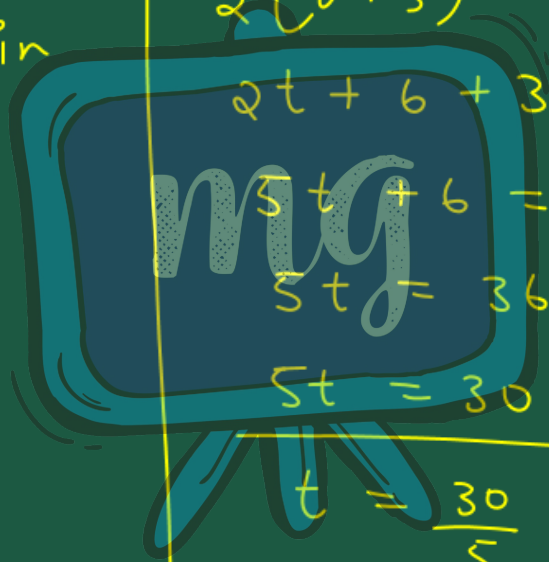
$t = 6$

by placing the value of t in eq (4)

$s = t + 3$

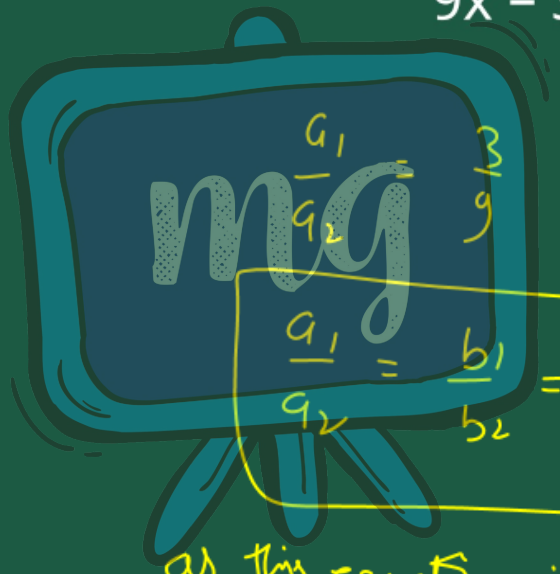
$s = 6 + 3$

$s = 9$



(iii) $3x - y = 3$

$9x - 3y = 9$



$\frac{a_1}{a_2} = \frac{3}{9}$ | $\frac{b_1}{b_2} = \frac{-1}{-3}$ | $\frac{c_1}{c_2} = \frac{3}{9}$

$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2} = \frac{1}{3}$

as this equation will show infinite many solution

$3x - y = 3$

$3x - 3 = y$

$9x - 3y = 9$

$9x - 3(3x - 3) = 9$

$9x - 9x + 9 = 9$

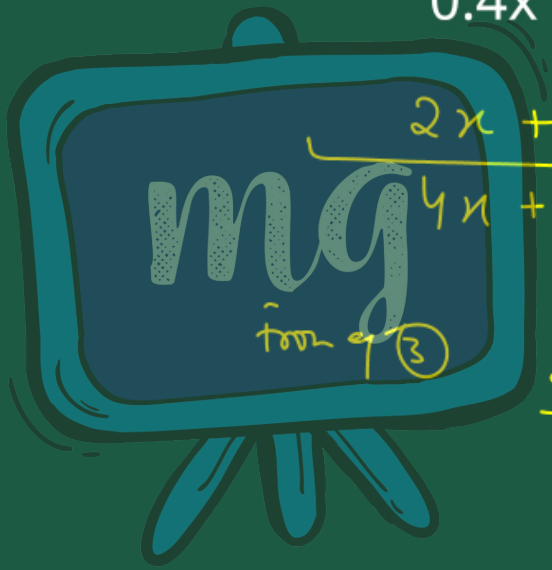
$0x + 9 = 9$

(iv) $0.2x + 0.3y = 1.3$ $\times 10$ — (1)

$0.4x + 0.5y = 2.3$ $\times 10$ — (2)

$2x + 3y = 13$ — (3)

$4x + 5y = 23$ — (4)



from eq (3)

$2x = 13 - 3y$

$$x = \frac{13 - 3y}{2}$$ — (5)

By substituting the value of x in eq (4)

$4x + 5y = 23$

$2\left[\frac{13-3y}{2}\right] + 5y = 23$

$26 - 6y + 5y = 23$

$-y = 23 - 26$

$+y = +3$

$y = 3$

By Placing $y = 3$ into eq (1)

$x = \frac{13-3y}{2}$

$x = \frac{13-3\times3}{2}$

$x = \frac{13-9}{2}$

$x = 2$

(v) $\sqrt{2}x + \sqrt{3}y = 0$

$\sqrt{3}x - \sqrt{8}y = 0$ — (2)

Soln = $\sqrt{2}x + \sqrt{3}y = 0$ — (1)

$\sqrt{2}x = -\sqrt{3}y$

$x = -\sqrt{\frac{3}{2}}y$ — (3)

From eq (2) and eq (3)

$\sqrt{3}\left[-\frac{\sqrt{3}}{\sqrt{2}}y\right] - \sqrt{8}y = 0$

$\frac{3}{\sqrt{2}}y - \sqrt{8}y = 0$

$\sqrt{2} \times \frac{3}{\sqrt{2}}y - \sqrt{8} \times \sqrt{2}y = 0$

$3y - 4y = 0$

$-y = 0$

$\boxed{y = 0}$

by placing $y = 0$ into eq. (3)

$$x = -\sqrt{\frac{3}{2}} \times y$$

$x = 0$

$x = 0, y = 0$ are the solution of given eq.

