

# Pair of Linear Equations in Two Variables

CBSE Class 10 Maths · Knowledge organiser

## KEY DEFINITIONS

### Pair of linear equations

Two linear equations in the same two variables, each a straight line.

### Consistent

The pair has at least one solution: the lines meet or coincide.

### Inconsistent

The pair has no solution: the lines are parallel.

## KEY FORMULAS

$$a_1x + b_1y + c_1 = 0, a_2x + b_2y + c_2 = 0$$

Unique solution (lines intersect)

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

No solution (parallel, inconsistent)

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

Infinitely many (coincident)

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

Solve by substitution or elimination; consistent = at least one solution

## YOU SHOULD BE ABLE TO...

- Solve a pair of equations by substitution or elimination and tell from the ratios whether lines meet, are parallel or coincide.
- Find  $k$  for a given number of solutions, solve by the graph, and turn a board-style word problem into two equations.
- Produce neat graphs with labelled lines and complete word-problem solutions that define variables and state the final answer.
- Handle consistency questions with two unknowns, clever combinations of the solution and the slightly unusual word problems that separate 95+ scripts.

## WORKED EXAMPLE

Solve  $4x + 3y = 18$ ,  $2x - y = 4$ . From the second,  $y = 2x - 4$ ; then  $4x + 6x - 12 = 18 \Rightarrow x = 3$ ,  $y = 2$ .

## COMMON MISTAKES

- ✗ Comparing only  $a$  and  $b$  ratios and forgetting  $c$  when deciding between parallel and coincident.
- ✗ Sign errors when subtracting equations; check the answer in *both* original equations.
- ✗ “Consistent” means at least one solution — not necessarily a unique one.
- ✗ In graphs: unlabelled axes/lines, or too few points plotted.