



PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

Graphical Method

1 CHAPTER SNAPSHOT

This topic covers:

- Pair of linear equations in two variables
- Graphical representation of linear equations
- Finding points using a value table
- Plotting two straight lines
- Finding the solution from the point of intersection
- Interpreting intersecting, parallel and coincident lines

Standard form:

$$a_1x + b_1y + c_1 = 0$$

$$a_2x + b_2y + c_2 = 0$$



Key Idea:

The common point of the two lines gives the solution of the pair.

2 KEY CONCEPTS

★ Linear Equation in Two Variables

An equation of the form $ax + by + c = 0$.

★ Graph of a Linear Equation

The graph of a linear equation in two variables is a straight line.

★ Solution of a Pair

A solution is an ordered pair (x, y) that satisfies both equations.

★ Graphical Solution

The coordinates of the point where the two lines intersect give the solution.

3 GRAPHICAL METHOD — STEP BY STEP

- 1 Write the two equations.
- 2 Choose suitable values of x .
- 3 Find the corresponding values of y .
- 4 Prepare a table of ordered pairs.
- 5 Plot the points on the coordinate plane.
- 6 Join the points to form the two straight lines.
- 7 Observe the relationship between the two lines.
- 8 Read the coordinates of their common point, if it exists.

Example

$$2x + y = 8 \quad \text{and} \quad x - y = 1$$

For $2x + y = 8$

x	0	2	4
y	8	4	0

For $x - y = 1$

x	1	2	3
y	0	1	2

The two lines intersect at $(3, 2)$.

So, the solution is $x = 3, y = 2$.

4 INTERPRETING THE GRAPH

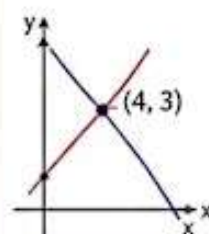
Graphical representation	Number of solutions	Interpretation
Intersecting lines 	One	Unique solution
Coincident lines 	Infinitely many	Infinitely many solutions
Parallel lines 	None	No solution

- ★ Remember:
- One intersection → One solution
 - Same line → Infinitely many solutions
 - Parallel lines → No solution

5 HOW TO READ THE SOLUTION FROM A GRAPH

Intersecting lines

If the lines meet at (x_1, y_1) , then $x = x_1, y = y_1$ is the solution.



Example:

If two lines intersect at $(4, 3)$,
Solution = $(4, 3)$

Always write the solution as an ordered pair.

6 GRAPHING SMARTLY

- ✓ Choose at least two convenient points for each equation.
- ✓ Use a suitable and uniform scale on both axes.
- ✓ Label the axes as x and y .
- ✓ Plot points carefully.
- ✓ Extend the lines sufficiently to identify their intersection.
- ✓ Mark the common point clearly.
- ✓ Read the coordinates carefully.



Quick tip:

Choose x -values that make calculating y easy.

7 COMMON QUESTION TYPES

- 1 Plot the graphs of two linear equations.
- 2 Find the solution graphically.
- 3 Identifying the number of solutions from a given graph.
- 4 Identify whether the lines are intersecting, parallel or coincident.
- 5 Read the coordinates of the point of intersection.
- 6 Verify the graphical solution by substituting the coordinates in both equations.

8 VISUAL MEMORY AID

PAIR OF LINEAR EQUATIONS

Intersecting	Coincident	Parallel
Unique solution	Infinitely many solutions	No solution



Memory rule:

Meet once → One
Meet everywhere → Infinite
Never meet → None

9 30-SECOND RAPID REVISION

- » A linear equation in two variables represents a straight line.
- » Make a table of values to obtain points.
- » Plot at least two points and join them.
- » Plot both equations on the same coordinate plane.
- » The intersection point → solution.
- » Intersecting lines → one solution.
- » Coincident lines → infinitely many solutions.
- » Parallel lines → no solution.

10 KEY TAKEAWAY

Graphical Method =
Plot → Observe →
Intersect → Read

- ★ The coordinates of the common point of two lines give the solution of the pair of linear equations.

Remember:

Intersecting → Unique
Coincident → Infinite
Parallel → None