Finding the length of the shorter sides

Year 9 Mathematics
Mainstream

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Learning Objectives

By the end of the lesson I hope that you understand and can apply the following to a range of questions from the Year 9 Mathematics course.

- To know how to use Pythagoras' Theorem to find the unknown side which is not the hypotenuse
- Be able to use Pythagoras' Theorem to find the length of a shorter side.

RECAP

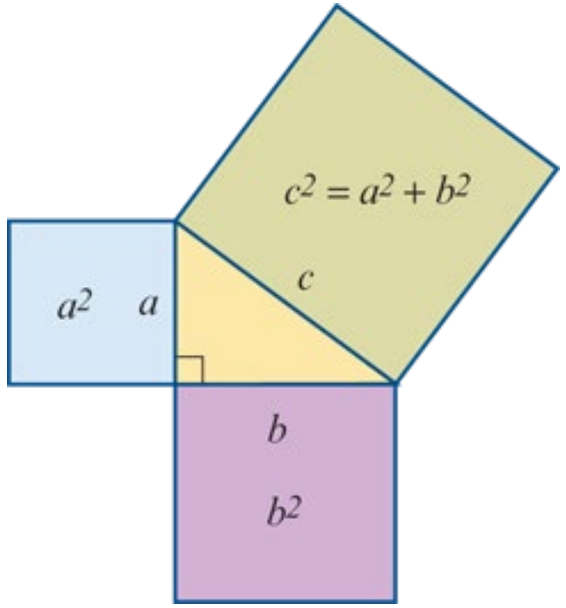
In a previous lesson we looked at how, for right angled triangles, there is a relationship between the sum of the areas of the two shortest sides of a right angled triangle and the area of the hypotenuse.

This is **only true** for right angled triangles.

The relationship is more formally known as:

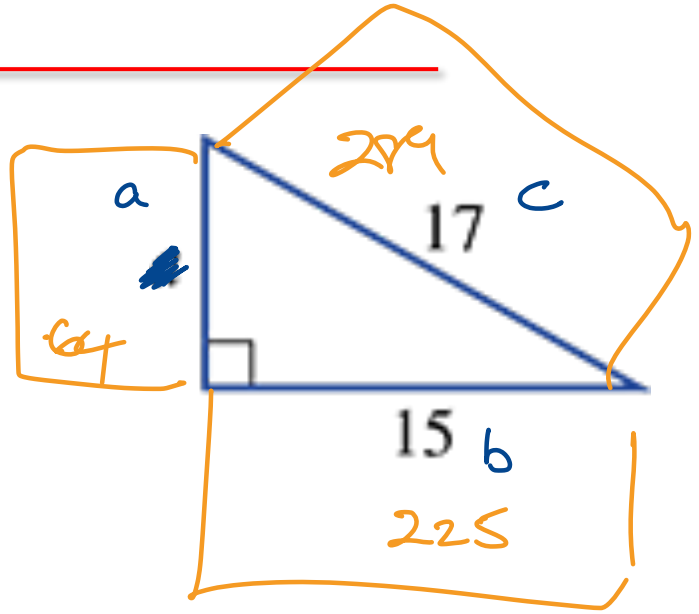
$$c^2 = a^2 + b^2$$

In the previous lesson we looked at how to find the hypotenuse (which is the longest side) of a right-angled triangle. Let's use the same theory to find the length of a shorter side.



Let's jump straight into some examples!

Find the value of the pronumeral of the following triangle. Round your answer to two decimal places **and** give an exact answer.



