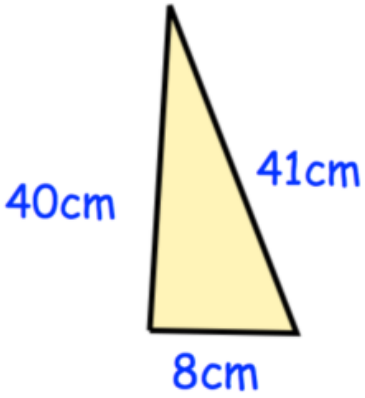
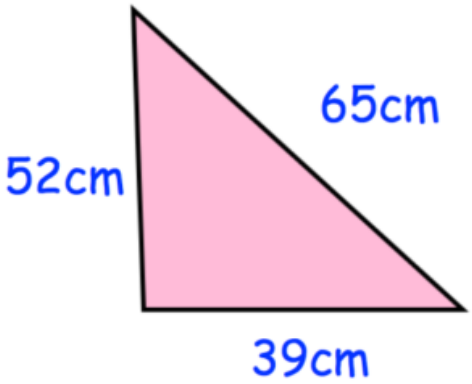
Pythagoras Theorem

CONTENTS

Worked example

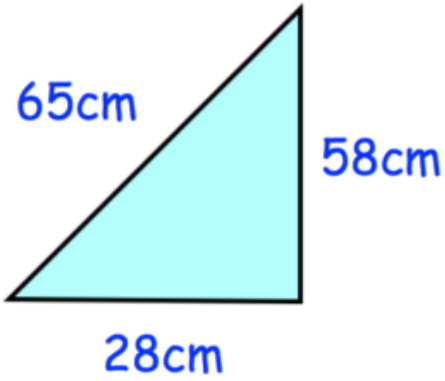
The triangle has been drawn inaccurately. Is the triangle right-angled?





Your turn

The triangle has been drawn inaccurately. Is the triangle right-angled?



No: $\sqrt{28^2 + 58^2}$

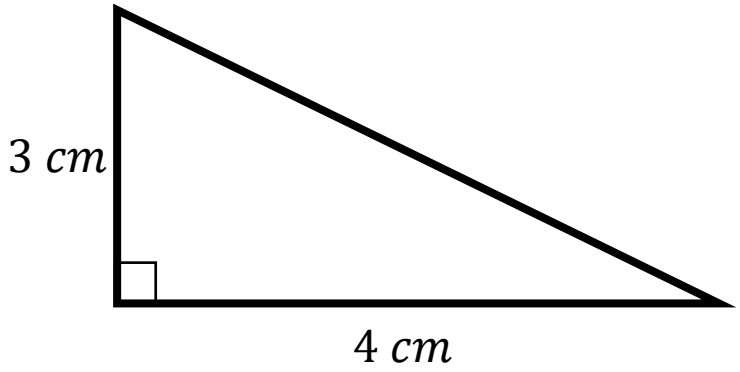
$= \sqrt{4148}$

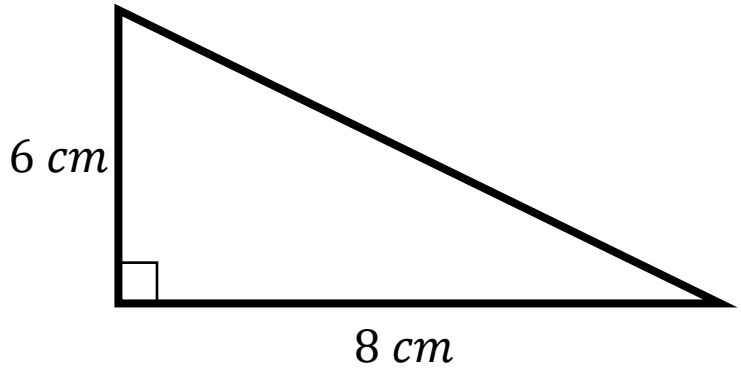
$= 64.4049 \ldots$

$\neq 65$

Questions used with permission from Corbettmaths: https://corbettmaths.com/

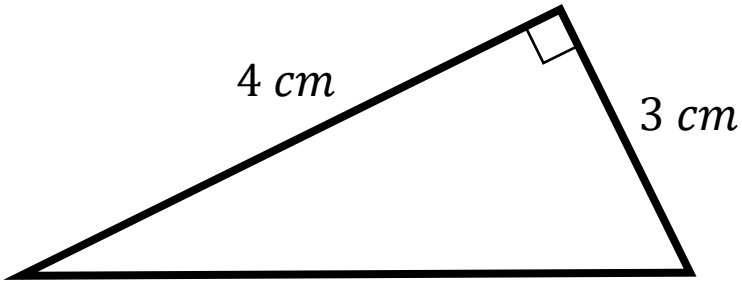
Worked example	Your turn
Calculate the length of the hypotenuse:	Calculate the length of the hypotenuse:

