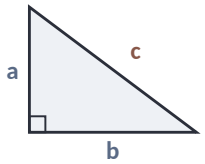
Pythagoras: fact sheet

Planner week 3 · Learn these facts

Pythagoras' theorem



For a **right-angled** triangle

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

The hypotenuse



The longest side, **opposite** the right angle

It is always *c*

Finding the longest side

Longest side (hypotenuse)

$c^2 = 6^2 + 8^2 = 100$

$c = \sqrt{100} = 10$

Square, **add**, square root

Answer is the biggest side

Finding a shorter side

Shorter side

$a^2 = 8.5^2 - 4^2 = 56.25$

$a = \sqrt{56.25} = 7.5$

Square, **subtract**, square root

Answer is smaller than *c*

Is it right-angled?

Sides 5, 12, 13

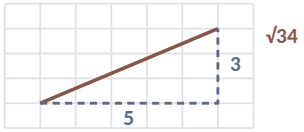
$5^2 + 12^2 = 25 + 144 = 169$

$13^2 = 169 \rightarrow$ right-angled ✓

Check if the two short sides squared add up

Equal → right-angled

Between two points



Draw a triangle under the line

$5^2 + 3^2 = 34$, length $\sqrt{34}$

Rounding

$\sqrt{261} = 16.155...$

$= 16.2$ (3 s.f.)

Write the full answer first, then round

1 d.p. or 3 s.f. as asked

Add or subtract?

Long side (*c*)	add the squares
Short side	subtract the squares
Check	is the answer sensible?

Key words

- **Hypotenuse** the longest side
- **Square** a number times itself ($7^2 = 49$)
- **Square root** $\sqrt{49} = 7$
- **Right angle** 90°, marked with a small square

Exam tips

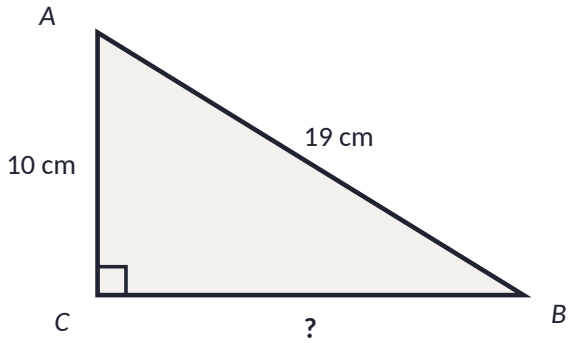
- Find the **hypotenuse** first: opposite the little square.
- Long side → add. Short side → subtract.
- Don't forget to **square root** at the end.
- Sense check: the hypotenuse is always the longest side.
- Pythagoras is only for **right-angled** triangles.
- If there's an angle in the question, you may need **trigonometry** instead.

Using Pythagoras' theorem: fact sheet

Pythagoras · Planner week 3 · Work out which type it is, follow the example

1 Finding a shorter side

ABC is a right-angled triangle. AB = 19 cm and AC = 10 cm. Work out the length of CB.

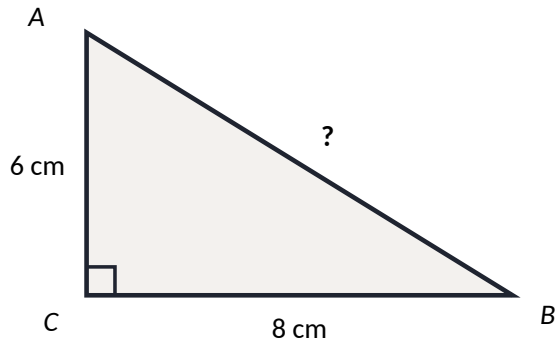


1. **No angle** in the question: Pythagoras
2. **Shorter side or the longest?** CB is shorter: **subtract**
3. $CB^2 = 19^2 - 10^2 = 361 - 100 = 261$
4. $CB = \sqrt{261} =$ **16.2 cm**

Use this when: you know two sides, want the third, and it is **not** the longest side

2 Finding the hypotenuse

ABC is a right-angled triangle. AC = 6 cm and CB = 8 cm. Work out the length of AB.



1. **No angle** in the question: Pythagoras
2. **Shorter side or the longest?** AB is the hypotenuse (opposite the right angle): **add**
3. $AB^2 = 6^2 + 8^2 = 36 + 64 = 100$
4. $AB = \sqrt{100} =$ **10 cm**

Use this when: you want the **longest** side, opposite the right angle

The big question

Is there an **angle** in the question?

No angle → Pythagoras. An angle given or wanted → trigonometry.

Pythagoras: do I want a **shorter side** (subtract) or the **longest side** (add)?

Watch out

- Adding when you should subtract (CB would be longer than 19!).
- Forgetting to square root.
- Doubling instead of squaring ($10^2 = 100$, not 20).