

Point of Intersection



Key idea

The intersection is where both lines share the same x and y . Algebra finds it exactly.

Method

1. Set both y -expressions equal.
2. Solve for x .
3. Substitute back to find y .
4. Write the point as (x, y) .

Example

Solve $y = x + 2$ and $y = 5 - x$.

Equal: $x + 2 = 5 - x \Rightarrow 2x = 3 \Rightarrow x = 1.5$.

Then $y = 3.5$. Point: $(1.5, 3.5)$.

Common mistake

Do not stop after finding x . You still need y for the point.

 = **copy this into your book.** Boxes without a pencil are just to read.

Intersection by Substitution



Key idea

When one equation gives y (like $y = x - 1$), **substitute** it into the other to get one equation in x .

Example

Solve $2x + y = 11$ and $y = x - 1$.
Sub in: $2x + (x - 1) = 11 \Rightarrow 3x = 12 \Rightarrow x = 4$.
Then $y = 3$. Point: $(4, 3)$.

What it means

If two phone plans meet at $(30, 24)$, then at 30 minutes both plans cost \$24.

Common mistake

A small sign error changes the answer. Substitute carefully and check the point works in **both** equations.