Pythagoras' Theorem – Lesson 2

In this lesson we will meet Pythagoras' theorem for the first time. We learn what it means and how we can use it to calculate the length of the longest side in a right-angled triangle if we know the length of the other two sides.

Pythagoras' Theorem states that: -

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

This raises some questions: -

a) What is a theorem?

A theorem is a rule which has been proved to always work.

b) Who was Pythagoras?

Pythagoras was the mathematician who was able to prove that this rule works for every possible right-angled triangle. He lived in Greece about 2000 years ago.

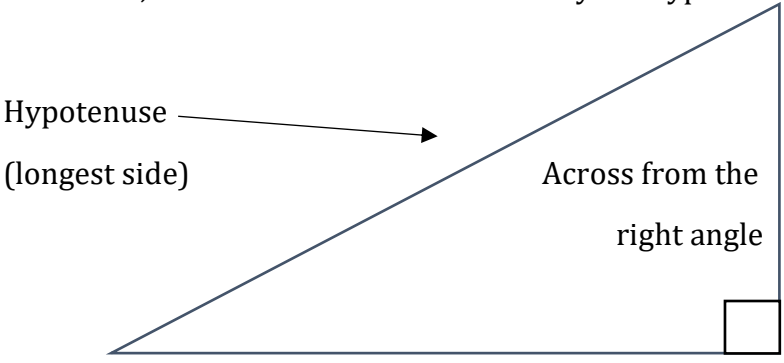
c) What is the hypotenuse?

It is the longest side in a right-angled triangle. It is opposite the right angle. (see below).

d) What use is this?

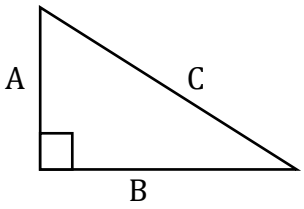
If we know the length of two sides of right-angled triangle we can calculate the length of the third side.

First of all, let us make sure we can identify the hypotenuse.



Write down the letter at the hypotenuse in each of these triangles: -

1)



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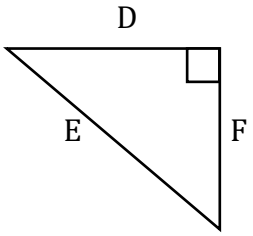

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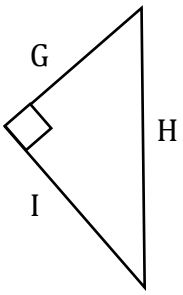

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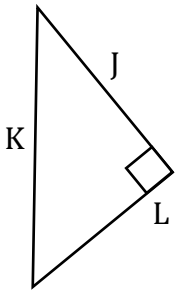

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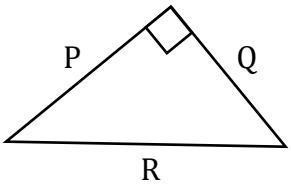

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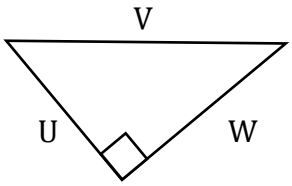
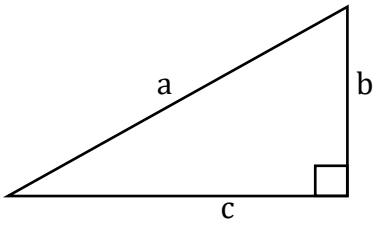
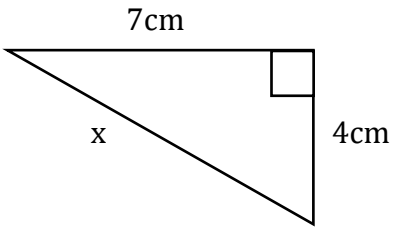


An alternative way of communicating Pythagoras' Theorem is to use a diagram and an equation.



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

This may make it easier to see how we calculate the length of the side marked x in the triangle below.



$x^2 = 7^2 + 4^2$

$= 49 + 16$

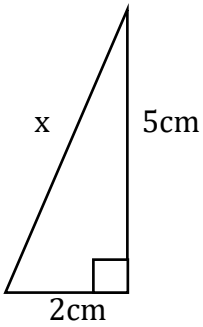
$= 65$

$x = \sqrt{65} = 8.0622577\ldots\ldots\ldots$

x = 8.1cm (rounded to one decimal place)

Using the example above to guide you, now calculate the length of the sides marked x in each of the triangles shown below. Round your answers to one decimal place.

7)



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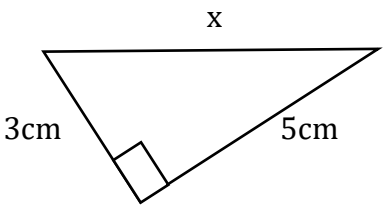

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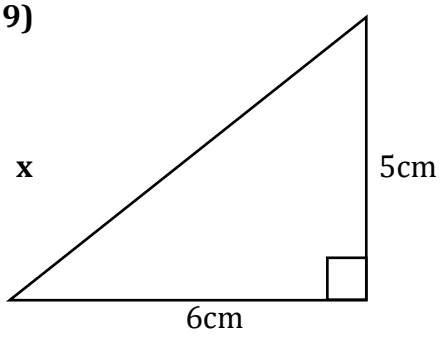

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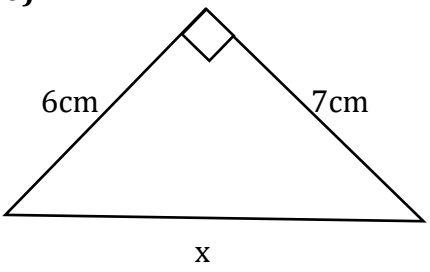

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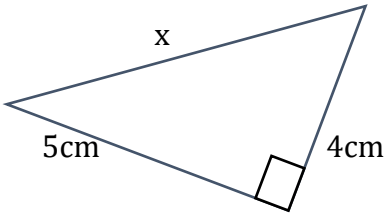

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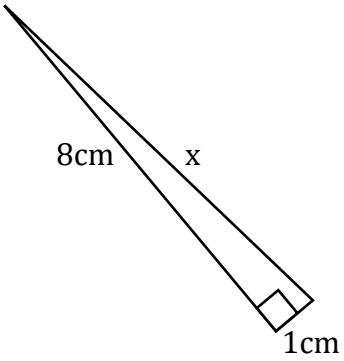

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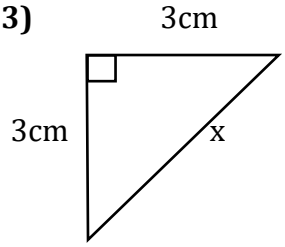

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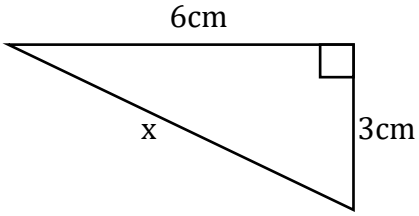

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