No calculators are permitted in this exercise.

Ex 9.1

Worked Example for Simple Questions

Name:

What is the $y-$coordinate of the point $(5, -6, 0)$?

(x, y, z)

Answer:

-6

Question 1

What is the $y-$coordinate of the point $(-8, 10, -5)$?

Question 2

What is the $x-$coordinate of the point $(4, 0, -7)$?

Question 3

What is the $x-$coordinate of the point $(2, -3, 1)$?

Question 4

What is the $z-$coordinate of the point $(0, 5, 1)$?

Question 5

What is the $x-$coordinate of the point $(3, 1, 0)$?

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Worked Example for Standard Questions

A point has coordinates $(-5, 3, 9)$.
(x, y, z)

Fill in the blanks:

y-coordinate $=$ 3

z-coordinate $=$ 9

x-coordinate $=$ -5

Question 6

A point has coordinates $(2, -3, 0)$.

Fill in the blanks:

x-coordinate $=$ ☐

y-coordinate $=$ ☐

z-coordinate $=$ ☐

Question 7

A point has coordinates $(-8, 1, 5)$.

Fill in the blanks:

x-coordinate $=$ ☐

z-coordinate $=$ ☐

y-coordinate $=$ ☐

Question 8

A point has coordinates $(11, 6, -3)$.

Fill in the blanks:

y-coordinate $=$ ☐

x-coordinate $=$ ☐

z-coordinate $=$ ☐

Question 9

A point has coordinates $(7, 11, 24)$.

Fill in the blanks:

y-coordinate $=$ ☐

z-coordinate $=$ ☐

x-coordinate $=$ ☐

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Question 10

A point has coordinates $(0, -4, 1)$.

Fill in the blanks:

z-coordinate $=$ ☐

y-coordinate $=$ ☐

x-coordinate $=$ ☐

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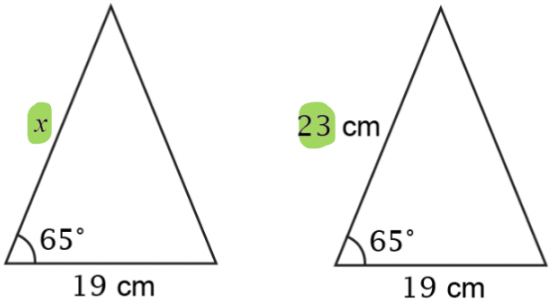
Ex 9.3

No calculators are permitted in this exercise.

Worked Example for Simple Questions

The triangles below are **congruent**.



* congruent means the triangles are exactly the same.
* x is in the same position as the side labelled 23 cm

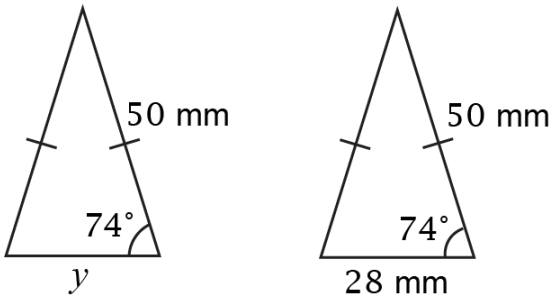
$\therefore x = 23$ cm

What is the length of the side labelled x?

23 cm

Question 1

The triangles below are **congruent**.

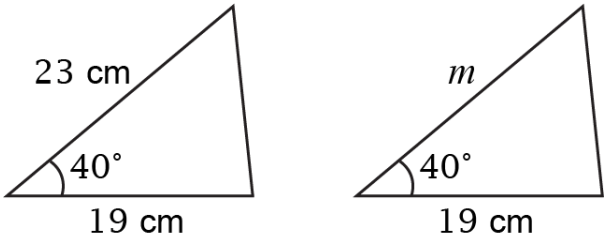


What is the length of the side labelled y?

mm

Question 2

The triangles below are **congruent**.



What is the length of the side labelled m?

cm

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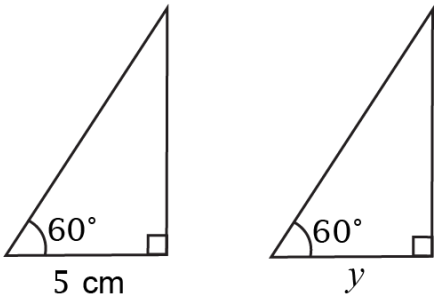
Finding Unknowns using Congruent Triangles

Question 3

The triangles below are **congruent**.

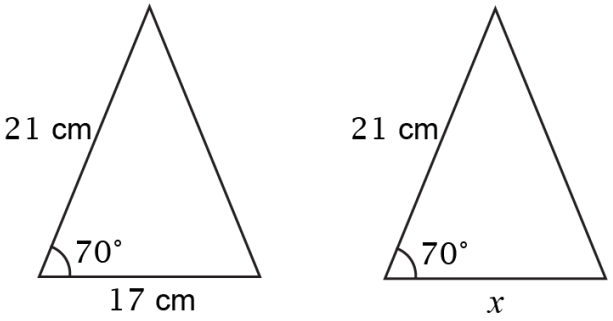


What is the length of the side labelled y?

