



Pythagoras' Theorem

- Labelling a right-angled triangle
- Using Pythagoras' Theorem
- Finding the length of a side of a right-angled triangle

Keywords

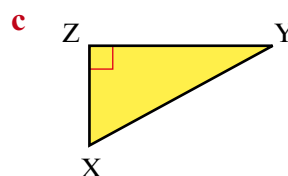
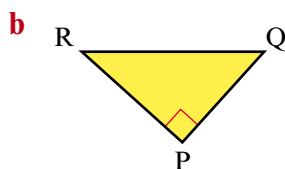
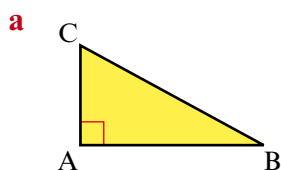
You should know

explanation 1a

explanation 1b

explanation 1c

1 Draw each triangle and label the hypotenuse.

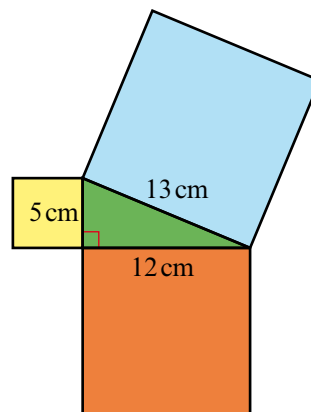


2 This is Pythagoras' Theorem:

In a right-angled triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides.

Use the diagram to answer these questions.

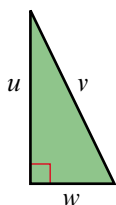
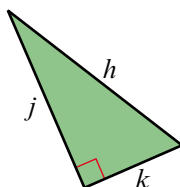
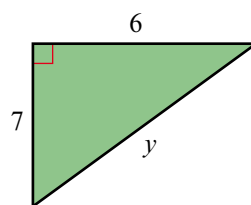
- a** What is the square on the hypotenuse?
- b** What is $5^2 + 12^2$?
- c** How does this show that Pythagoras' Theorem is true for this particular triangle?



explanation 2a

explanation 2b

- 3** Aisha is using Pythagoras' Theorem for triangle **i**, and writes $w^2 + u^2 = v^2$.
 Sophie says that this is wrong and it should be $u^2 + w^2 = v^2$.

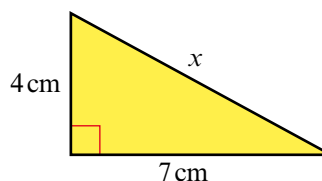
i

ii

iii


- a** Explain who is right.
b Write Pythagoras' Theorem for each of the other triangles.

explanation 3a

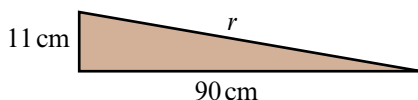
explanation 3b

- 4** Tim is using Pythagoras' Theorem to find x .
 He starts the question, and then gets stuck.

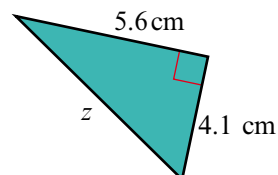
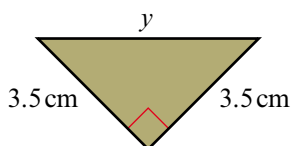
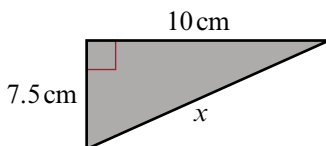


Copy and complete Tim's working out.
 Find the value of x to 2 decimal places.

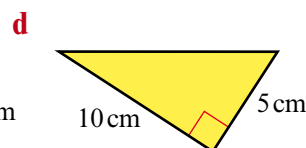
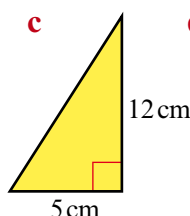
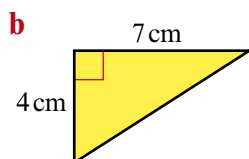
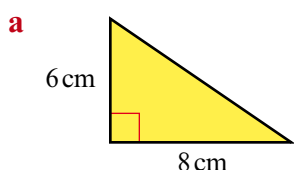
- 5** Find the length of the ramp, labelled r , to 1 decimal place.



- 6** Find x , y and z to 2 decimal places.



7 Find the length of each unknown side correct to 2 decimal places.

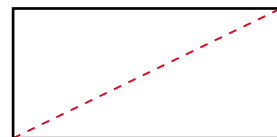


8 The diagram shows a rectangle.

a Draw a rectangle that is 11 cm long and 7 cm wide.

b Use Pythagoras' Theorem to find the length of the diagonal. Write your answer to 1 decimal place.

c Use a ruler to measure the diagonal of your rectangle. Which gives the more accurate answer, measuring or calculating?

