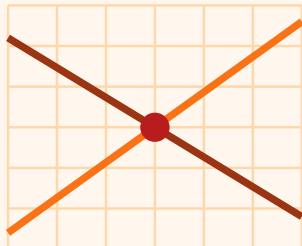


Systems of Equations

9th Grade

Graphing, substitution and elimination side by side, plus what 'no solution' looks like.

GRAPHING — where the lines cross



The solution is the point that satisfies both equations — where the two graphs meet.

Good for a check; poor for exact answers.

SUBSTITUTION — when one variable is already alone

$$y = 2x + 1 \text{ and } 3x + y = 11$$

1. Replace y : $3x + (2x + 1) = 11$
2. Solve: $5x + 1 = 11 \rightarrow x = 2$
3. Back-substitute: $y = 2(2) + 1 = 5$

Solution: (2, 5)

ELIMINATION — when the terms line up

$$2x + 3y = 12 \text{ and } 2x - y = 4$$

1. Subtract the equations: $4y = 8 \rightarrow y = 2$
2. Substitute back: $2x - 2 = 4 \rightarrow x = 3$

If nothing cancels, multiply one equation through first.

Solution: (3, 2)

HOW MANY SOLUTIONS?

One

lines cross

different slopes

None

parallel lines

same slope, different intercept

Infinite

the same line

same slope, same intercept