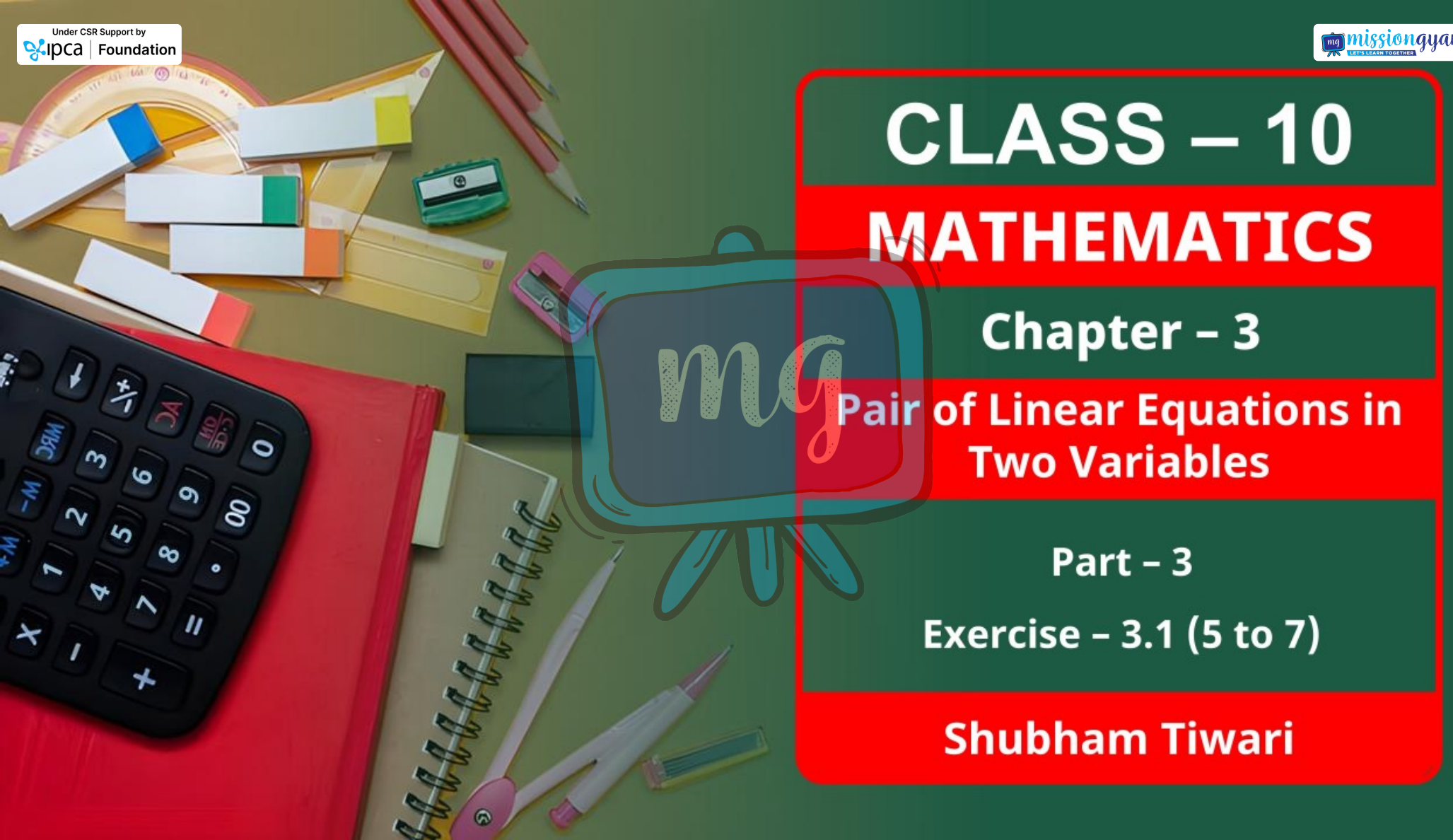


CLASS – 10

MATHEMATICS

Chapter – 3

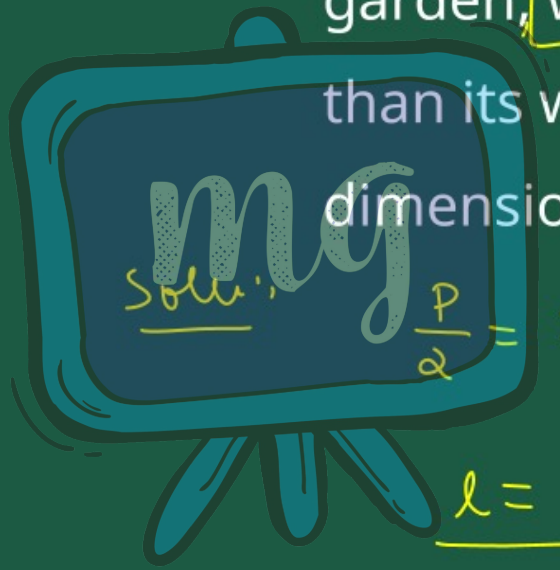
Pair of Linear Equations in Two Variables

Part – 3

Exercise – 3.1 (5 to 7)

Shubham Tiwari

5. Half the perimeter of a rectangular garden, whose length is 4m more than its width, is 36m. Find the dimensions of the garden.



