

Pythagoras Theorem

KS3 Maths · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

Find the hypotenuse of a right triangle with legs 6cm and 8cm.

Step 1 · State the theorem

$$a^2 + b^2 = c^2$$

Step 2 · Substitute and square

$$6^2 + 8^2 = 36 + 64 = 100$$

Step 3 · Square root to find c

$$c = \sqrt{100} = 10$$

Answer: Hypotenuse = 10cm

Check: 6,8,10 is a multiple of the 3,4,5 triangle (×2) ✓

2. Now try one with the steps

A right triangle has hypotenuse 25cm and one leg 7cm. Find the other leg.

Step 1 · Rearrange the formula for a leg

Step 2 · Substitute and calculate

Step 3 · Square root

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. A right triangle has legs of 3cm and 4cm. Find the hypotenuse. [2]

2. A right triangle has a hypotenuse of 13cm and one leg of 5cm. Find the other leg. [2]

3. A ladder 6.5m long leans against a wall, its base 2.5m from the wall. How high up the wall does it reach? [3]

4. A right triangle has legs 8cm and 15cm. Find the hypotenuse. [2]

5. A rectangular field is 24m by 18m. Find the length of the diagonal. [3]

6. Explain how to check whether a triangle with sides 9cm, 12cm, and 15cm is right-angled. [3]

7. A right-angled triangle has shorter sides of 5 cm and 12 cm. Find the hypotenuse. [2]

8. A right-angled triangle has shorter sides of 9 cm and 12 cm. Find the hypotenuse. [2]

9. A right-angled triangle has a hypotenuse of 10 cm and one shorter side of 6 cm. Find the other side. [2]

10. A right-angled triangle has shorter sides of 4 cm and 7 cm. Find the hypotenuse to 1 decimal place. [2]

11. A right-angled triangle has a hypotenuse of 9 cm and one shorter side of 5 cm. Find the other side to 1 decimal place. [2]

12. Is a triangle with sides 7 cm, 8 cm and 11 cm right-angled? [2]

13. A TV screen is 80 cm wide and 60 cm tall. How long is its diagonal? [2]

14. Find the distance between the points (1, 2) and (7, 10). [3]

15. An isosceles triangle has two sides of 13 cm and a base of 10 cm. Find its perpendicular height. [3]

16. A square has a diagonal of 10 cm. Find the length of its sides to 1 decimal place. [3]

4. Before you hand it in

Using $a^2+b^2=c^2$ to find a missing LEG by adding both known sides

If finding the HYPOTENUSE (longest side): ADD the squares of the two legs. If finding a LEG: SUBTRACT the square of the known leg from the square of the hypotenuse. Always identify the hypotenuse first — it's opposite the right angle.

Forgetting to square root at the end, leaving the answer²

$a^2+b^2=c^2$ gives you c^2 , not c . You MUST take the square root of your final sum to get the actual side length.

Adding the sides before squaring: $(3 + 4)^2 = 49$, so $c = 7$

Square each side separately, then add: $3^2 + 4^2 = 9 + 16 = 25$, so $c = 5$. $(3 + 4)^2$ is not the same as $3^2 + 4^2$.