(vi) $\frac{3x}{2} - \frac{5y}{3} = -2$ — (1)

$\frac{x}{3} + \frac{y}{2} = \frac{13}{6}$ — (2)

$9x - 10y = -12$ — (3)

$2x + 3y = 13$ — (4)

$x = \frac{13 - 3y}{2}$

By subs the value of x in eq (3)

$9x - 10y = -12$

$9\left[\frac{13-3y}{2}\right] - 10y = -12$

$x = \frac{13-3y}{2}$

$x = \frac{13-3\times3}{2}$

$x = \frac{13-9}{2}$

$x = 2$

$2\left[\frac{117-27y}{2}\right] - 20y = -24$

$117 - 27y - 20y = -24$

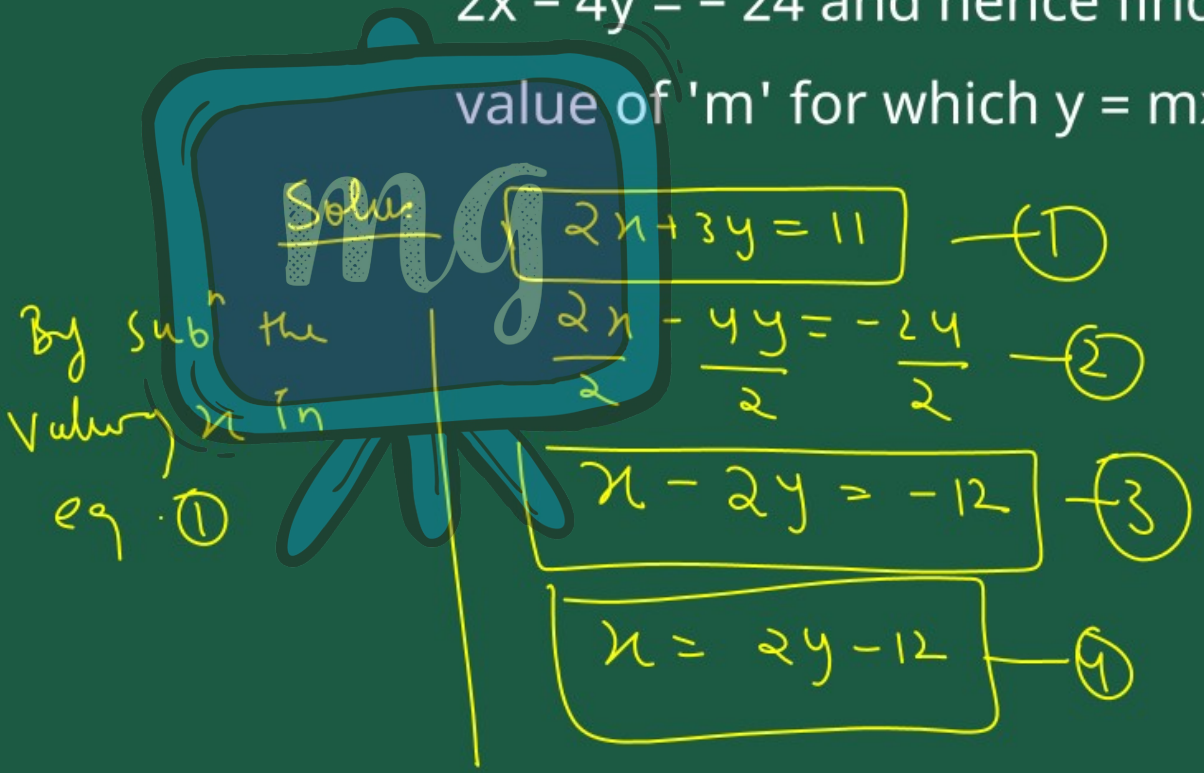
$117 - 47y = -24$

$117 + 24 = 47y$

$141 = 47y$

$3 = y$

2. Solve $2x + 3y = 11$ and $2x - 4y = -24$ and hence find the value of 'm' for which $y = mx + 3$.



$$2x + 3y = 11$$

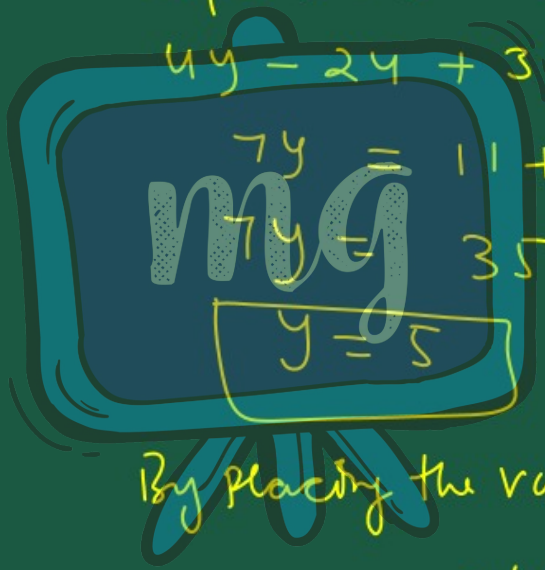
$$2(2y - 12) + 3y = 11$$

$$4y - 24 + 3y = 11$$

$$7y = 11 + 24$$

$$7y = 35$$

$$\boxed{y = 5}$$



By placing the value of y in eq. (4)

$$x = 2(5) - 12$$

$$x = 10 - 12$$

$$\boxed{x = -2}$$