Right Triangles, Solved

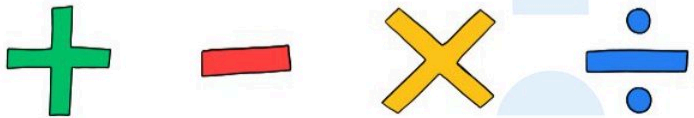
Use Pythagoras and ratios to crack them

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What could this be?

A ladder is 3 m out, 4 m up. How long is it?





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

The big idea in 30 seconds

- Right-angled triangle has one 90° angle.
- Longest side opposite it is hypotenuse.
- $a^2 + b^2 = c^2$ always works here.

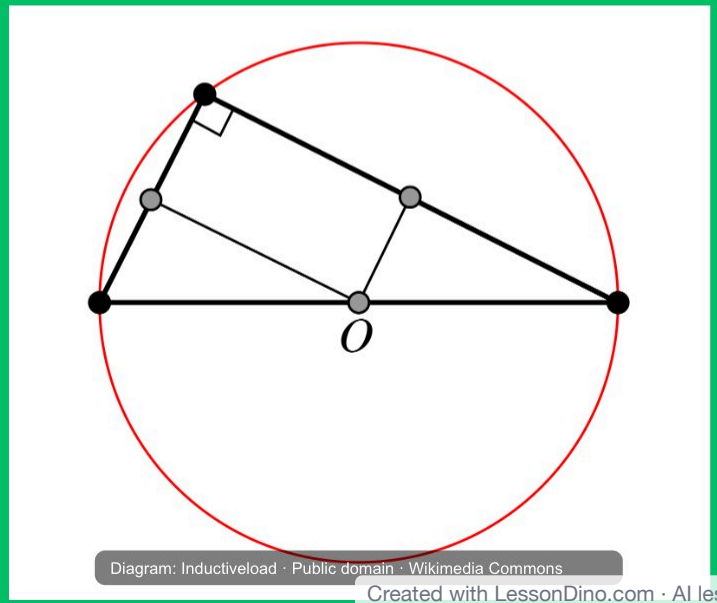
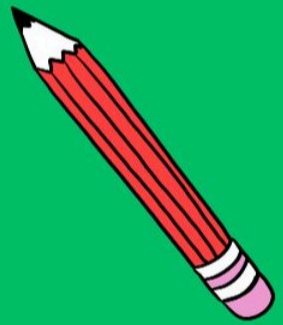


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Four jobs you can do

Find hypotenuse

Square the shorter sides, add, then square root.

Find shorter side

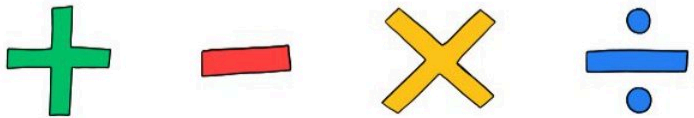
Square hypotenuse, subtract, then square root.

Check right angle

Does $a^2 + b^2$ equal c^2? Then it is right-angled.

Use similar twin

Same angles means sides share the same ratios.