Solu:,

$\frac{P}{2} = 36$ — (1)

$l = w + 4$ — (2)

let length be x and width be y - -

$$\frac{P}{2} = \frac{2(x+y)}{2} = 36$$

$$x + y = 36 \quad \text{—— (3)}$$

$$x - y = 4 \quad \text{—— (4)}$$

$x + y = 36$

$x = 36 - y$

x	20	16	12
y	16	20	24

$x - y = 4$

$x = 4 + y$

x	8	12	16
y	4	8	12

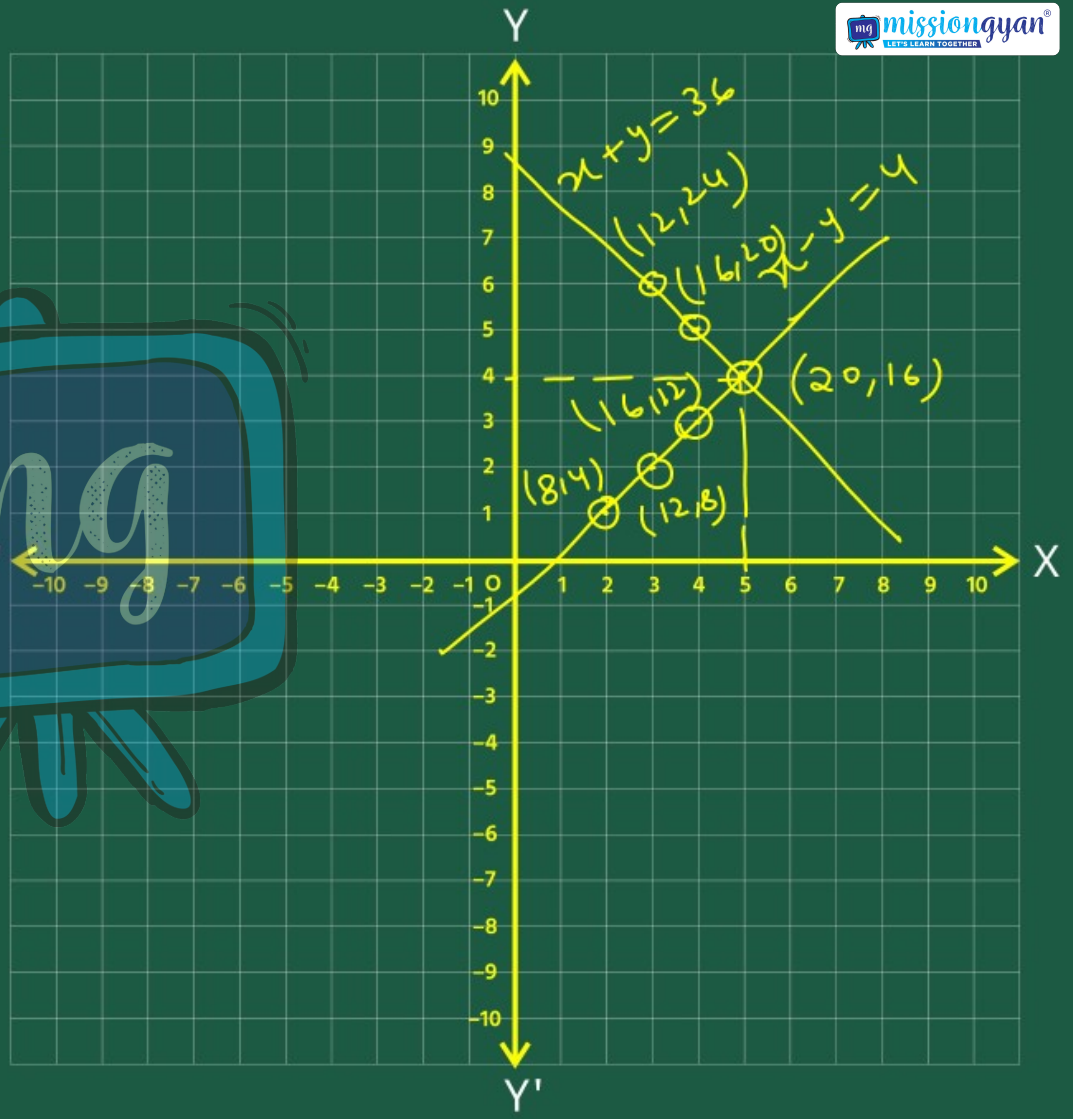
1 - unit = 4m.

