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PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

PPT3

SUBJECT : MATHEMATICS
CHAPTER NUMBER: 03
CHAPTER NAME : PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

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PREVIOUS KNOWLEDGE TEST

•**Consistent system.** A system of linear equations is said to be consistent if it has at least one solution.

•**Inconsistent system.** A system of linear equations is said to be inconsistent if it has no solution.

• The general form of a pair of linear equations is: $a_1x + b_1y + c_1 = 0$; $a_2x + b_2y + c_2 = 0$
where a_1, a_2, b_1, b_2, c_1 and c_2 are real numbers, such that $a_1^2 + b_1^2 \neq 0$, $a_2^2 + b_2^2 \neq 0$.

•A pair of values of variables 'x' and 'y' which satisfy both the equations in the given system of equations is said to be a solution of the simultaneous pair of linear equations.

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Learning outcome

- Students will be able to find solution of a pair of linear equations graphically

- Students will be able to draw the graph of a pair of linear equations in two variables

Students will be able to know the conditions for consistency and apply the conditions in drawing graphs.

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. Ist equation is $x - y + 1 = 0$.

Table for 1st equation $x = y - 1$

Table is

x	0	1	-2	2
y	1	2	-1	3

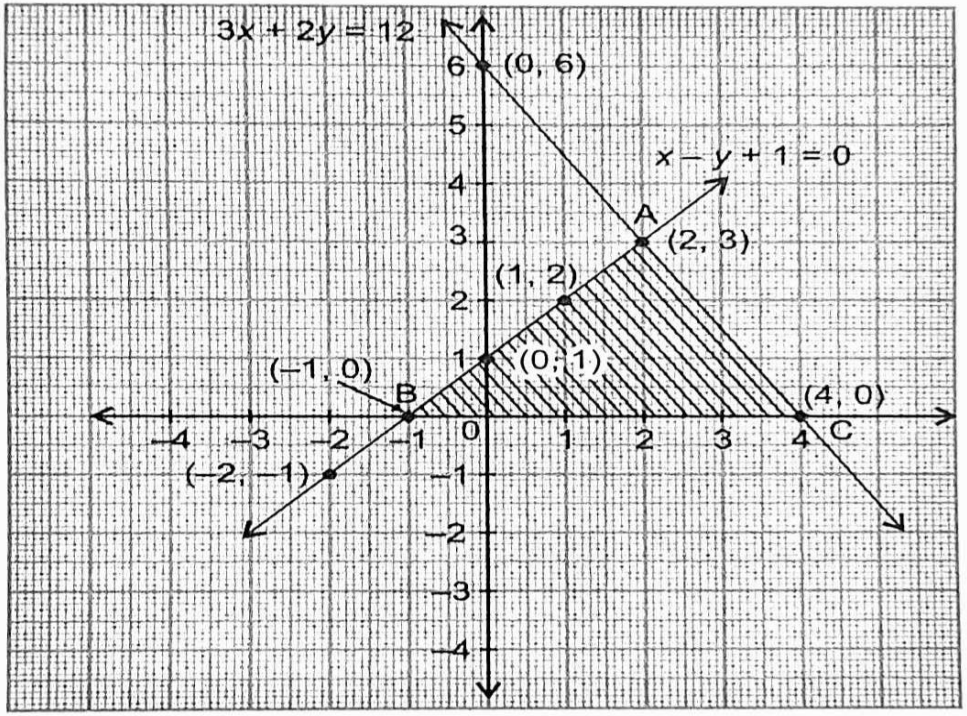
2nd equation is $3x + 2y = 12$

$\Rightarrow 3x = 12 - 2y \Rightarrow x = \dfrac{12 - 2y}{3}$

Table is

x	4	2	0
y	0	3	6

Required triangle is ABC. Coordinates of its vertices are $A(2, 3)$, $B(-1, 0)$, $C(4, 0)$.



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

https://youtu.be/2VSufdxWMFw

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

Sol. Let length of garden $= x$ m and width of garden $= y$ m

$\therefore$ Perimeter of rectangular garden $= 2(x + y)$

A.T.Q.

Ist Condition:

$$\frac{2(x+y)}{2} = 36 \quad \Rightarrow \quad x + y = 36 \qquad \ldots (i)$$

2nd Condition:

$$x = y + 4 \Rightarrow x - y = 4 \qquad \ldots (ii)$$

Adding equation (i) and (ii), we get

$$2x = 40 \quad \Rightarrow \quad x = 20$$

Putting $x = 20$ in equation (i), we get

$$20 + y = 36$$

$$y = 16$$

Hence, dimensions of the garden are 20 m and 16 m.

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 (ii) parallel lines (iii) coincident lines.
https://youtu.be/DZfQEZYPnBY

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

(*ii*) parallel lines

(*iii*) coincident lines

Sol. Given equation is $2x + 3y - 8 = 0$

We have $2x + 3y = 8$ ... (*i*)

Let required equation be $ax + by = c$ ... (*ii*)

Condition:

(*i*) For intersecting lines

$\frac{2}{a} \neq \frac{3}{b} \neq \frac{8}{c}$, where a, b, c can have any value which satisfy the above condition.

Let $a = 3, b = 2, c = 4$

So, $\frac{2}{3} \neq \frac{3}{2} \neq \frac{8}{4}$

$\therefore$ Equations are $2x + 3y = 8$ and $3x + 2y = 4$

Equations $2x + 3y = 8$ and $3x + 2y = 4$ have unique solution and their geometrical representation shows intersecting lines.

(*iii*) For coincident lines:

Given equation is $2x + 3y = 8$

Let required equation be $ax + by = c$

For coincident lines.

$$\frac{a}{2} = \frac{b}{3} = \frac{c}{8}$$

So, a, b, c can have any possible value which satisfy the above condition.

Let $a = 2, b = 3, c = 8$

$\therefore$ Equation will be $2x + 3y = 8$.

Equations $2x + 3y = 8$ and

$2x + 3y = 8$ have infinitely many solutions and their geometrical representation shows coincident lines.

Home assignment

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- **Ex. 3.2 Q. 4 to 7 & AHA**
  Represent the following pair of equations graphically and write the coordinates of points where the lines intersect y-axis X+ 3Y= 6, 2X – 3Y =12

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