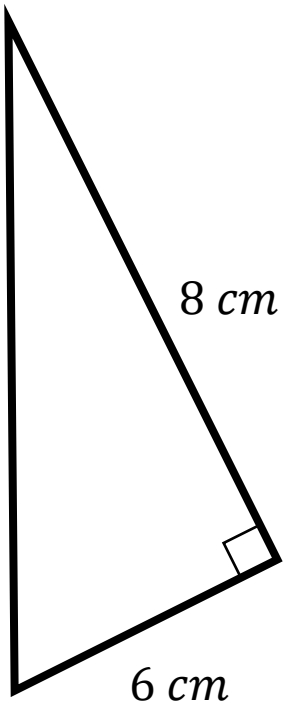




$10\ cm$

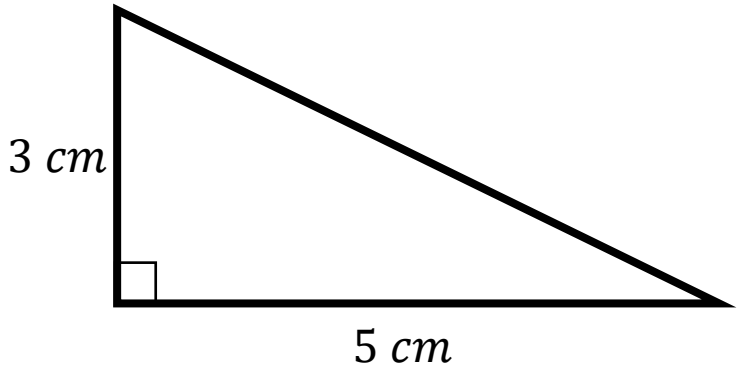
Worked example	Your turn
Calculate the length of the hypotenuse:	Calculate the length of the hypotenuse:

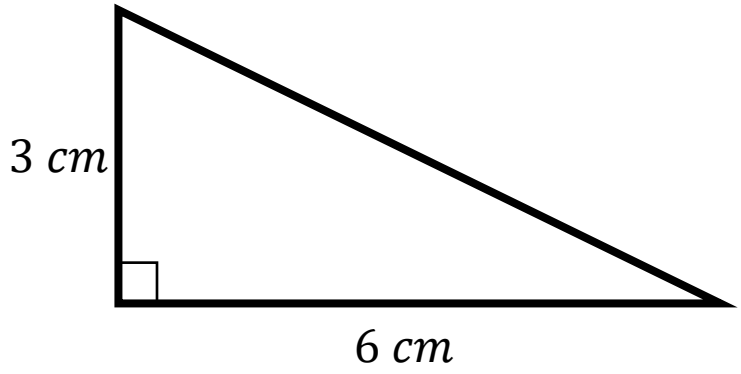




$10\ cm$

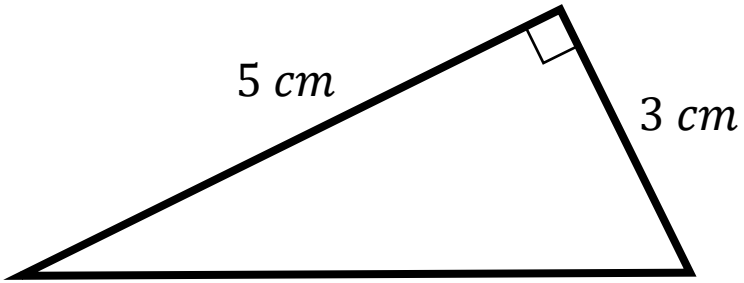
Worked example	Your turn
Calculate the length of the hypotenuse:	Calculate the length of the hypotenuse:

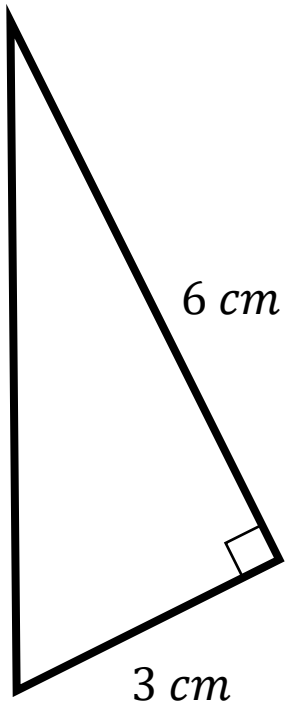




6.71 cm (2 dp)

Worked example	Your turn
Calculate the length of the hypotenuse:	Calculate the length of the hypotenuse:

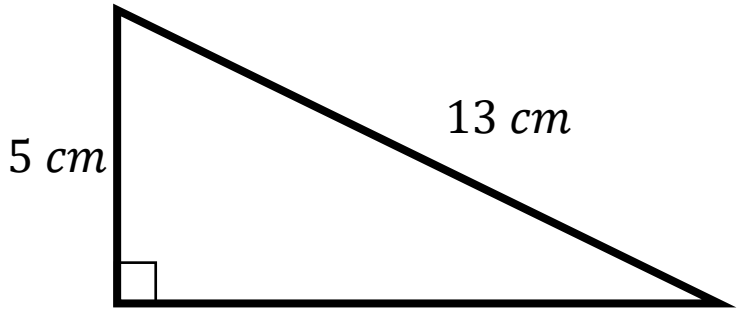




6.71 cm (2 dp)