Point of intersection (20, 16)

$x = 20$ m.

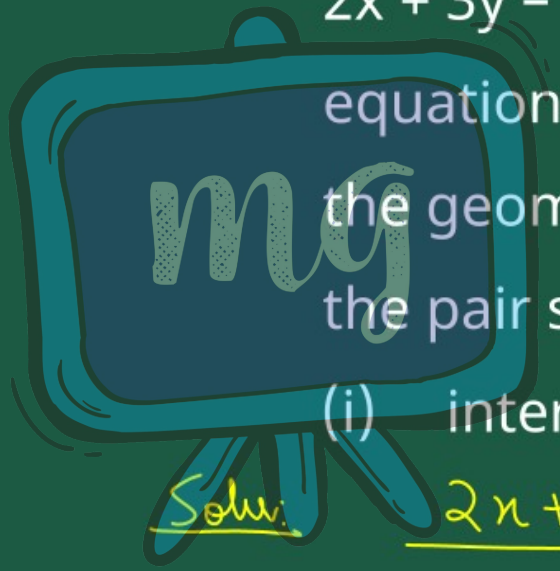
$y = 16$ m.

Hence the dimensions of the Rectangular garden is 20m and 16m.



6. Given the linear equation $2x + 3y - 8 = 0$, write another linear equation in two variables such that the geometrical representation of the pair so formed is :

