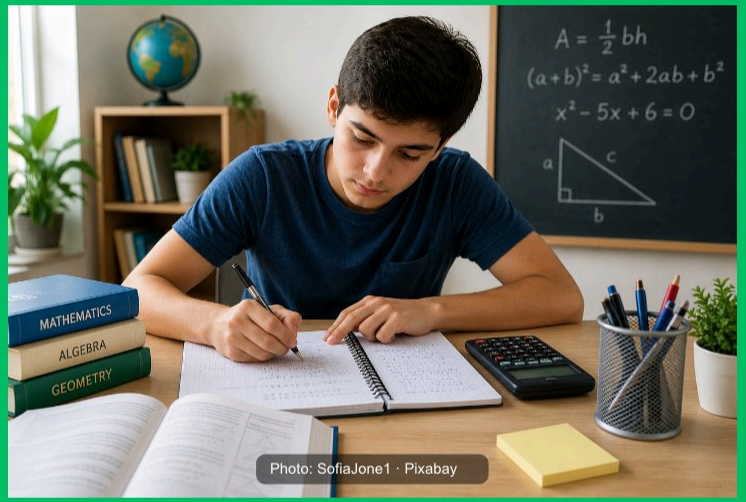
Solving Linear Equations: Find x

Keep it balanced and uncover the mystery number

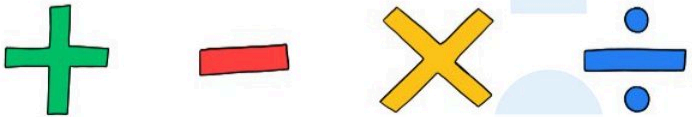


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What could this be?

Both sides stay level.
Take one thing off.
What must you do?





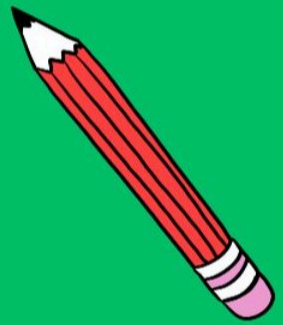
$a^2+b^2=c^2$

How We Solve

- Undo with opposite operations
- Move x-terms together
- One, none, or many answers

Solve for x

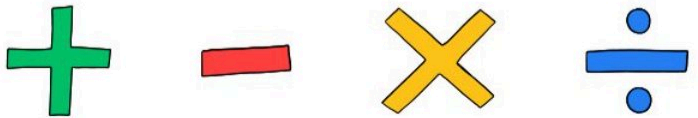
- Simplify each side first
- Check by plugging back



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Keep It Balanced

- Do the same thing to both sides.
- Undo added numbers with subtraction.
- Undo multiplied numbers with division.
- Check answer by plugging back in.



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$a^2+b^2=c^2$

Think, pair, share

If 3x + 2 = 14, what would you undo first? Why?





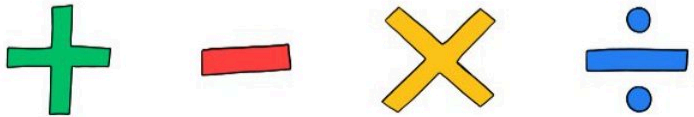
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Two Steps to x



▶ 0:00 – 4:30

- Spot which operation gets undone first
- Listen for keeping both sides balanced



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$a^2+b^2=c^2$

Three Possible Endings

🎯

One solution

Ends as x = a, like x = 3.

🚫

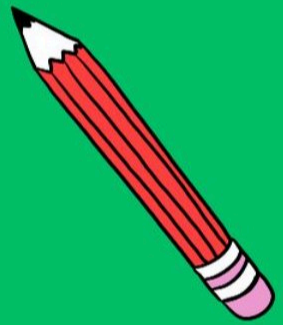
No solution

Ends as 5 = 6, impossible.

