JRA Tutors
Private tuition and small online Study Pods

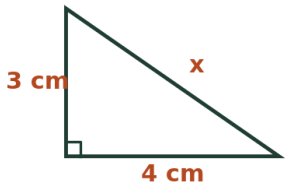
Pythagoras

Grade 4 topic, stretching to Grade 9 · Foundation and Higher · Edexcel and AQA

How to use this pack
20 questions that get harder as you go. Foundation students: aim for Questions 1–15 (41 marks) and have a go at the rest. Higher students: complete all 20. Show your working on the lines and write your final answer on the answer line, then mark yourself with the answers at the back. Diagrams are not drawn accurately. Total: 64 marks.

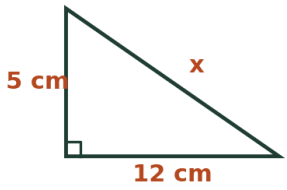
Warm-up

1 Find the length of the hypotenuse of a right-angled triangle with shorter sides 3 cm and 4 cm. **[1 mark]**



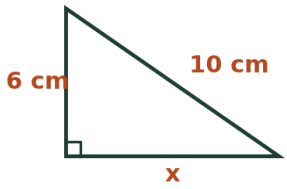
Answer _____

2 A right-angled triangle has shorter sides 5 cm and 12 cm. Work out the hypotenuse. **[2 marks]**



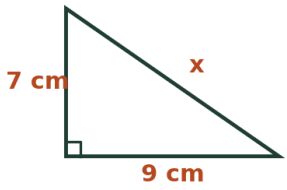
Answer _____

3 A right-angled triangle has hypotenuse 10 cm and one shorter side 6 cm. Work out the other shorter side. **[2 marks]**



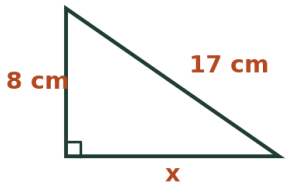
Answer _____

4 The shorter sides of a right-angled triangle are 7 cm and 9 cm. Work out the hypotenuse. Give your answer to 1 decimal place. **[2 marks]**



Answer _____

5 A right-angled triangle has hypotenuse 17 cm and one shorter side 8 cm. Work out the area of the triangle. **[3 marks]**



Answer _____

Core

6 A triangle has sides 9 cm, 12 cm and 15 cm. Is it right-angled? You must show your working. **[2 marks]**

Answer _____

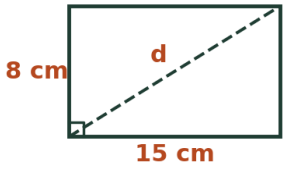
7 A triangle has sides 8 cm, 10 cm and 13 cm. Is it right-angled? You must show your working. **[2 marks]**

Answer _____

8 A 6.5 m ladder leans against a vertical wall. The foot of the ladder is 2.5 m from the wall on level ground. How high up the wall does the ladder reach? **[3 marks]**

Answer _____

9 A rectangle is 15 cm long and 8 cm wide. Work out the length of a diagonal. **[2 marks]**



Answer _____

10 The diagonal of a square is 10 cm. Work out the side length. Give your answer to 3 significant figures. **[3 marks]**

Answer _____

Stretch

11 A ship sails 12 km north then 9 km east. (a) How far is it from its starting point? (b) How much shorter is this than the distance it sailed? **[4 marks]**

Answer _____

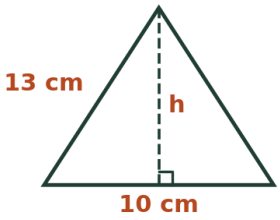
12 A is the point (1, 2) and B is the point (7, 10). Work out the length of AB. **[3 marks]**

Answer _____

13 P is the point (−2, 3) and Q is the point (4, −1). Work out the length of PQ. Give your answer to 3 significant figures. **[3 marks]**

Answer _____

14 An isosceles triangle has two sides of 13 cm and a base of 10 cm. Work out (a) the perpendicular height, (b) the area. **[5 marks]**



Answer _____

15 An equilateral triangle has side length 10 cm. Work out its area. Give your answer to 3 significant figures. **[4 marks]**

Answer _____

Challenge

16 An isosceles trapezoid has parallel sides 20 cm and 8 cm, and slanting sides of 10 cm each. Work out its area. **[5 marks]**

Answer _____

17 A right-angled triangle has sides x cm, (x + 7) cm and a hypotenuse of 13 cm. Show that $x^2 + 7x - 60 = 0$, then solve to find x. **[5 marks]**

Answer _____

18 A cuboid measures 3 cm by 4 cm by 12 cm. Work out the length of the longest straight line that can be drawn inside it. **[4 marks]**

Answer _____

19 A chord of length 16 cm is drawn in a circle of radius 10 cm. Work out the shortest distance from the centre of the circle to the chord. **[4 marks]**

Answer _____

20 A triangle has sides $(n^2 - 1)$, $2n$ and $(n^2 + 1)$, where $n > 1$. Prove that it is right-angled. Then find the side lengths when $n = 4$. **[5 marks]**

Answer _____