

GCSE Maths: Is it right-angled? Pythagorean triples and problems in context (Foundation): answers

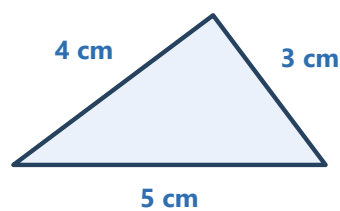
GCSE Maths - Pythagoras and Trigonometry - Foundation - Lesson 20.2

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch20-pythagoras-trigonometry/foundation/is-it-right-angled-pythagorean-triples-and-problems-in/

Exercise 20C Right-angled triangles in problems Calculator allowed

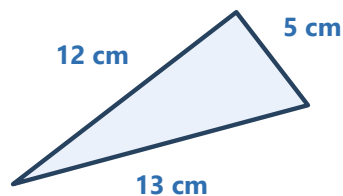
1 Is each triangle right-angled? Show your working. All the lengths are in centimetres.

(a)



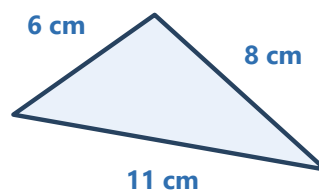
Answer: Yes, it is right-angled

(b)



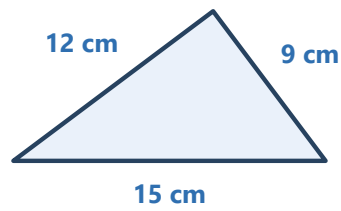
Answer: Yes, it is right-angled

(c)



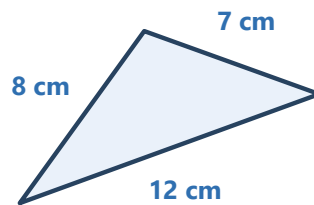
Answer: No, it is not right-angled

(d)



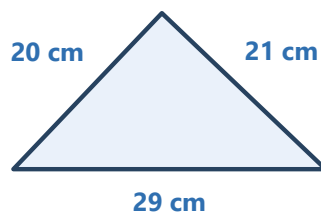
Answer: Yes, it is right-angled

(e)



Answer: No, it is not right-angled

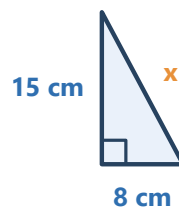
(f)



Answer: Yes, it is right-angled

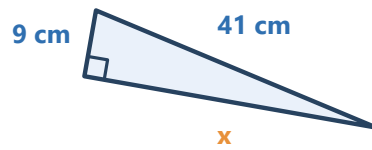
2 Each triangle is right-angled and the lengths are in centimetres. Find the missing length x (a whole number).

(a) (3 whole numbers 8, 15, x)



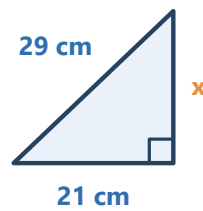
Answer: 17 cm

(b) $(9, x, 41)$



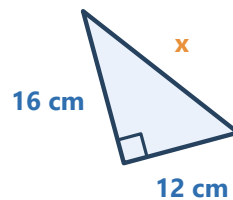
Answer: 40 cm

(c) $(x, 21, 29)$



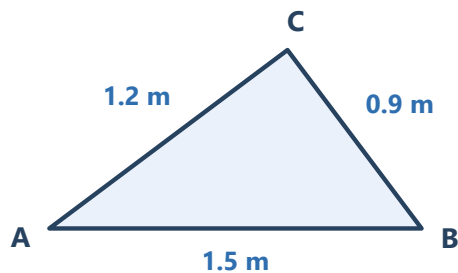
Answer: 20 cm

(d) $(12, 16, x)$



Answer: 20 cm

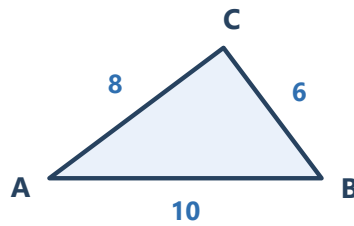
- 3 A builder marks out the corner of a patio. She measures 0.9 m along one edge and 1.2 m along the other edge. The distance between the two marks is 1.5 m. Is the corner a right angle? You must show your working.



Answer: Yes, it is right-angled

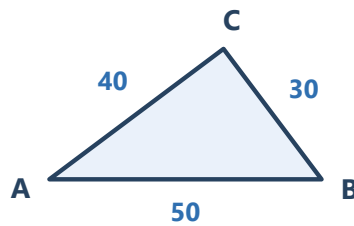
- 4 3, 4, 5 is a Pythagorean triple because $9 + 16 = 25$.

- (a) Show that 6, 8, 10 is a Pythagorean triple.



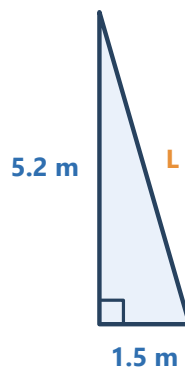
Answer: $6^2 + 8^2 = 100 = 10^2$, so it is a triple

- (b) Show that 30, 40, 50 is a Pythagorean triple.