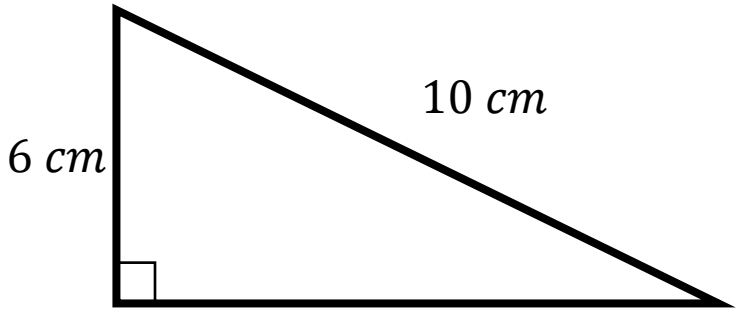
Worked example

Calculate the missing side length:



Your turn

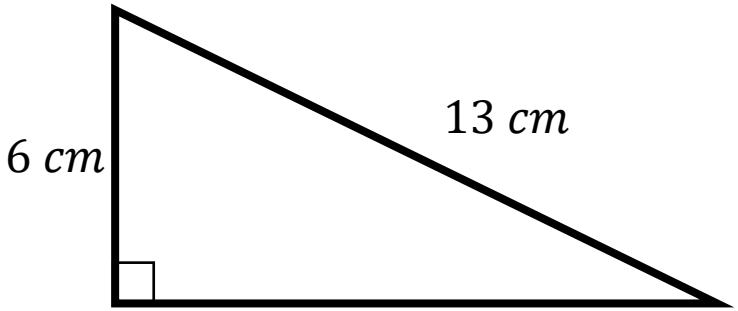
Calculate the missing side length:



$8\ cm$

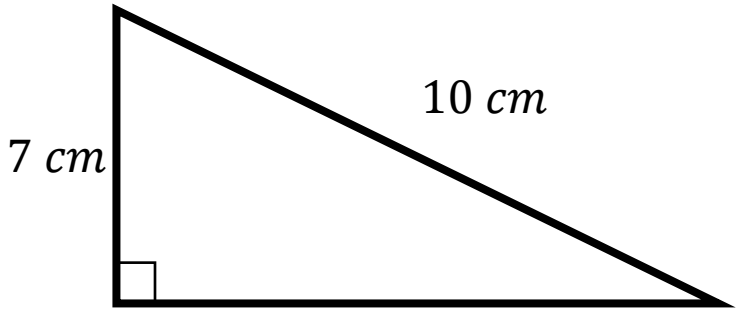
Worked example

Calculate the missing side length:



Your turn

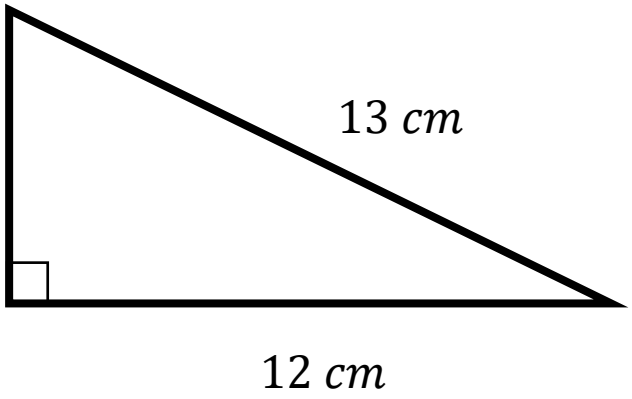
Calculate the missing side length:



$7.14\ cm$ (2 dp)

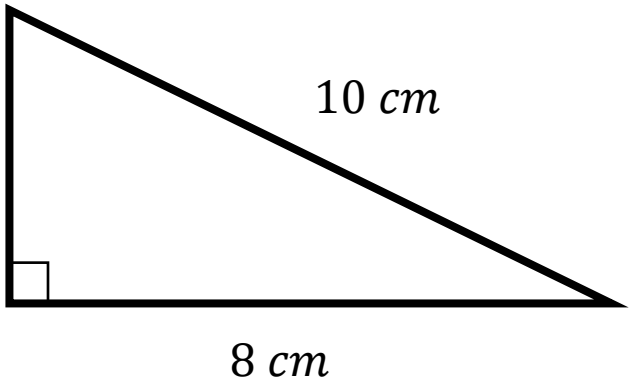
Worked example

Calculate the missing side length:



Your turn

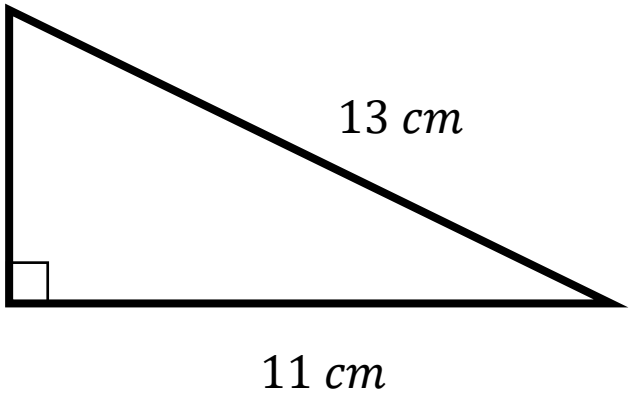
Calculate the missing side length:



