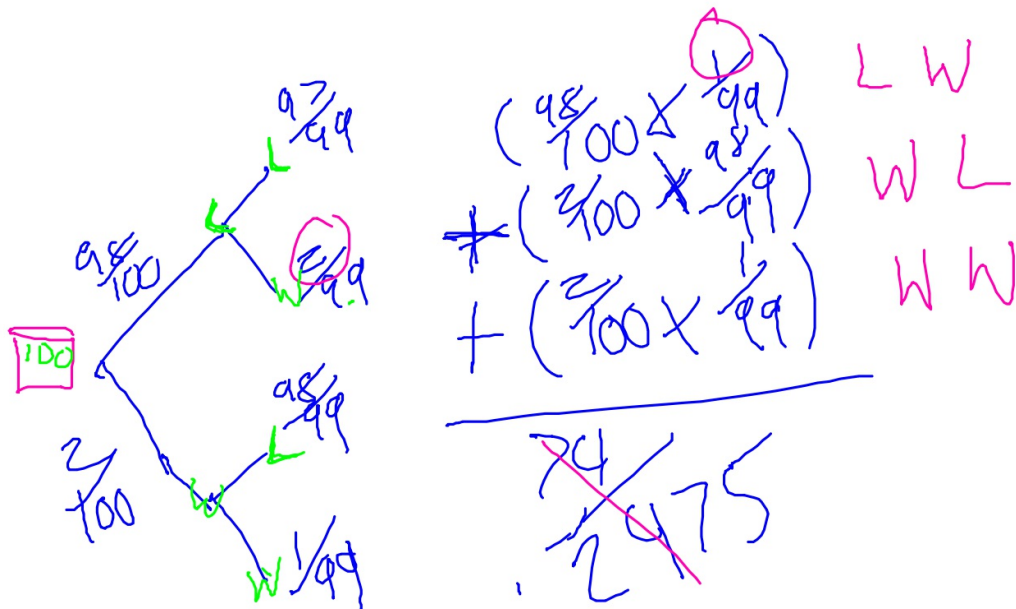


A man holds two tickets in a 100-ticket lottery in which there are two winning tickets. If no replacement occurs, determine the probability that he will win:

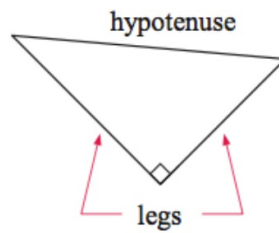
- a both prizes b neither prize c at least one prize.



Chapter 12

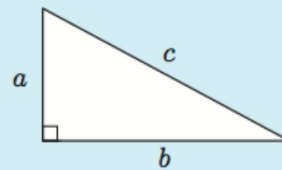
Pythagoras' theorem

- Contents:**
- A** Pythagoras' theorem
 - B** Right angles in geometry
 - C** The converse of Pythagoras' theorem

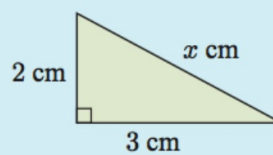


In a right angled triangle with legs a and b , and hypotenuse c ,

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

**Example 1****Self Tutor**

Find the length of the hypotenuse in the triangle shown.



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

$$13 = x^2$$

$$x = \sqrt{13}$$

ACCURACY OF ANSWERS

In **Example 1**, the solution $\sqrt{13}$ in surd form is exact, and is acceptable since it is irrational. If the answer was $\sqrt{16}$, you would be expected to simplify it to 4.

Answers given in surd form may not always be practical in real contexts. For example, if we needed to draw a line $\sqrt{13}$ centimetres long using a ruler, we would approximate the value to 3.6 cm using a calculator.

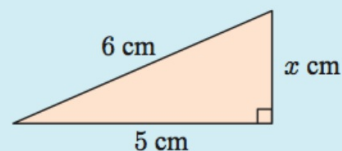
Within all IB Mathematics courses, final answers should be given either exactly or correct to 3 significant figures. Rounding to 3 significant figures should only occur at the end of a calculation and not at intermediate steps.

$$1357.8732\dots$$
$$\approx 1360 \text{ (3 s.f.)}$$

Example 2

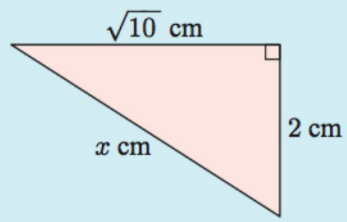
Self Tutor

Find the length of the third side of the given triangle.

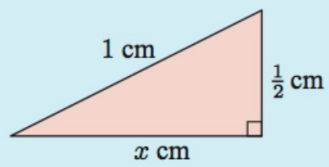


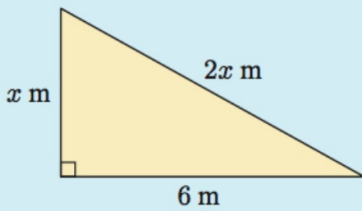
Example 3

Find x in the following:

**Example 4**

Solve for x :



