

Pythagoras: the Long Side



Key idea

Find the **right-angled triangle** first.

Its longest side (hypotenuse) is
 $c^2 = a^2 + b^2$.

Method

1. Sketch the triangle; label known sides.
2. Use $c^2 = a^2 + b^2$, then square root and add units.

Example: rectangle diagonal

A 6 m by 8 m rectangle; the diagonal is the hypotenuse.

$$d^2 = 6^2 + 8^2 = 100, \text{ so } d = 10 \text{ m.}$$

Common mistake

Use only the sides of the actual right-angled triangle — not just any outside edge of the shape.

Pythagoras: a Shorter Side



Key idea

To find a **leg** (shorter side), subtract:

$$\text{leg}^2 = \text{hyp}^2 - \text{other leg}^2.$$

Example: isosceles height

Sides 13, base 10; half-base = 5.
 $h^2 = 169 - 25 = 144$, so $h = 12$ cm.

Second step: area

Now use the height you found.

$$\begin{aligned}\text{Area} &= \frac{1}{2} \times \text{base} \times \text{height} \\ &= \frac{1}{2} \times 10 \times 12 = 60 \text{ cm}^2\end{aligned}$$

Common mistake

If a shape is not already right-angled, split it first — do not assume the right angle is there.

 = **copy this into your book.** Boxes without a pencil are just to read.