$6\ cm$

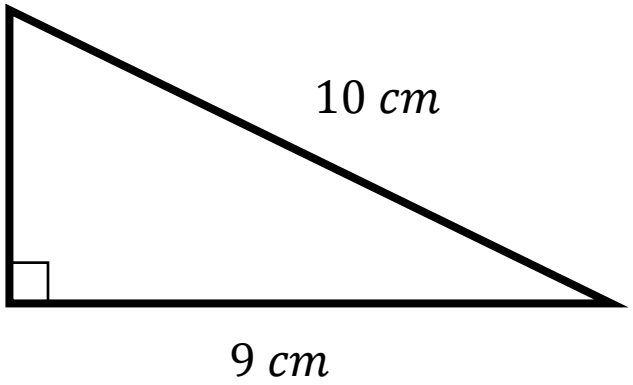
Worked example

Calculate the missing side length:



Your turn

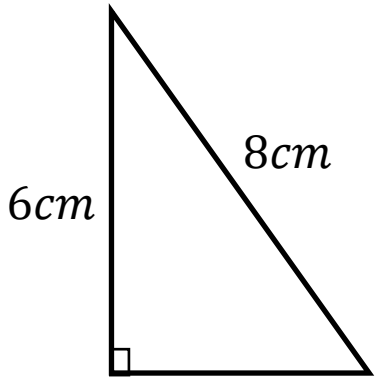
Calculate the missing side length:

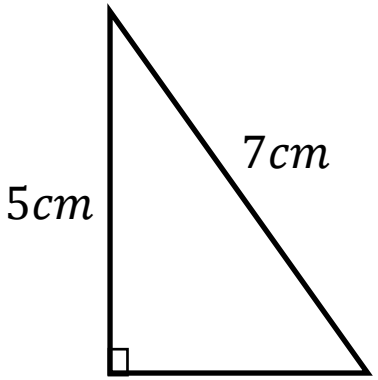


4.36 cm (2 dp)

Worked example	Your turn
Find the distance between the coordinates: $(0, 0)$ and $(5, 7)$	Find the distance between the coordinates: $(-2, -3)$ and $(8, 11)$
	17.20 (2 dp)
$(-1, -4)$ and $(4, 3)$	

Worked example	Your turn
Calculate the area of this triangle:	Calculate the area of this triangle:

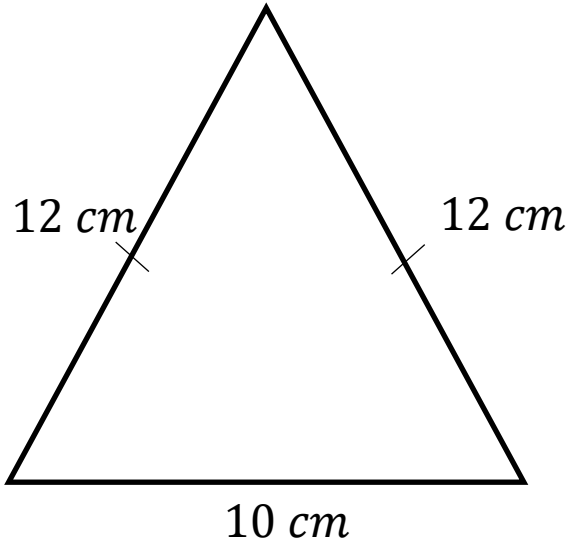




$12.25\ cm^2$ (2 dp)

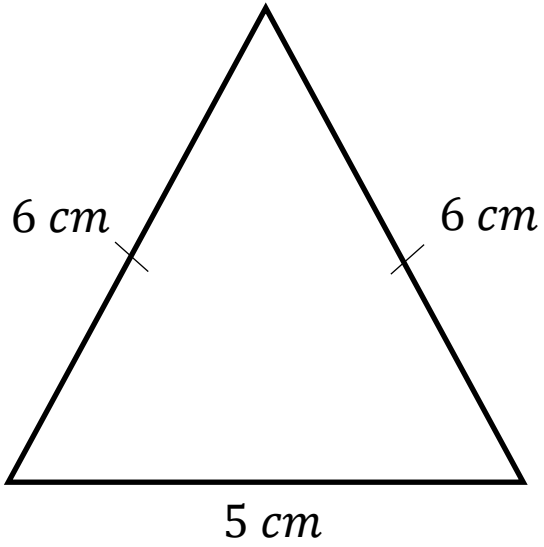
Worked example

Find the area of this triangle:



Your turn

Find the area of this triangle:



$13.64\ cm^2$ (2 dp)