∞

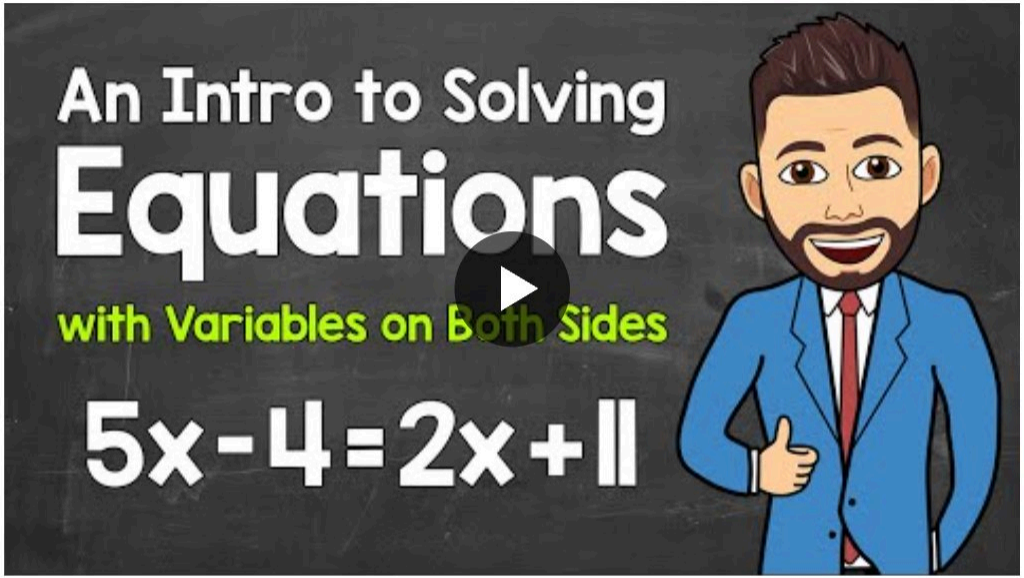
Infinitely many

Ends as 4 = 4, always true.



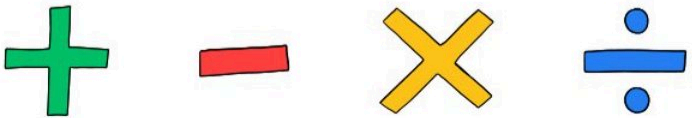
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x on Both Sides



▶ 0:00 – 4:40

- Watch how x-terms move to one side
- Watch combining like terms after distributing



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$a^2+b^2=c^2$

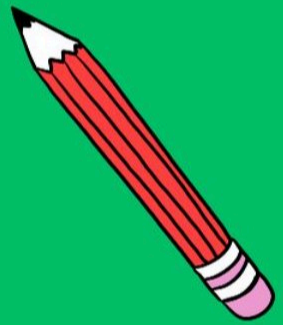
Your task

In pairs, solve 4 equations and check each answer by plugging back.

1. Solve: 2(x + 3) = 16; 5x - 4 = 3x + 8
2. Solve: x/2 + 5 = 11; 3(2.5 - 2x) = 5 - 6x
3. Label each: one, none, or many solutions

