



Pythagoras' theorem

About 40 minutes Calculator allowed 38 marks

Date _____

A Do Now

The first question is what today's lesson needs. The others bring back earlier topics.

- A1** Needed today [2 marks] **A2** From chapter 9 [2 marks]
Work out 0.16^2 .

Answer

Answer

- A3** Last lesson [2 marks] **A4** Key Stage 3 [2 marks]
A plumber charges a fixed fee plus an amount for each hour. A 4-hour job costs £184 and an 8-hour job costs £348. Find the fixed fee.

Answer

Answer

B Example, then your turn

Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

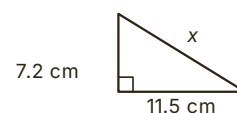
Work out the hypotenuse, x . Give your answer to 1 decimal place.



Not drawn accurately

Hint Square the two shorter sides, add, then take the square root.

- B1** Work out the hypotenuse, x . [3 marks]
Give your answer to 1 decimal place.

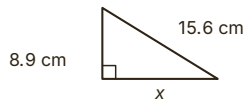


Not drawn accurately

Answer

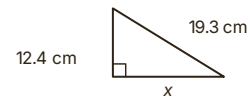
EXAMPLE 2

Work out the length x . Give your answer to 1 decimal place.



Not drawn accurately

Hint The hypotenuse is the longest side, so subtract.

B2 Work out the length x . Give your answer to 1 decimal place. [3 marks]

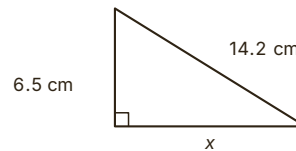
Not drawn accurately

Answer

c Practice

- C1** A triangle has sides of 48 cm, 55 cm and 73 cm. Is it right-angled? Show how you decide. [2 marks]

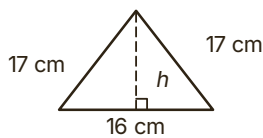
- C2** Work out the length x . Give your answer to 1 decimal place. [2 marks]



Not drawn accurately

Answer

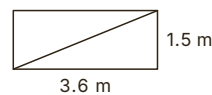
- C3** The triangle is isosceles. Work out its height, h . [2 marks]



Not drawn accurately

Answer

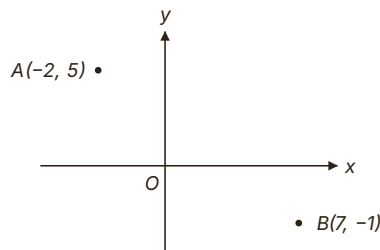
- C4** A rectangular gate is 3.6 m long and 1.5 m high. A diagonal brace runs from one corner to the opposite corner. Work out the length of the brace. [2 marks]



Not drawn accurately

Answer

- C5** A is the point $(-2, 5)$ and B is the point $(7, -1)$. Work out the length of AB . Give your answer to 1 decimal place. [3 marks]



Not drawn accurately

Answer

D Exam-style questions

- D1** A right-angled triangle has a hypotenuse of 13.6 cm and another side of 6.4 cm. Ravi says, "The third side is $\sqrt{6.4^2 + 13.6^2} = 15.0$ cm." [2 marks]
- Explain why Ravi is wrong, and work out the third side.

- D2** The cross-section of a roof is an isosceles triangle. Its base is 9.6 m wide and each sloping edge is 6.2 m long.

- (a) Work out the height of the roof. Give your answer to 1 decimal place. [3 marks]

Answer

- (b) Work out the area of the cross-section. Give your answer to 3 significant figures. [2 marks]

Answer

- (c) Is the angle at the top of the roof bigger or smaller than 90° ? Use the side lengths to decide. [2 marks]

Total for D2: 7 marks

E Extension

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** The sides of a right-angled triangle are x cm, $(x + 7)$ cm and $(x + 8)$ cm. Work out the value of x . [4 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** The longest side, $x + 8$, is the hypotenuse. Write down Pythagoras with these three lengths.
- Hint 2** $x^2 + (x + 7)^2 = (x + 8)^2$.
- Hint 3** Expand: $2x^2 + 14x + 49 = x^2 + 16x + 64$, so $x^2 - 2x - 15 = 0$, $(x - 5)(x + 3) = 0$ and $x = 5$, as a length cannot be negative.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

- I can find the hypotenuse or a shorter side of a right-angled triangle. ☐ ☐ ☒
- I can test whether a triangle has a right angle. ☐ ☐ ☒
- I can use Pythagoras in isosceles triangles, rectangles and on a coordinate grid. ☐ ☐ ☒