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

$17^2 = a^2 + 15^2$

$289 = a^2 + 225$

$289 - 225 = a^2$

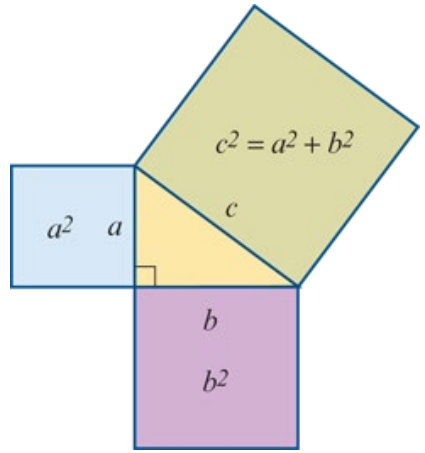
$64 = a^2$

$\sqrt{64} = a$

$a = 8$

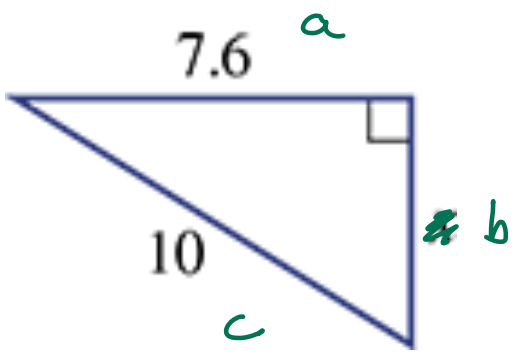
$a = \sqrt{64}$

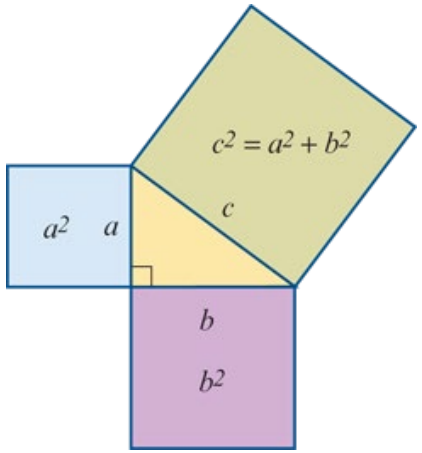
$= 8$



Example 2

Find the value of the pronumeral of the following triangle. Round your answer to two decimal places **and** give an exact answer.





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

$$10^2 = 7.6^2 + b^2$$

$$100 = 57.76 + b^2$$

$$100 - 57.76 = b^2$$

$$b^2 = 42.24$$

$$b = \sqrt{42.24}$$

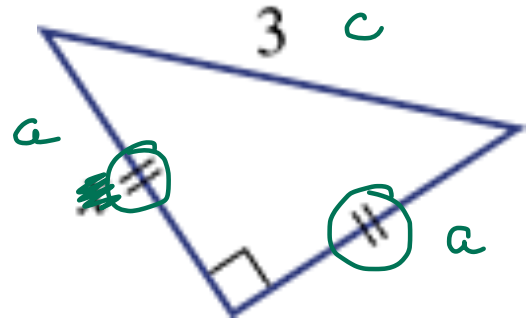
$$= \frac{4\sqrt{66}}{5}$$

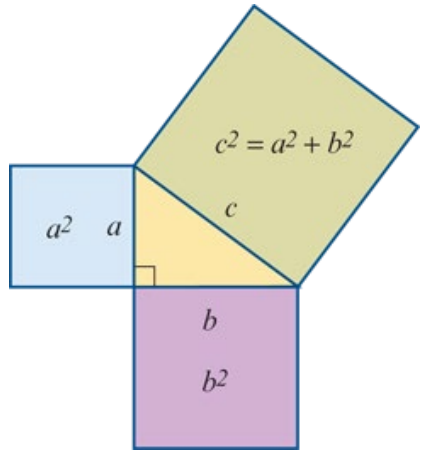
$$\therefore x = \frac{4\sqrt{66}}{5}$$

$$x = 6.50$$

Example 3

Find the value of the pronumeral of the following triangle. Round your answer to two decimal places **and** give an exact answer.





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

$$3^2 = a^2 + a^2$$

$$9 = 2a^2$$

$$4.5 = a^2$$

$$a = \sqrt{4.5}$$

$$x = \frac{3\sqrt{2}}{2}$$

$$x = 2.12$$

Questions to complete:

The questions I would like you to complete for this lesson are:

Exercise 3B: Finding the length of the shorter sides
Questions: 2ace, 3cf, 4ab, 6a, 7, 8, 10

Extension Questions (optional)
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