Interactive Lesson: Solving Simultaneous Equations by Elimination

Master the elimination method through step-by-step guidance, real-world examples, and interactive practice problems designed to build your confidence in solving simultaneous equations.

What Are Simultaneous Equations?

Two Equations, Two Unknowns

Simultaneous equations are pairs of equations containing two variables (like x and y) that must be solved together to find unique values.

Real-World Connection

Think of buying apples and bananas with a fixed budget - you need both prices to determine how many of each fruit you can afford.

Why Choose the Elimination Method?
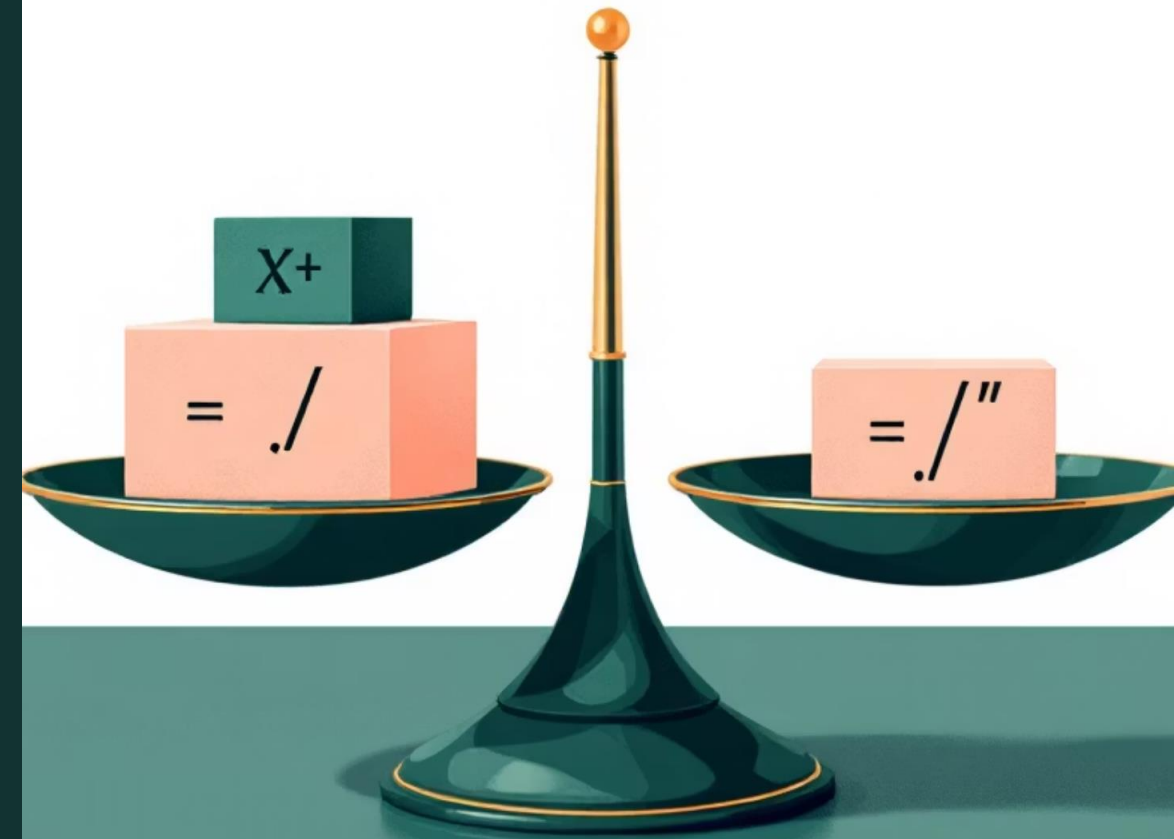
01

Strategic Variable Removal

Elimination systematically removes one variable, making the problem simpler to solve than substitution in many cases.

02

Clear Problem-Solving Path

Think of it as "canceling out" one unknown to solve the puzzle - like removing one weight from balanced scales to focus on the other.

Step 1: Write Equations in Standard Form

Organize your equations with variables and constants properly aligned for easy manipulation.

Example Setup

$3x + 2y = 17$

$4x - y = 30$

Alignment Check

Ensure x-terms, y-terms, and constants are vertically aligned for clear visualization of the elimination process.

$+ X = + 2$

Step 2: Make Coefficients Opposite

Multiply one or both equations to create matching coefficients with opposite signs for the variable you want to eliminate.

1	2

Original Second Equation

4x – y = 30

Multiply by 2

8x – 2y = 60

Now the y-coefficients are +2y and –2y, perfect for elimination!