(i) intersecting lines



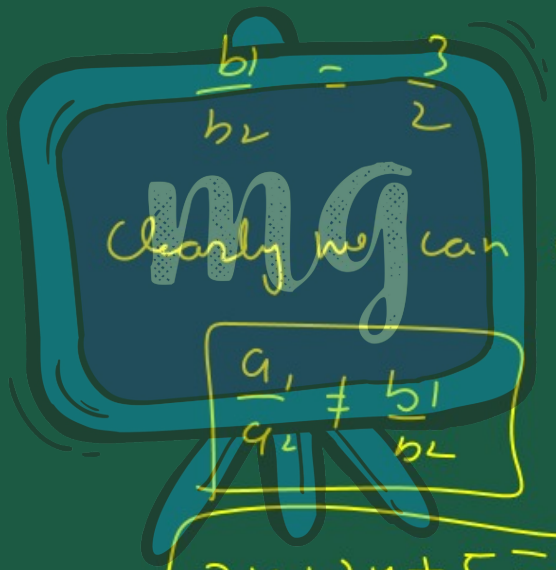
Solu: $2x + 3y - 8 = 0$

From the eq. $a_1 = 2,\ b_1 = 3,\ c_1 = -8$

let assume $a_2 = 3,\ b_2 = 2,\ c_2 = 5$

$$\frac{a_1}{a_2} = \frac{2}{3}$$

$$\frac{b_1}{b_2} = \frac{3}{2}$$



Clearly we can say that

$$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$$

$$3x + 2y + 5 = 0$$

This line will form intersecting lines with the given line.

(ii) parallel lines

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

$$2x + 3y - 8 = 0$$

from the eq. we have: $a_1 = 2, b_1 = 3, c_1 = -8$

Let assume $a_2 = 4, b_2 = 6, c_2 = 9$

$$\frac{a_1}{a_2} = \frac{2}{4}, \quad \frac{b_1}{b_2} = \frac{3}{6}, \quad \frac{c_1}{c_2} = \frac{-8}{9}$$

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

Hence the equation

$4x + 6y + 9 = 0$

will form parallel line with the given eg. on the graph.

(iii) coincident lines

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

$$2x + 3y - 8 = 0$$

From the eq $a_1 = 2,\ b_1 = 3,\ c_1 = -8$

Let another $a_2 = 4,\ b_2 = 6,\ c_2 = -16$

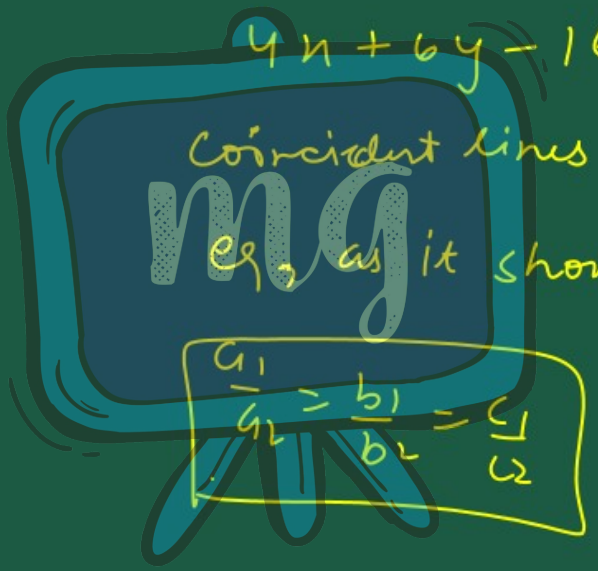
Now, $\frac{a_1}{a_2} = \frac{2}{4} = \frac{1}{2}$ | $\frac{b_1}{b_2} = \frac{3}{6} = \frac{1}{2}$ | $\frac{c_1}{c_2} = \frac{-8}{-16} = \frac{1}{2}$

Clearly the equation

$4x + 6y - 16 = 0$ will form

Coincident lines with the given

eq, as it shows.



7. Draw the graphs of the equations $x - y + 1 = 0$ and $3x + 2y - 12 = 0$ Determine the coordinates of the vertices of the triangle formed by these lines and the x–axis, and shade the triangular region.

