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Pythagoras' Theorem

Solutions & Answer Key

Full worked solutions, marking scheme & answer key

IGCSE Mathematics

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Companion to the *Student Worksheet*

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Note

About this booklet. These are the complete solutions to every question in the *Pythagoras' Theorem — Student Worksheet*. Question numbers match exactly: right-angled triangles T1–T5, finding the hypotenuse H1–H8, finding a shorter side G1–G8, Pythagorean triples P1–P6, testing for a right angle V1–V6, applications in 2D shapes S1–S7, 3D problems E1–E6, real-world applications A1–A6, the Mixed Review MR1–MR10, and the examination questions Q1–Q8 of Part III.
Each solution identifies the hypotenuse first, states whether the squares are added or subtracted, and works one step at a time. Part V collects the common mistakes to watch for, and Part VI is a quick answer key for fast marking.

4 Part IV — Complete Solutions

Note

Each solution names the step being applied and shows the working in order, exactly as the notes recommend. Depth is scaled to difficulty — brief for basic questions, fuller for the harder ones. Unless a question says otherwise, all lengths are rounded only at the final step.

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4.1 Solutions — Right-Angled Triangles and the Hypotenuse

Solution T1

The right angle is at Q, and the hypotenuse is always the side *opposite* the right angle. The side opposite Q is the one joining the other two vertices:

$$\boxed{PR \text{ is the hypotenuse.}}$$

It is also the longest side of the triangle.

Solution T2

The hypotenuse is the longest side, so it is $\boxed{17\,\text{cm}}$.
Check: $8^2 + 15^2 = 64 + 225 = 289 = 17^2$, confirming that 17 cm is opposite the right angle.

Solution T3

The right angle is marked at Z, so the side opposite Z is the hypotenuse:

$$\boxed{XY \text{ is the hypotenuse; } XZ \text{ and } ZY \text{ are the legs.}}$$

XY is the longest side — it must be longer than either leg, since $XY^2 = 9^2 + 12^2 = 225$, giving $XY = 15\,\text{cm}$.

Solution T4

Pythagoras' Theorem applies *only* to right-angled triangles. This triangle has angles $50°$, $60°$ and $70°$, none of which is $90°$, so

$$\boxed{\text{No right angle} \Rightarrow \text{Pythagoras' Theorem cannot be used.}}$$

(The angles do add to $180°$, so the triangle is perfectly valid; it is simply not right-angled.)

Solution T5

The statement is wrong because the hypotenuse is defined by its *position relative to the right angle*, not by how the triangle happens to be drawn on the page. Rotating the diagram does not change which side is the hypotenuse, but it certainly changes which side is at the bottom.

$$\boxed{\text{The hypotenuse is the side opposite the right angle.}}$$

It is also always the longest side, whichever way the triangle is drawn.

Common Mistake

Never identify the hypotenuse by its position on the page. Find the small square marking the right angle, then look directly across from it.

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Preview ends here

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