Step 3: Add or Subtract to Eliminate

Combine the equations strategically - add when coefficients have opposite signs, subtract when they're the same.
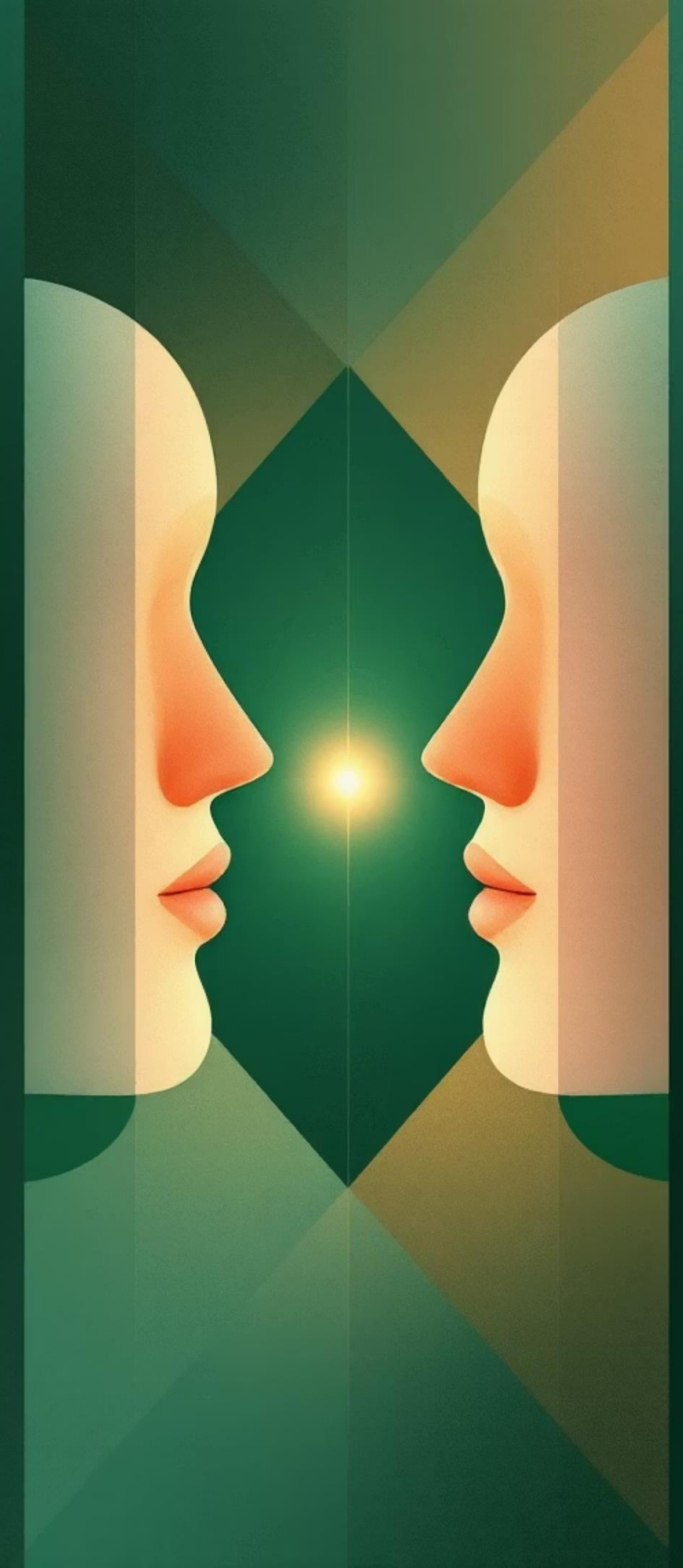
Addition Process	Y-Terms Cancel
$(3x + 2y) + (8x - 2y) = 17 + 60$	$11x + 0y = 77$
Simplified Result	
$11x = 77$	

Step 4: Solve for the Remaining Variable

1 —— Find x

$11x = 77 \rightarrow x = 7$

2 —— Substitute Back

$3(7) + 2y = 17$

3 —— Solve for y

$21 + 2y = 17 \rightarrow y = -2$

4 —— Final Answer

$x = 7, y = -2$

Real-Life Practice Scenario

Apply elimination to solve practical problems that mirror everyday decision-making.

> ## The Shopping Problem
>
> You buy 3 apples and 2 bananas for $17. Your friend buys 4 apples and 1 banana for $30. What's the price of each fruit?
>
> Use our elimination steps: Let x = apple price, y = banana price

This gives us the same equations we just solved: apples cost $7 each, but bananas have a negative price - time to check our work!

Common Mistakes & Pro Tips

Sign Management

Pay careful attention to positive and negative signs when adding or subtracting equations - one wrong sign ruins everything!

Always Verify

Substitute your final answers back into both original equations to confirm they work - this catches calculation errors.

Choose Wisely

Pick the variable with simpler coefficients to eliminate first - it reduces the chance of messy fractions.

Master the Method: Your Elimination Flowchart

01

Standard Form

Align variables and constants

02

Match Coefficients

Create opposite coefficients

03

Eliminate Variable

Add or subtract equations

04

Solve & Check

Find both variables and verify

Ready for the challenge? Try solving this system: $2x + 3y = 13$ and $5x - y = 7$. Use elimination to find x and y!