Example 5Find the value of x :

$$x^2 + 6^2 = (2x)^2$$

$$x^2 + 36 = 4x^2$$

$$\begin{array}{r} -x^2 \\ \hline \end{array}$$

$$\frac{36}{3} = \frac{3x^2}{3}$$

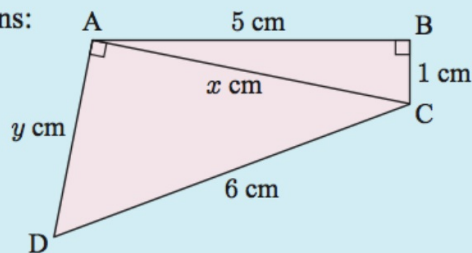
$$12 = x^2$$

$$x = \sqrt{12}$$

$$2\sqrt{3}$$

Example 6**Self Tutor**

Find the value of any unknowns:



$$5^2 + 1^2 = x^2$$

$$x = \sqrt{26}$$

$$(\sqrt{26})^2 + y^2 = 6^2$$

$$26 + y^2 = 36$$

$$y = \sqrt{10}$$

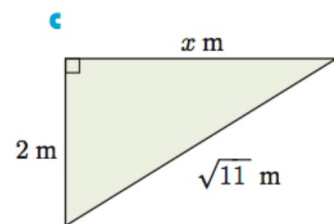
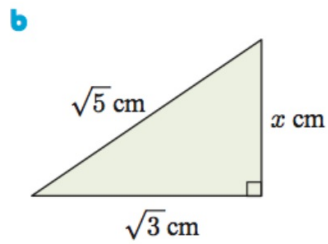
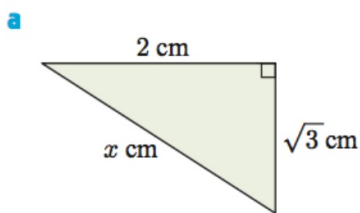
Assignment:

Exercise 12 A

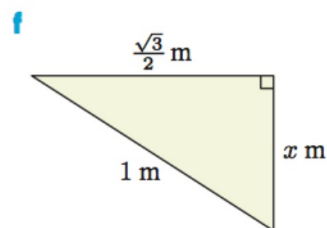
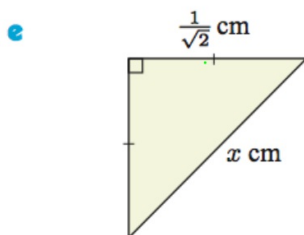
- # 3 a-c,
- # 4 e-f
- # 5 d-f
- # 6,7,8,9 all

Exercise 12 A # 3 a-c, # 4 e-f, # 5 d-f, # 6,7,8,9 all

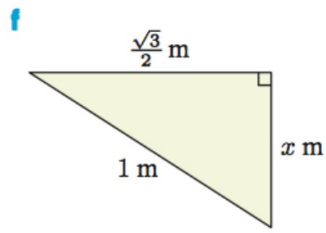
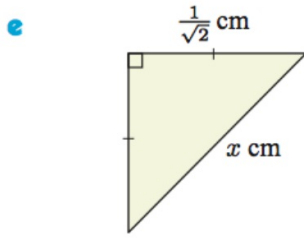
3 Find x in the following:



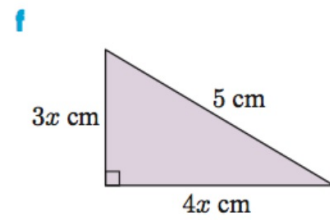
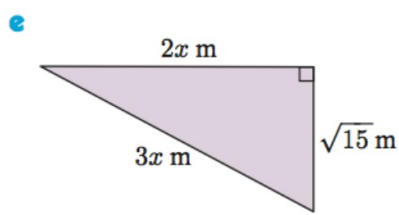
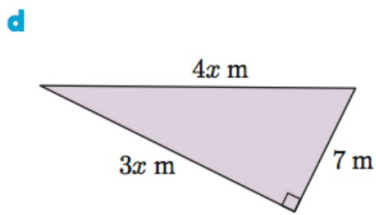
4 Solve for x :



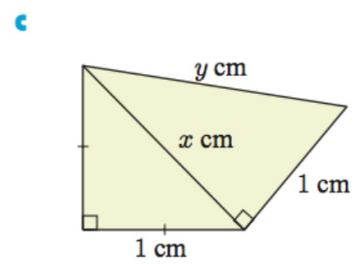
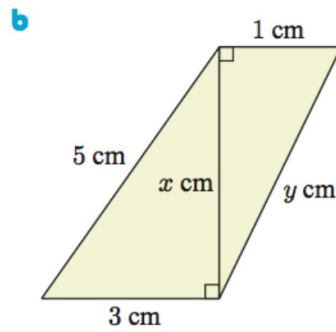
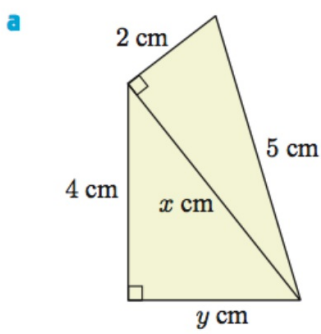
4 Solve for x :



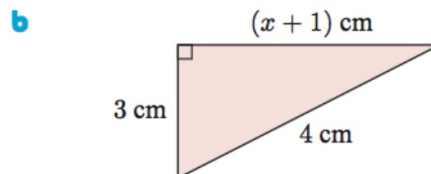
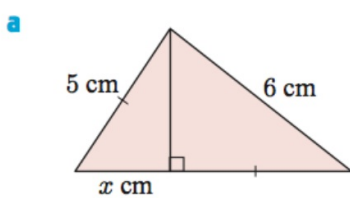
5 Find the value of x :



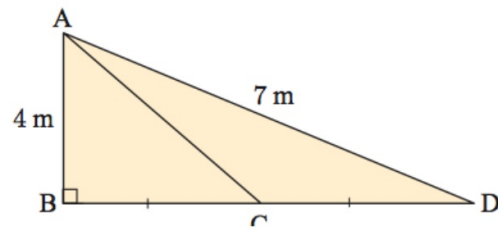
6 Find the value of any unknowns:



7 Find x :



8 Find the length AC:



9 In the following figures, draw additional lines to complete right angled triangles. Apply Pythagoras' theorem to find the unknown distance AB.