Sol: $x - y + 1 = 0$ | $3x + 2y - 12 = 0$

$x + 1 = y$

x	0	1	2
y	1	2	3

$2y = 12 - 3x$

$$y = \frac{12 - 3x}{2}$$

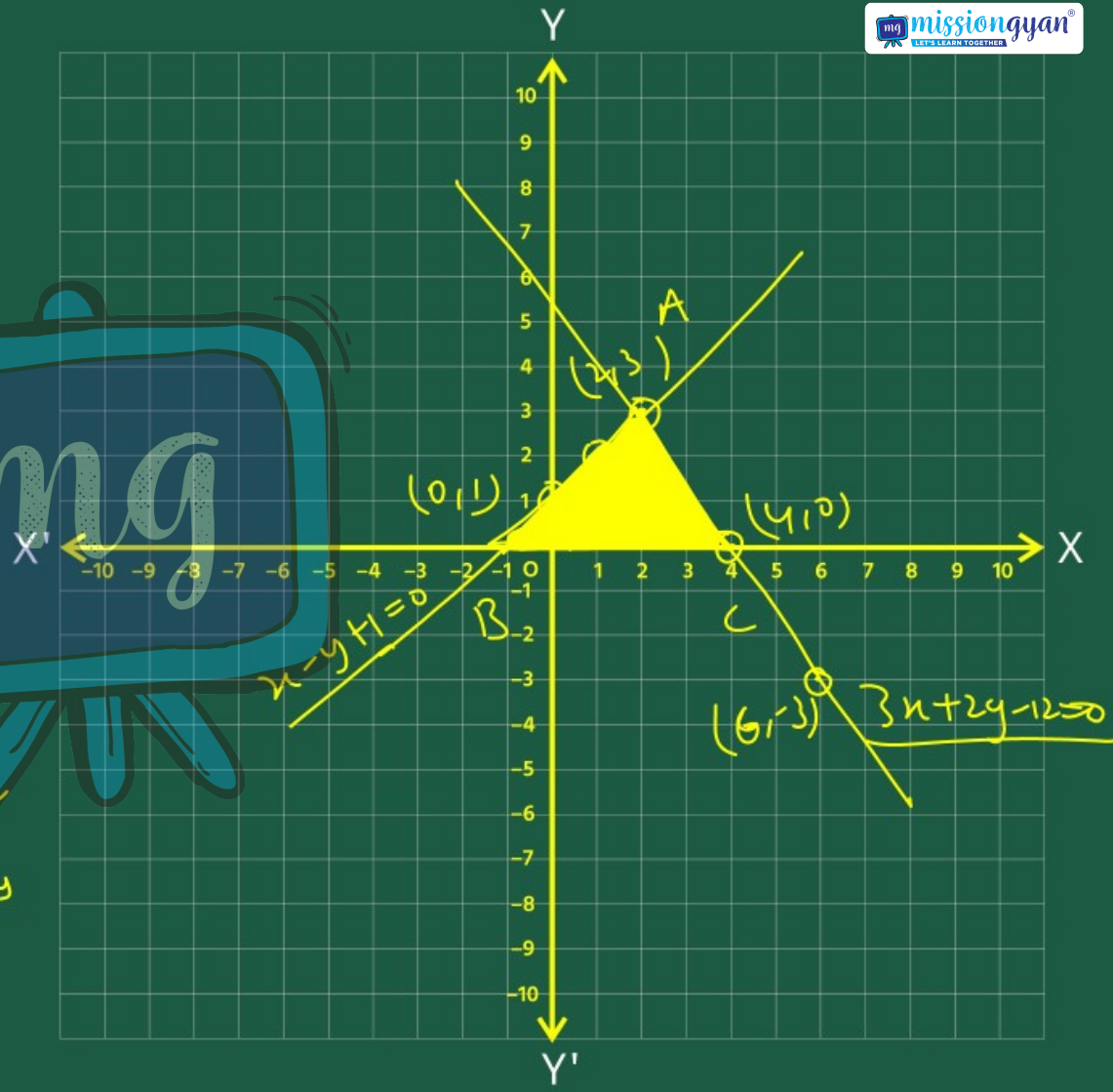
x	2	4	6
y	3	0	-3

The lines are intersecting at (2, 3)

Hence the solution of the given eq. are

$x = 2, y = 3$

The Triangle formed between the two lines and the x-axis is



$\triangle ABC$ such that

$A(2,3)$, $B(-1,0)$, $C(4,0)$