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

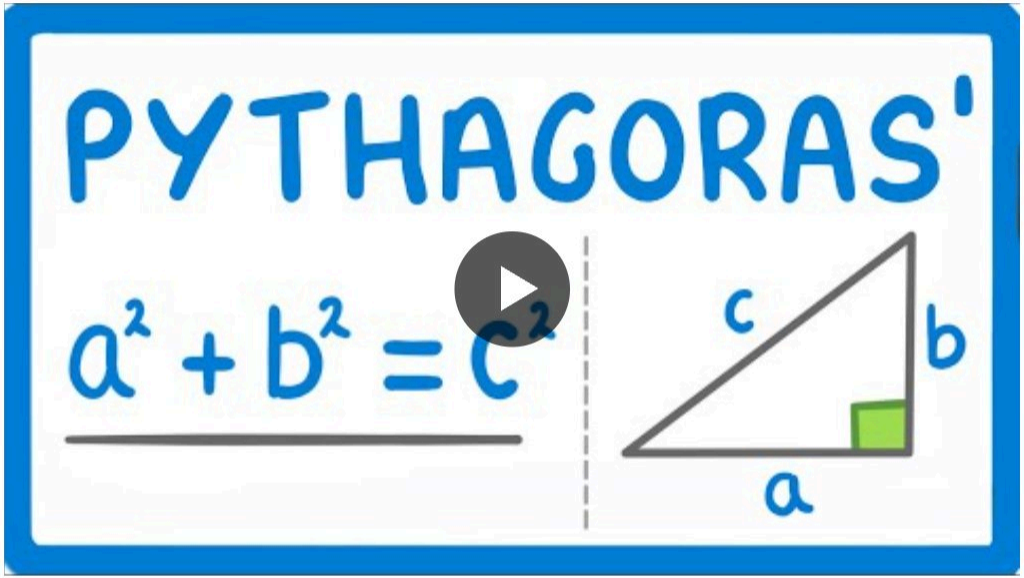
Think, pair, share

Two right-angled triangles have angles 90°, 37°, 53°. What will match?



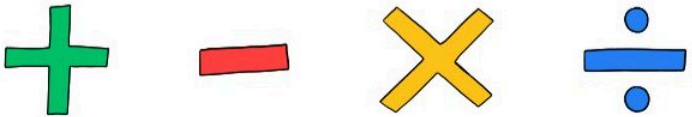
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Watch: finding missing sides



▶ 0:00 – 4:45

- Spot the right angle and hypotenuse first.
- Notice when to add or subtract squares.



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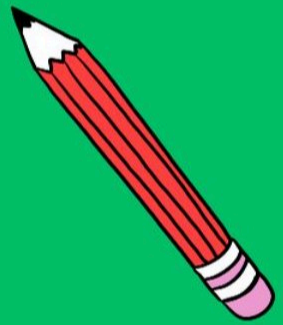
$a^2+b^2=c^2$

Link it together

- $a^2 + b^2 = c^2$
- similar = same angles
- ratio finds missing sides

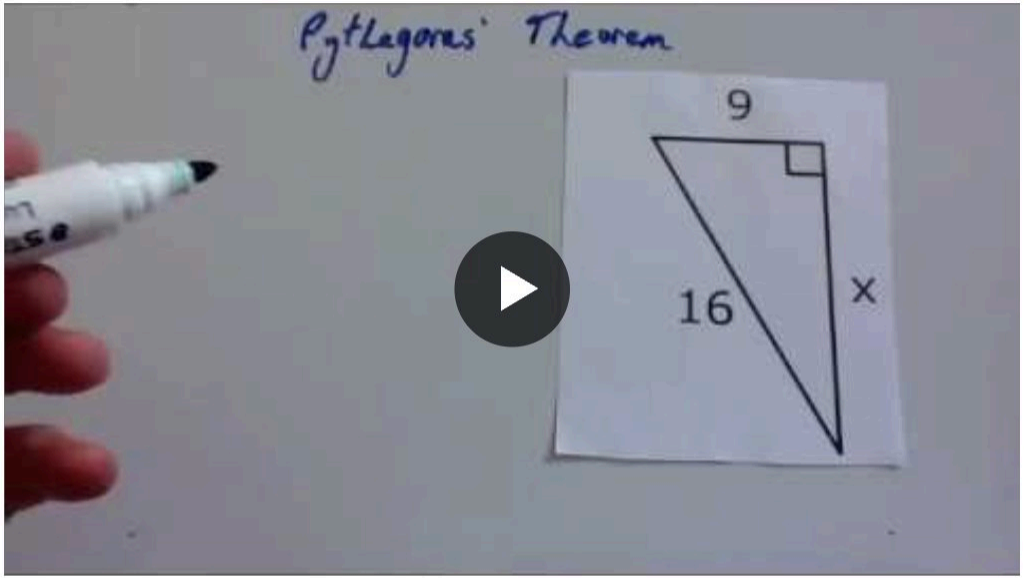
Right triangle

- hypotenuse = longest
- sides in same proportion



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Watch: worked examples



▶ 0:00 – 5:00

- How similar triangles give same ratios.
- How to pick the matching sides.