10 min

In pairs



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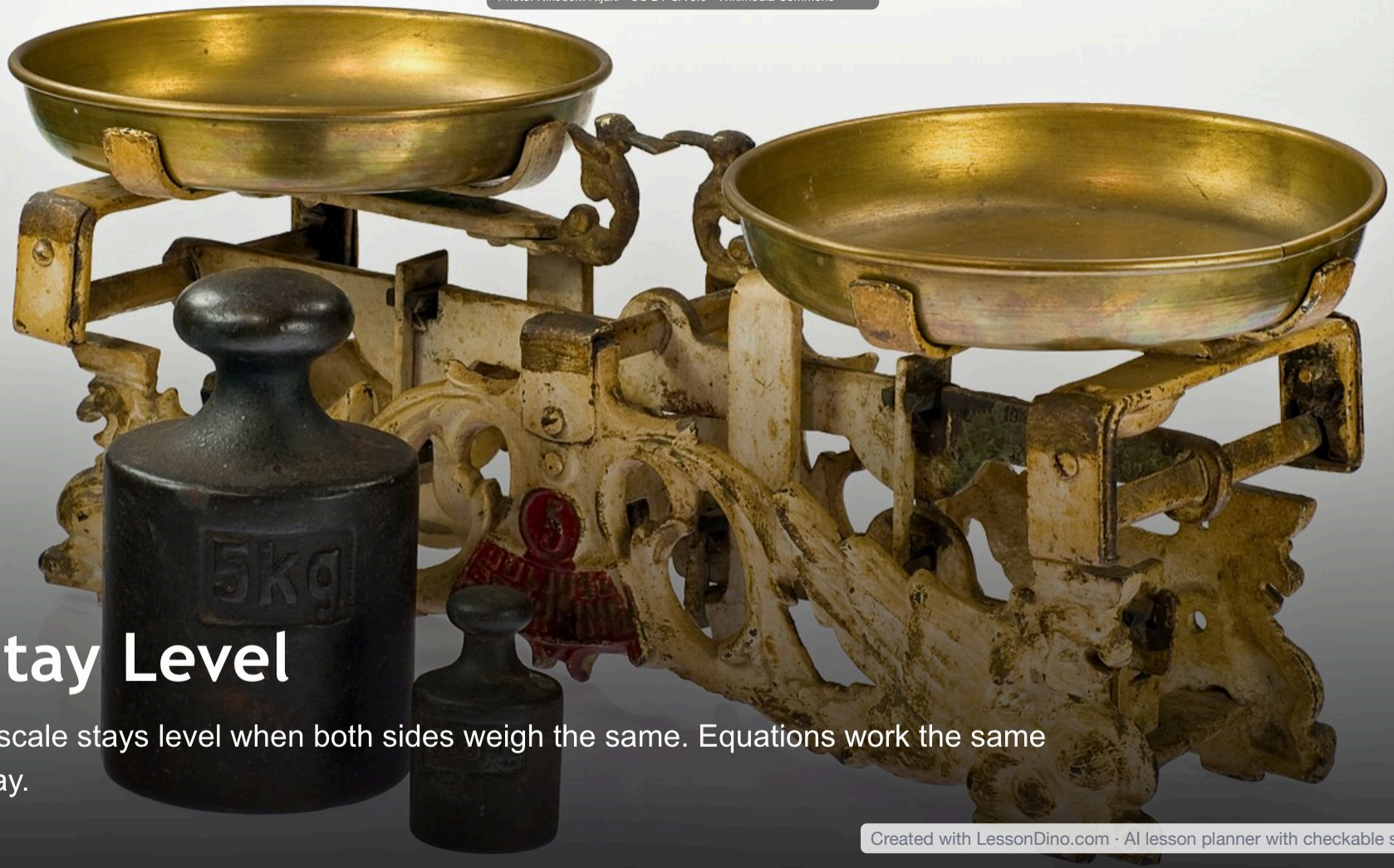


Photo: Nikodem Nijaki · CC BY-SA 3.0 · Wikimedia Commons

Stay Level

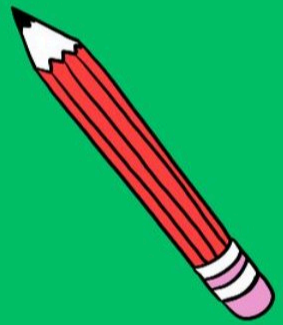
A scale stays level when both sides weigh the same. Equations work the same way.

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$a^2+b^2=c^2$

Your First Move?

When x is on both sides, what is your favorite first move?



- **A** Move the smaller x-term first
- **B** Move all numbers first
- **C** Simplify and distribute first

Vote with your hands, then explain why.

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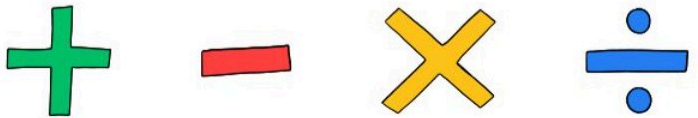
True or false?

2(x + 3) = 14 solves to x = 4.

3x + 5 = 3x + 9 has no solution.

You can add different things to each side.

2x / 3 = 8 solves to x = 12.



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