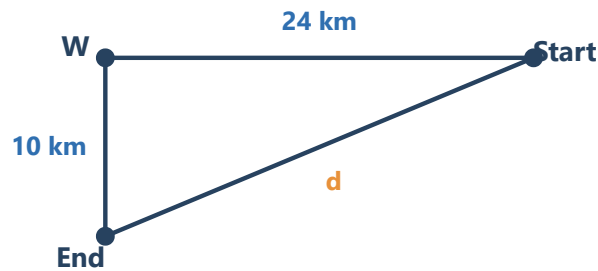
Answer: $30^2 + 40^2 = 2500 = 50^2$, so it is a triple

- 5 A ladder reaches 5.2 m up a vertical wall. The foot of the ladder is 1.5 m from the wall. Work out the length of the ladder, correct to 2 decimal places.



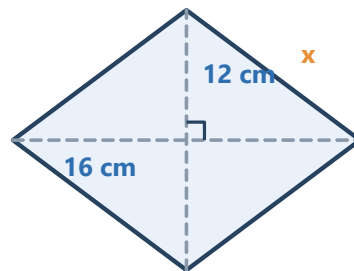
Answer: 5.41 m

- 6 A boat sails 24 km due west and then 10 km due south. Work out the distance of the boat from its starting point.



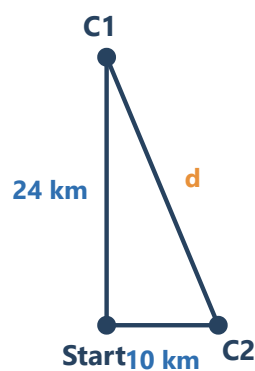
Answer: 26 km

- 7 The diagonals of a rhombus are 16 cm and 12 cm long. Work out the length of one side of the rhombus, x .



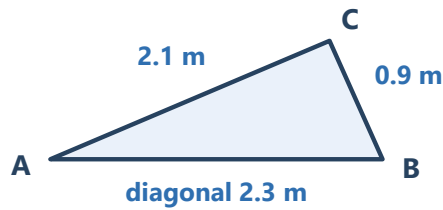
Answer: 10 cm

- 8 Two cyclists leave the same place at the same time. One cycles north at 12 km/h and the other cycles east at 5 km/h. How far apart are they after 2 hours?



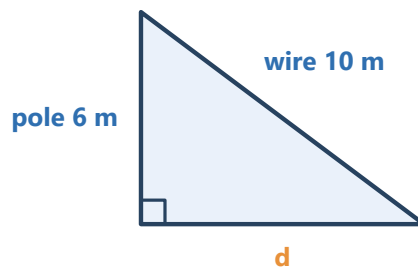
Answer: 26 km

- 9 A joiner checks that a door frame is square. The frame is 0.9 m wide and 2.1 m tall, and a diagonal measures 2.3 m. Is the frame exactly square (right-angled)? Give a reason using Pythagoras' theorem.



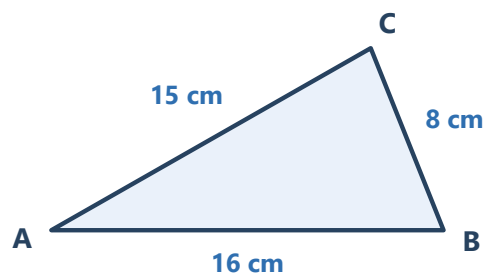
Answer: No, it is not right-angled

- 10** A vertical pole is 6 m tall. A wire 10 m long runs from the top of the pole to a point on level ground. How far is that point from the foot of the pole?



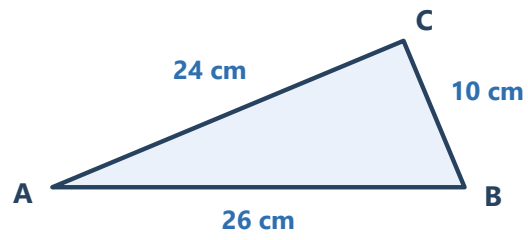
Answer: 8 m

- 11** Raj says: "This triangle is not right-angled because $8 + 15 = 23$, and 23 is not 16." Explain why Raj's method is wrong. Then use the correct method to decide whether the triangle is right-angled.



Answer: Raj added lengths instead of squares. $8^2 + 15^2 = 289$ is not $16^2 = 256$, so it is not right-angled.

- 12 Challenge.** Jada says: "If I double every length of a right-angled triangle, the new triangle is still right-angled." Use the triangle 5 cm, 12 cm, 13 cm to show that Jada is right for this triangle (the doubled triangle is drawn). Then explain why this must be true for any right-angled triangle.



Answer: $10^2 + 24^2 = 676 = 26^2$, so it is right-angled. Doubling multiplies each square by 4.