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

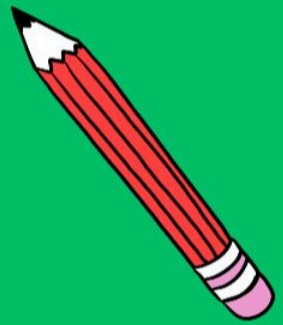
Your task

In pairs, solve four right-angled triangle problems using Pythagoras and similar-triangle ratios.

1. Sketch each triangle, mark right angle and hypotenuse.
2. Choose Pythagoras or matching ratios from the similar twin.
3. Calculate, then check with an estimate.

10 min

In pairs



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Key words

hypotenuse

longest side, opposite the right angle.

similar

same shape, same angles, sides in proportion.

perpendicular

meets at 90°, like wall and floor.

ratio

comparison of two lengths by division.

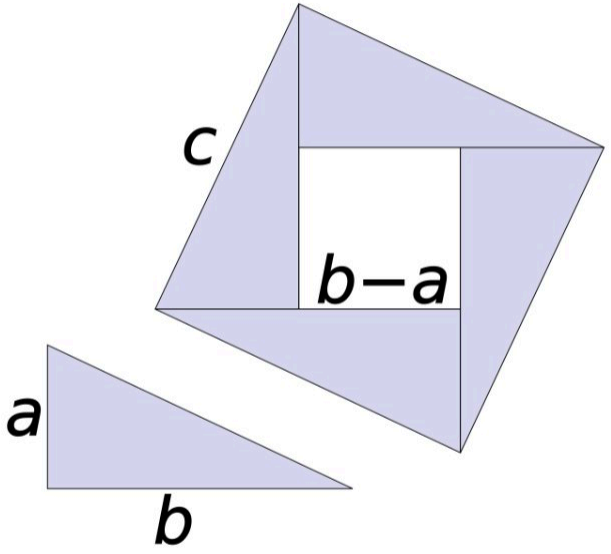
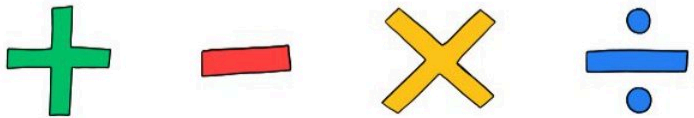


Diagram: JohnBlackburne · CC BY-SA 3.0 · Wikimedia Commons

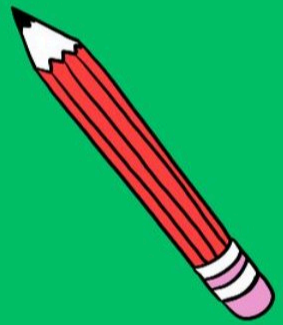


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$a^2+b^2=c^2$

Most useful?

Which right-triangle problem would you use most?



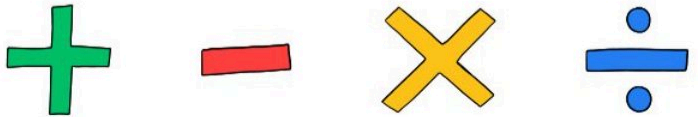
- **A** Ladder length against a wall
- **B** Mobile phone screen diagonal
- **C** Tree height from its shadow

Vote with your hands, then explain why.

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Quick quiz

1. Legs 6 cm and 8 cm. Hypotenuse?
2. Hypotenuse 13 cm, one leg 5 cm. Other leg?
3. Sides 9 cm, 12 cm, 15 cm. Right-angled?
4. Similar twin has double hypotenuse. Ratios?



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