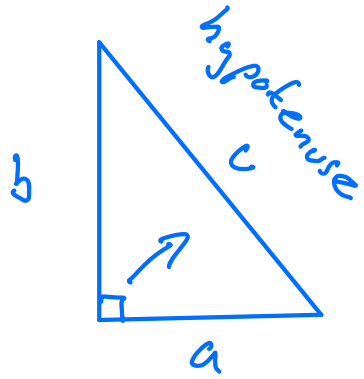
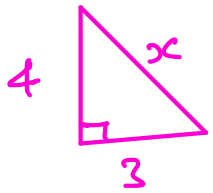
Pythagoras Theorem



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

Pythagorean Triples

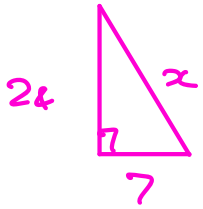


$$3^2 + 4^2 = x^2$$
$$9 + 16 = x^2$$
$$25 = x^2$$
$$\sqrt{25} = x$$
$$x = 5$$

3, 4, 5
right-angled triangle

$$5^2 + 12^2 = x^2$$
$$25 + 144 = x^2$$
$$169 = x^2$$
$$\sqrt{169} = x$$
$$x = 13$$

5, 12, 13

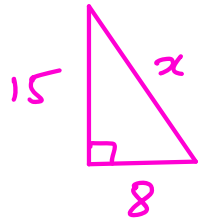


$$7^2 + 24^2 = x^2$$
$$49 + 576 = x^2$$
$$625 = x^2$$

$\sqrt{625} = x$

$x = 25$

7, 24, 25



$8^2 + 15^2 = x^2$

$64 + 225 = x^2$

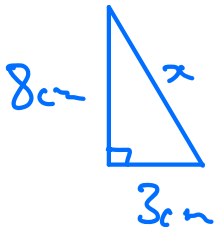
$289 = x^2$

8, 15, 17

$\sqrt{289} = x$

$x = 17$

By Pythagoras



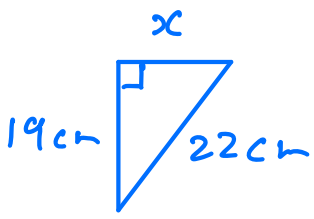
$3^2 + 8^2 = x^2$

$9 + 64 = x^2$

$73 = x^2$

$\sqrt{73} = x$

$\underline{x = 8.54\text{ cm}}$



By Pythagoras

$x^2 + 19^2 = 22^2$

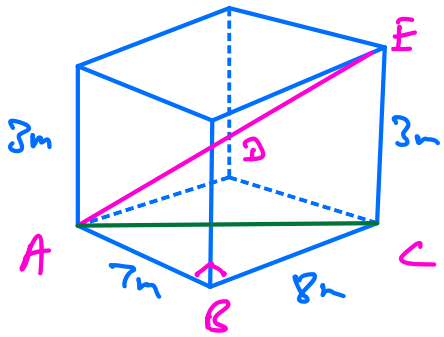
$x^2 = 22^2 - 19^2$

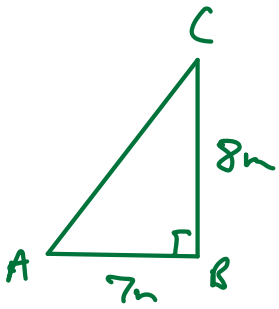
$$x^2 = 123$$
$$x = \sqrt{123}$$
$$x = 11.1 \text{ cm}$$

3D Example

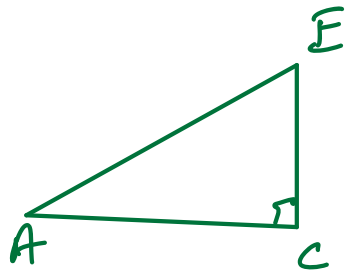
This room 8m x 7m x 3m

Find length of diagonal from base of door to ceiling in opposite corner





$$7^2 + 8^2 = AC^2$$
$$49 + 64 = AC^2$$
$$113 = AC^2$$



$$AC^2 + EC^2 = AE^2$$
$$113 + 3^2 = AE^2$$
$$113 + 9 = AE^2$$

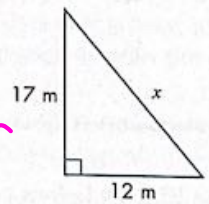
$122 = AE^2$

$AE = \sqrt{122} = 11.1\,m$

Classwork

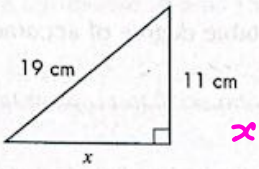
2 For each of the following triangles, calculate the length x, giving your answers to one decimal place.

a



$x = 20.8\,m$

b

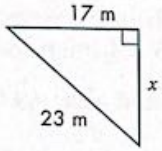


$x = 15.5\,cm$

HINTS AND TIPS

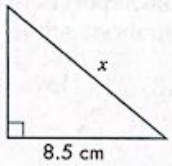
These examples are a mixture. Make sure you combine the squares of the sides correctly.

c



$x = 15.5\,m$

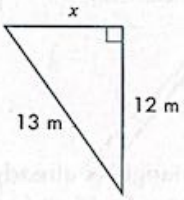
d



$x = 12.4\,m$

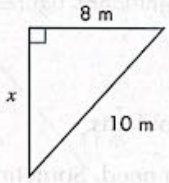
3 For each of the following triangles, find the length marked x.

a



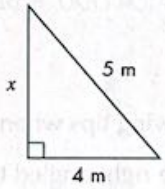
$x = 5\,m$

b



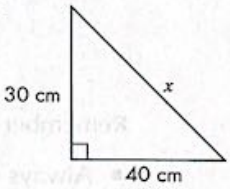
$x = 6\,m$

c



$x = 3\,m$

d



$x = 50\,cm$