



YEAR 9

Pythagoras' Theorem

Three sections. $a^2 + b^2 = c^2$, where c is always the hypotenuse, the side opposite the right angle. Section A uses whole-number triples so you can check yourself; section B needs a calculator.

A. Whole-number triangles

- 1 A right-angled triangle has shorter sides 3cm and 4cm. Find the hypotenuse.
5cm
- 2 A right-angled triangle has shorter sides 6cm and 8cm. Find the hypotenuse.
10cm
- 3 A right-angled triangle has shorter sides 8cm and 15cm. Find the hypotenuse.
17cm
- 4 A right-angled triangle has shorter sides 20cm and 21cm. Find the hypotenuse.
29cm
- 5 A right-angled triangle has hypotenuse 13cm and one shorter side 12cm. Find the other shorter side. **5cm**
- 6 A right-angled triangle has hypotenuse 25cm and one shorter side 24cm. Find the other shorter side. **7cm**
- 7 A right-angled triangle has hypotenuse 41cm and one shorter side 40cm. Find the other shorter side. **9cm**

B. To 1 decimal place

- 8 A right-angled triangle has shorter sides 5cm and 7cm. Find the hypotenuse to 1 decimal place. **8.6cm**
 - 9 A right-angled triangle has shorter sides 4cm and 9cm. Find the hypotenuse to 1 decimal place. **9.8cm**
 - 10 A right-angled triangle has shorter sides 2.5cm and 6cm. Find the hypotenuse to 1 decimal place. **6.5cm**
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- 11 A right-angled triangle has hypotenuse 10cm and one shorter side 6.5cm. Find the other to 1 decimal place. **7.6cm**
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- 12 A right-angled triangle has hypotenuse 12cm and one shorter side 5cm. Find the other to 1 decimal place. **10.9cm**
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C. Using it

- 13 A ladder 5m long leans against a wall with its foot 1.4m from the base. How far up the wall does it reach, to 1 decimal place? **4.8m**
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- 14 A rectangle is 9cm by 12cm. Find the length of its diagonal. **15cm**
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- 15 A boat sails 8km east then 6km north. How far is it from where it started? **10km**
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- 16 Find the distance between the points (1, 2) and (5, 5). **5**
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- 17 A triangle has sides 7cm, 24cm and 25cm. Is it right-angled? Show how you know. **Yes. $7^2 + 24^2 = 49 + 576 = 625$, and $25^2 = 625$, so the theorem holds and the angle opposite the 25cm side is 90° .**
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- 18 A triangle has sides 5cm, 6cm and 8cm. Is it right-angled? **No. $5^2 + 6^2 = 61$ but $8^2 = 64$, and 61 is not 64.**
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- 19 Explain why the hypotenuse is always the longest side. **It is found by adding the squares of the other two and square rooting, so its square is larger than either of theirs.**
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