

Solving systems



Substitution

when one equation gives a variable on its own

- 1 start: $y = 2x$ and $x + y = 9$
- 2 put $2x$ in place of y : $x + 2x = 9$
- 3 $3x = 9$, so $x = 3$
- 4 then $y = 2 \cdot 3 = 6$

Solution: (3, 6)

Elimination

when adding or subtracting cancels a variable

- 1 start: $x + y = 7$ and $x - y = 3$
- 2 add the two: $2x = 10$ (the y 's cancel)
- 3 $x = 5$
- 4 then $5 + y = 7$, so $y = 2$

Solution: (5, 2)

A solution makes both equations true at once. Substitution swaps one equation into the other; elimination adds or subtracts them to drop a variable. Parallel lines share no solution; one line written twice has infinitely many.