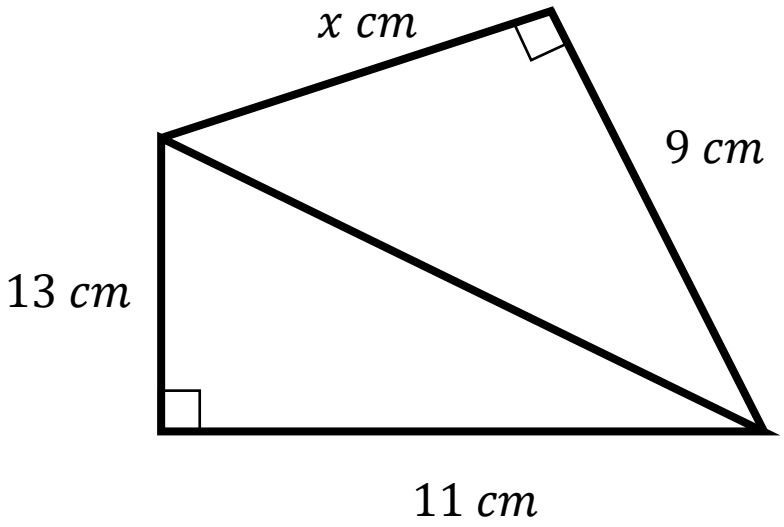
Worked example	Your turn
A person walks $5\ km$ due east, then 8 km due south. How far did they walk? How far are they from the start?	A person walks $10\ km$ due east, then 4 km due south. How far did they walk? How far are they from the start? A

Worked example	Your turn
A rectangle has one length which is 5 cm long, and a diagonal of 8 cm. Calculate the area and perimeter of the rectangle.	A rectangle has one length which is 4 cm long, and a diagonal of 10 cm. Calculate the area and perimeter of the rectangle. Area $= 36.66\ cm^2$ (2 dp) Perimeter $= 26.33\ cm$ (2 dp)

Worked example	Your turn
A triangle has side lengths of 5 cm, 8 cm and 10 cm. Is the triangle right-angled?	A triangle has side lengths of 10 cm, 16 cm and 20 cm. Is the triangle right-angled? No, $10^2 + 16^2 \neq 20^2$
A triangle has side lengths of 6 cm, 8 cm and 10 cm. Is the triangle right-angled?	

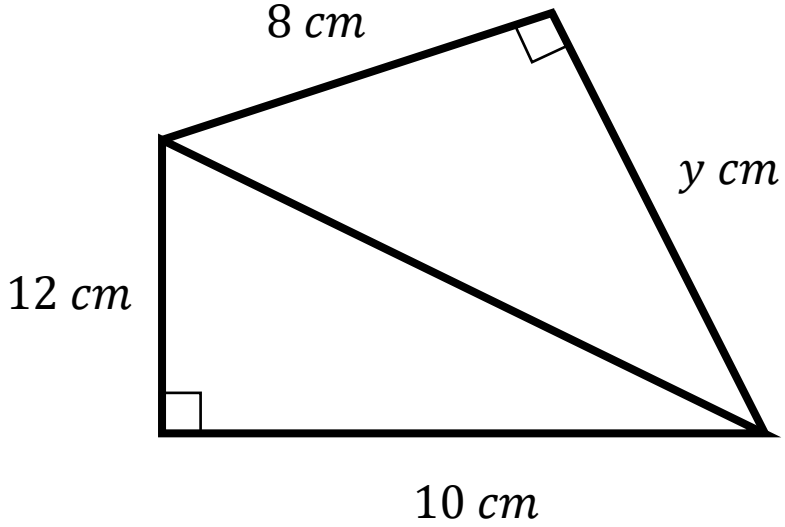
Worked example

Calculate x



Your turn

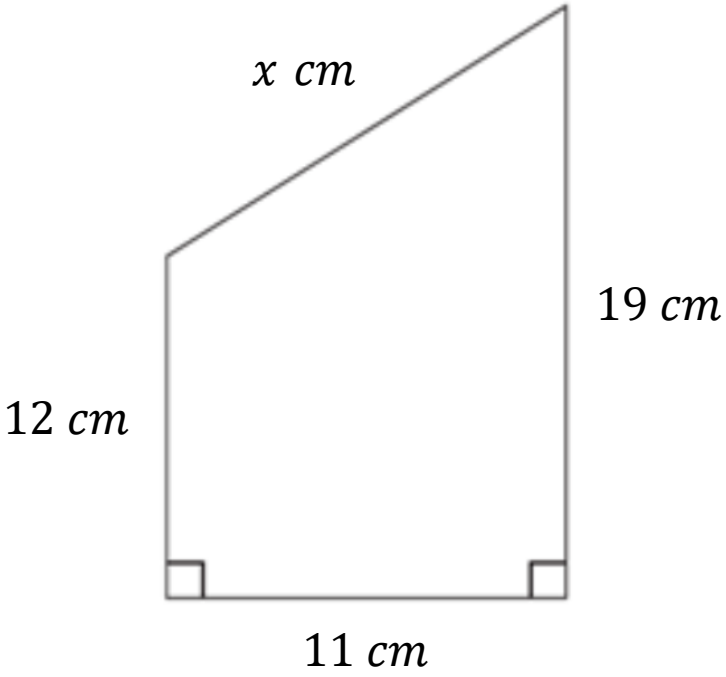
Calculate y



$y = 13.42$ (2 dp)