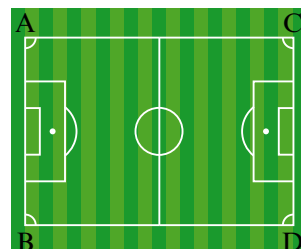


9 A football pitch is a rectangle 110 m by 85 m.

a Sketch the football pitch.

b Use Pythagoras' Theorem to calculate the length of the diagonal from corner flag B to corner flag C. Write your answer correct to 1 decimal place.

c The players warm up by running from corner flag A to corner flag B, then to corner flag C, then D, and then back to corner flag A. How far is this altogether?



10 Daniel draws a triangle with sides 8.4 cm, 11.2 cm and 14 cm.

He says it looks like a right-angled triangle.

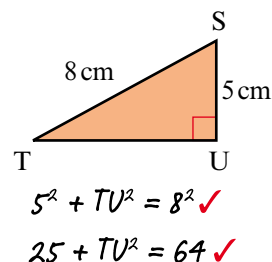
Explain how you can tell if it is a right-angled triangle without doing a drawing.

11 Ask your partner to draw, without measuring, a right-angled triangle on a plain piece of paper. Measure the sides and use Pythagoras' Theorem to check how accurate they have been.

explanation 4

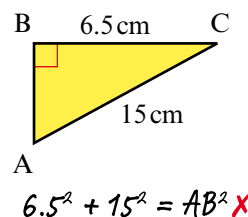
- 12** Mia is finding the side TU. She writes Pythagoras' Theorem and then squares the numbers. She is unsure what to do next.

- a** Her partner tells her to subtract 25 from each side. Is this right?
- b** Complete her working and find TU to 2 decimal places.



- 13** Scott is trying to find the length of AB. When his teacher looks at his work, she says that Scott's first line is wrong.

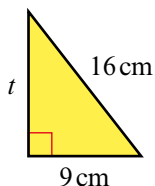
- a** What is wrong with the first line?
- b** Show Scott how to complete this question and find AB correct to 2 decimal places.



- 14** Mr Wilson draws a warning sign to remind pupils how to write out Pythagoras' Theorem properly.

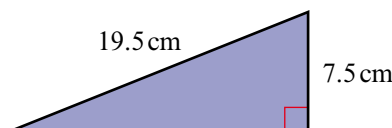
Find the unknown sides, correct to 2 decimal places where necessary.

a



WARNING
 $9^2 + 16^2 = t^2 \times$
 $t^2 + 9^2 = 16^2 \checkmark$

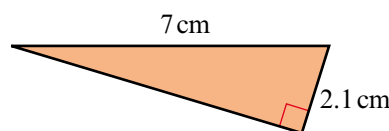
b



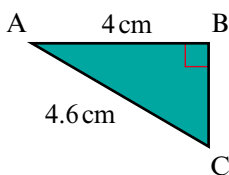
c



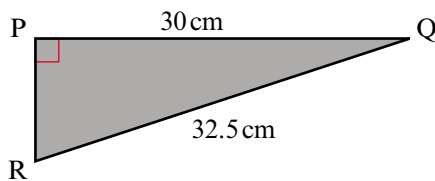
d



e



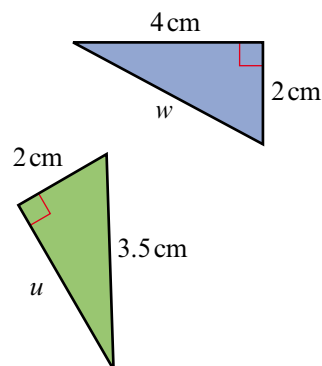
f



- 15** The diagram shows two triangles.
Each has one side where the length is unknown.

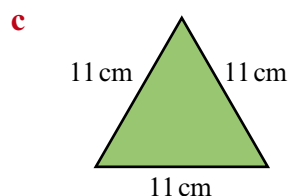
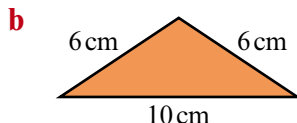
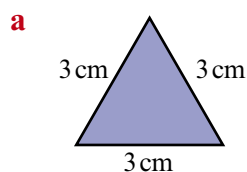
You are going to use Pythagoras' Theorem to find the length of each unknown side.

- What is the main difference between the two problems?
- Calculate the unknown side length in each triangle correct to 2 decimal places.



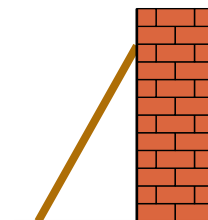
explanation 5

- 16** Find the height of each triangle.



- 17** Sam has a 4 m long ladder.
He puts the foot of the ladder 0.8 m from the wall.

- Draw a diagram and find how far up the wall the ladder reaches.
- Linda has a 6.5 m extension ladder. She puts the foot of the ladder 1.2 m from the wall. Draw a diagram and calculate how far up the wall this ladder will reach.



- 18** The diagram shows a pentagon.

- Copy the diagram. Draw dashed lines to form a right-angled triangle that has CD as one of its sides.
- Use Pythagoras' Theorem to find CD to 2 decimal places.
- Find the perimeter of the pentagon.

