



Pythagoras in two dimensions

GCSE Mathematics 1MA1 · L038 · 60 minutes

Objective: Use Pythagoras' theorem to find a missing length in a right-angled triangle and justify whether a triangle is right-angled.

Calculator conditions: Core square-number examples may be non-calculator; calculator questions are labelled C. Round only when requested.

Connect & Check
5 min

Retrieve squares and square roots and identify the side opposite a right angle.

C1. Which side is the hypotenuse in a right-angled triangle? **[NC] [1 marks]**

C2. Calculate 9^2 , 12^2 and $\sqrt{225}$. **[NC] [3 marks]**

Share
5 min

Choose a route: Visual (draw/annotate), Method (structured calculation), or Explain (justify decisions). Compare with a partner; all routes must produce the same core evidence.

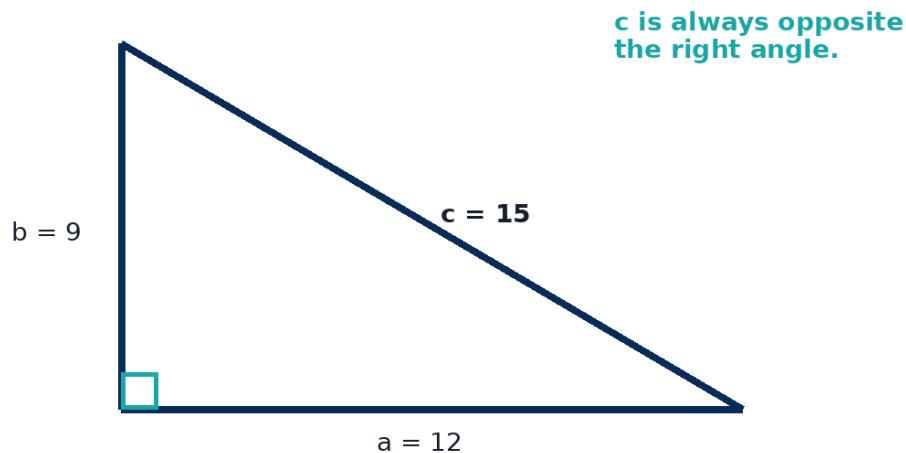
Route	Journey	Evidence
A · Visual	Annotate the triangle and square each relevant side.	Labelled diagram + equation.
B · Method	Use a structured $a^2+b^2=c^2$ template.	Equation + exact/rounded length.
C · Explain	Explain whether to add or	Justified method + check.

subtract squares and why.

Present
12 min

Identify the hypotenuse before forming an equation. Compare missing-hypotenuse and missing-short-side cases.

Pythagoras: $a^2 + b^2 = c^2$ for a right-angled triangle



If c is missing: add squares. If a shorter side is missing: subtract squares.

P1. A right triangle has shorter sides 9 cm and 12 cm. Find the hypotenuse. **[NC] [3 marks]**

Apply
25 min

Complete supported practice, then remove the scaffold and complete independent/exam-style work. Show a separate check where requested.

Supported practice

A1. Find the hypotenuse of a right triangle with legs 6 cm and 8 cm. **[NC] [3 marks]**

A2. A right triangle has hypotenuse 13 cm and one shorter side 5 cm. Find the other side. **[NC] [4 marks]**

Independent practice - scaffold removed

A3. A ladder reaches 6 m up a wall and its foot is 2.5 m from the wall. Find the ladder length. **[C] [4 marks]**

A4. A rectangle is 9 cm by 12 cm. Find its diagonal. **[NC] [3 marks]**

Exam-style practice

E1. A rectangular field is 30 m by 40 m. Find the straight-line distance between opposite corners. **[NC] [3 marks]**

E2. A triangle has side lengths 7 cm, 24 cm and 25 cm. Show that it is right-angled. **[NC] [4 marks]**

Extension and deep challenge

X1. A 9 cm by 12 cm rectangle is cut along a diagonal. Find the perimeter of one resulting triangle. **[NC] [4 marks]**

X2. A triangle has sides 8 cm, 15 cm and 17 cm. Prove it is right-angled and find its area. **[NC] [5 marks]**

Recall & Review
8 min

Complete the exit task without notes, compare with your baseline and record one WWW and one EBI.

R1. A right triangle has hypotenuse 10 cm and one shorter side 6 cm. Find the other side and show a check. **[NC] [4 marks]**

WWW: _____

EBI: _____

Next lesson preparation: Review sine, cosine and tangent on a calculator and make sure it is in degree mode.

Recall & Review: feedback and extension integration

Lesson L038: Pythagoras in two dimensions

Objective: Use Pythagoras to find a missing length in a right-angled triangle.

Timing for a 60-minute lesson

0-7 Connect & Check; 7-14 Share; 14-25 Present/model; 25-44 Apply route choice/practice; 44-52 independent exam-style check; 52-60 Recall & Review, WWW/EBI and next step.

Recall & Review evidence

At the end of the lesson, solve a fresh question without prompts, explain one check, correct one error and record the next practice step.

What Went Well (WWW)

I selected the correct geometric fact, theorem, formula or transformation and used a clear diagram with appropriate labels and units.

Even Better If (EBI)

I will name the fact or theorem, show the substitution or construction step and check whether the size, direction and units of the result are reasonable.

Integrated stretch and deep challenge

Stretch: A rectangle is 9 cm by 12 cm. Find its diagonal and the perimeter of one of the right triangles formed by that diagonal.

Deep challenge: A triangle has sides 8, 15 and 17 cm. Prove it is right-angled and find its area.

My next-step response