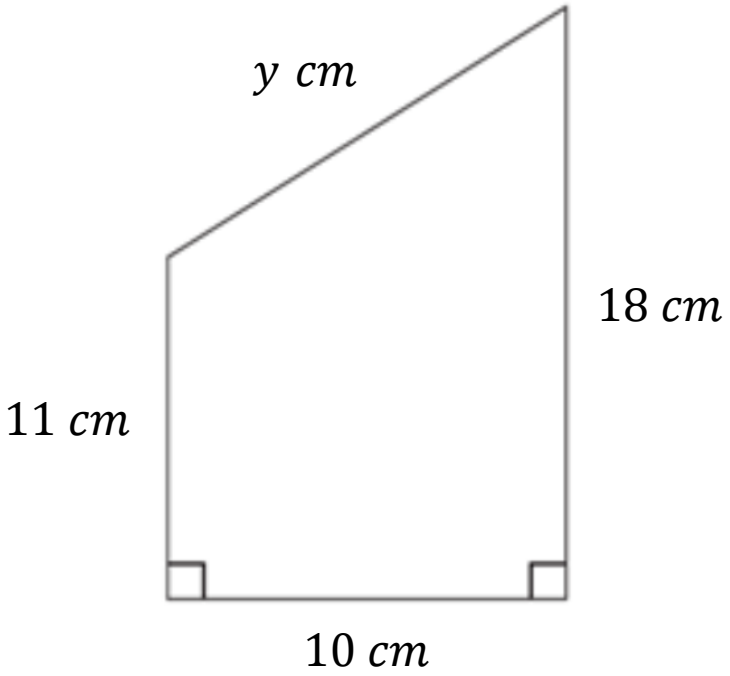
Worked example

Calculate x



Your turn

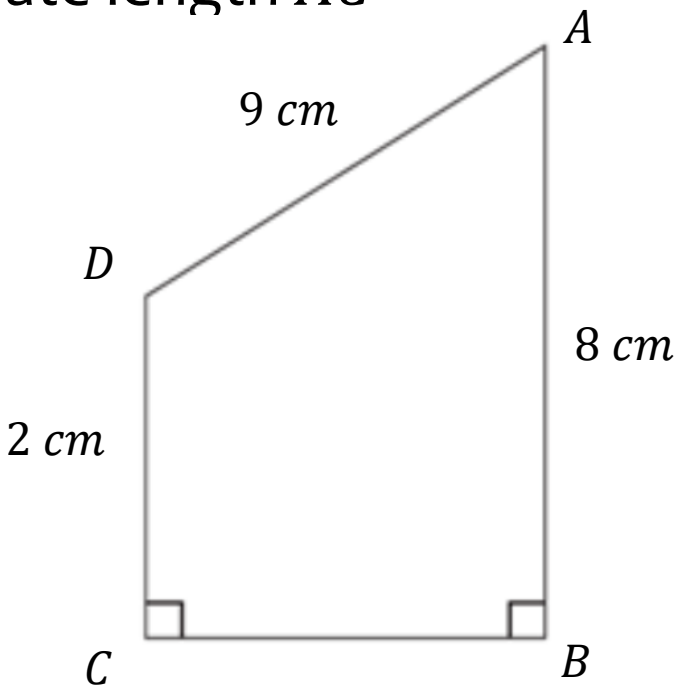
Calculate y



$y = 12.21$ (2 dp)

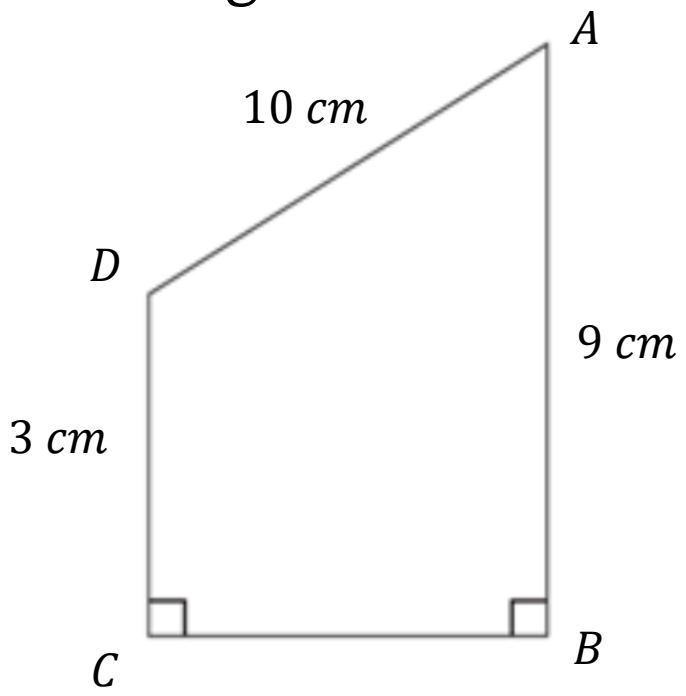
Worked example

Calculate length AC



Your turn

Calculate length AC



12.04 cm (2 dp)

Worked example	Your turn
The lengths of a right-angled triangle are $x, x+7, x+8$. Find the value of x	The lengths of a right-angled triangle are $x, x+2, x+4$. Find the value of x $x = 6$

Worked example	Your turn
The lengths of a right-angled triangle are $x, x+7, x+8$. Find the area of the triangle	The lengths of a right-angled triangle are $x, x+3, x+6$. Find the area of the triangle 24 square units

Worked example	Your turn
The lengths of a right-angled triangle are $x, x+7, x+8$. Find the perimeter of the triangle	The lengths of a right-angled triangle are $x, x+1, x+2$. Find the perimeter of the triangle 12 units

Worked example	Your turn
An equilateral triangle has a perimeter of 24 cm. Find its area	An equilateral triangle has a perimeter of 12 cm. Find its area $6.93\ cm^2$ (2 dp)

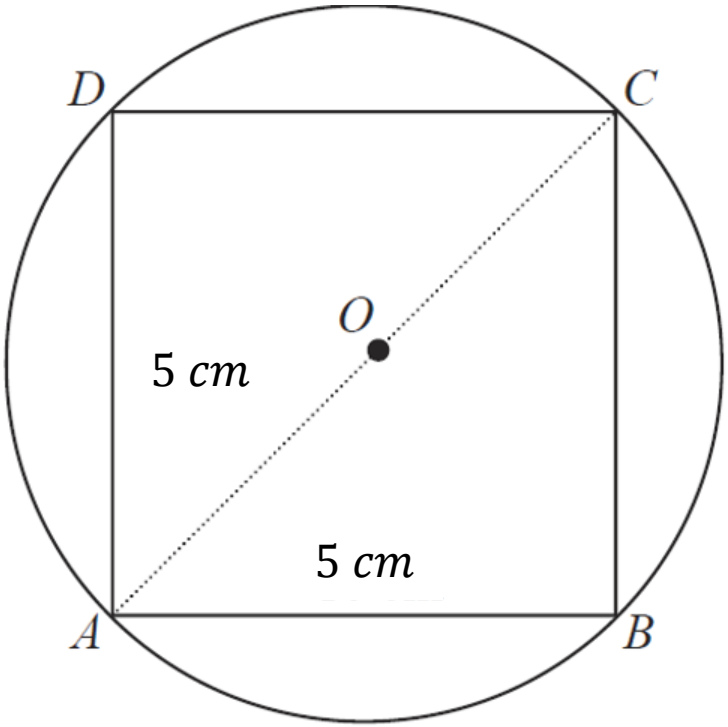
Worked example	Your turn
Point A has coordinates $(2, 5)$. Point B has coordinates $(x, 10)$. Given that the distance AB is $\sqrt{34}$, find the possible values of x	Point A has coordinates $(5, 2)$. Point B has coordinates $(x, 10)$. Given that the distance AB is $\sqrt{65}$, find the possible values of x $x = 4 \; or \; 6$

Worked example	Your turn
To generate a Pythagoras triple, choose any two positive integers, a and b. 1) Calculate the sum of their squares 2) Calculate the difference between their squares 3) Calculate double their product You will have a Pythagoras Triple. eg. if we start with 3 and 4	Using the method, find a Pythagoras triple starting with the numbers 2 and 5. $20^2 + 21^2 = 29^2$ Can you prove why it works algebraically?

Worked example	Your turn
A cube has side lengths of 10 cm. Find the length of the longest diagonal.	A cube has side lengths of 5 cm. Find the length of the longest diagonal. $8.66\ cm$ (2 dp)

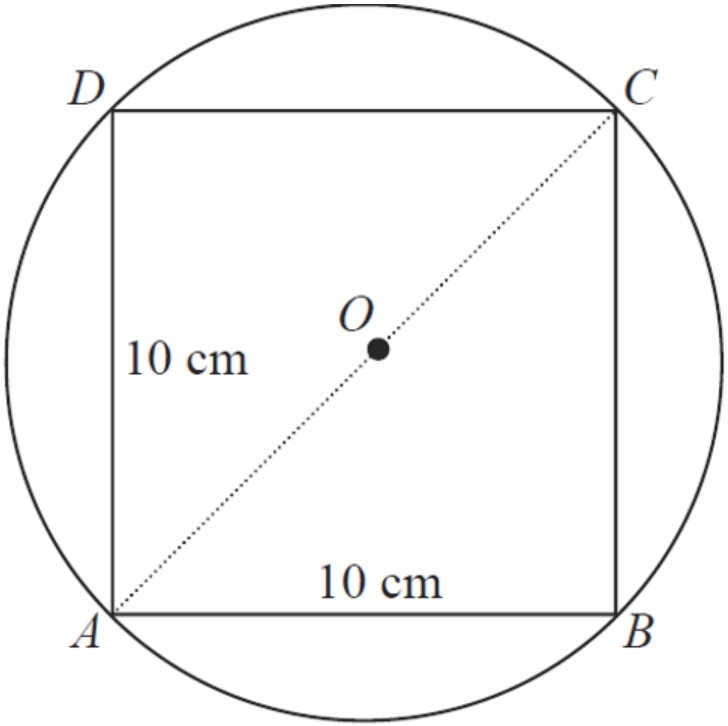
Worked example

Calculate the area of the circle



Your turn

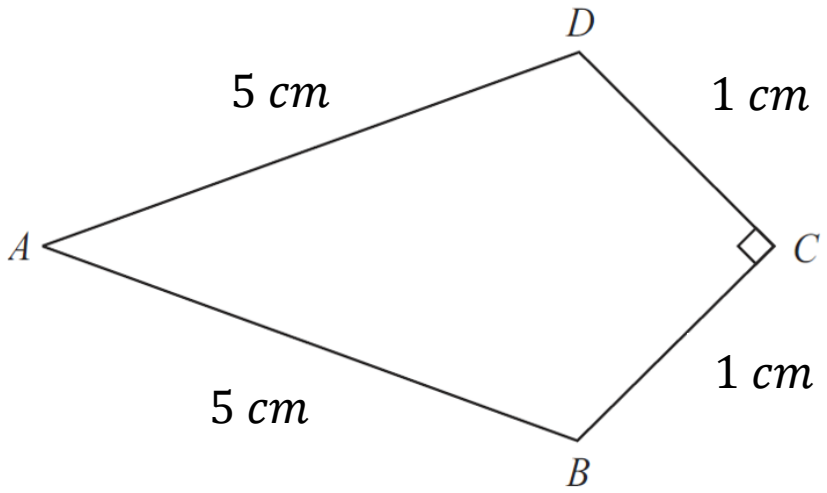
Calculate the area of the circle



$44.4\ cm^2$ (1 dp)

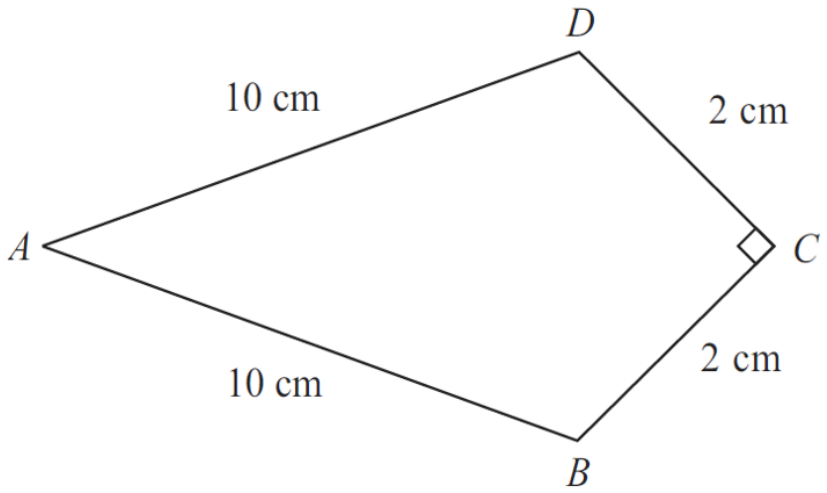
Worked example

Calculate the area of the kite

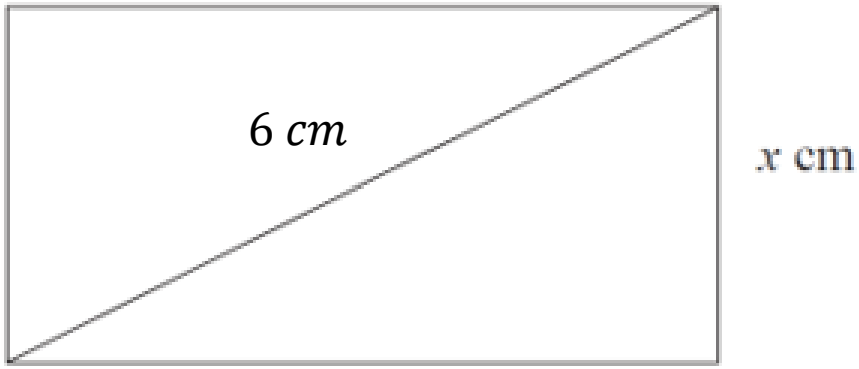
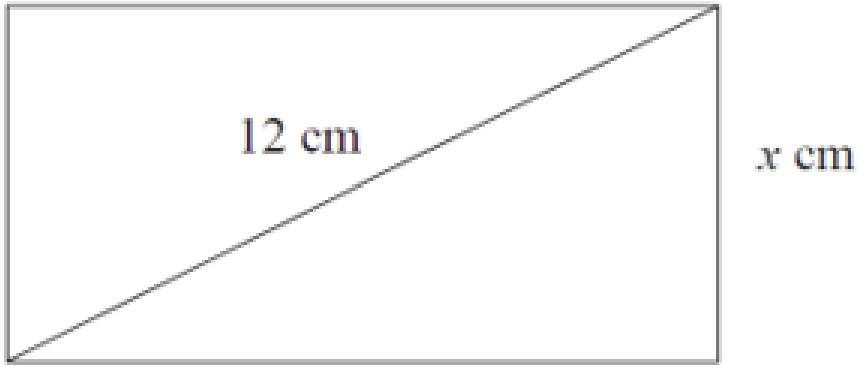


Your turn

Calculate the area of the kite



$16.0\ cm^2$ (1 dp)

Worked example	Your turn
The perimeter of the rectangle is $14\ cm$. Work out the possible values of x	The perimeter of the rectangle is $28\ cm$. Work out the possible values of x
	
	$x = 11.8$ or 2.2 (1 dp)

Worked example	Your turn
$a = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$ Find the magnitude of a	$b = \begin{pmatrix} 3 \\ -4 \end{pmatrix}$ Find the magnitude of a $\lvert a \rvert = 5$
$a = \begin{pmatrix} -5 \\ 12 \end{pmatrix}$ Find the magnitude of a	