$\square$ cm

Question 4

The triangles below are **congruent**.

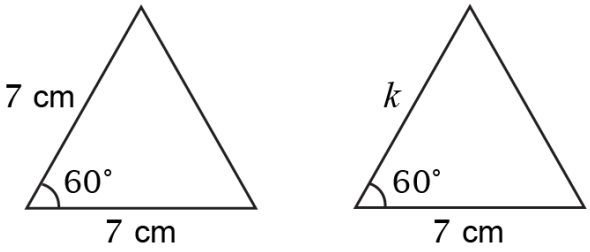


What is the length of the side labelled x?

$\square$ cm

Question 5

The triangles below are **congruent**.



What is the length of the side labelled k?

$\square$ cm

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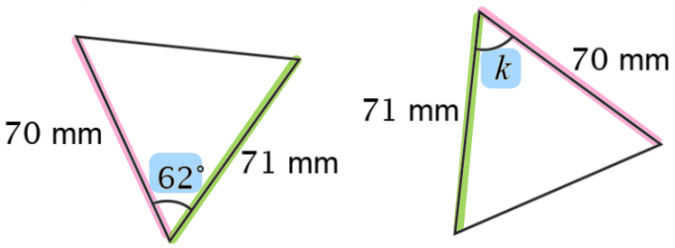
Worked Example for Standard Questions

The triangles below are **congruent**.



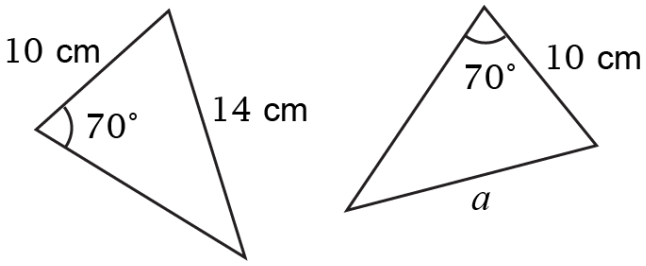
What is the size of the angle labelled k?

62 °

* Congruent shapes have the exact same size and shape.
* These triangles are rotations of each other.
Comparing the labelled sides, we see the angle k must be 62°.

Question 6

The triangles below are **congruent**.

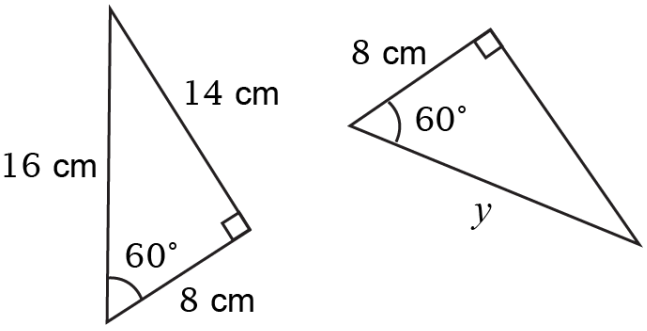


What is the length of the side labelled a?

cm

Question 7

The triangles below are **congruent**.



What is the length of the side labelled y?

cm

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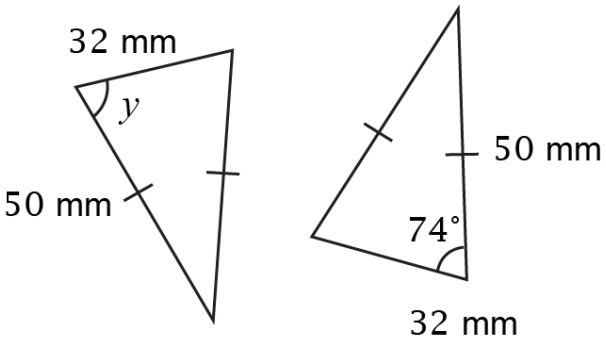
Finding Unknowns using Congruent Triangles

Question 8

The triangles below are **congruent**.

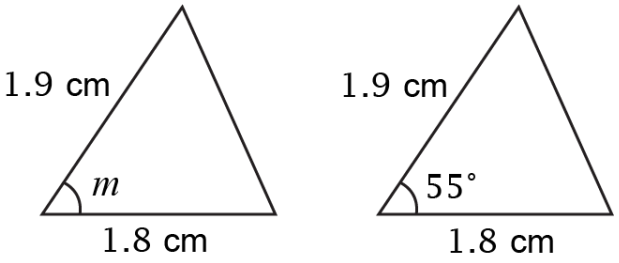


What is the size of the angle labelled y?

$\square$ °

Question 9

The triangles below are **congruent**.

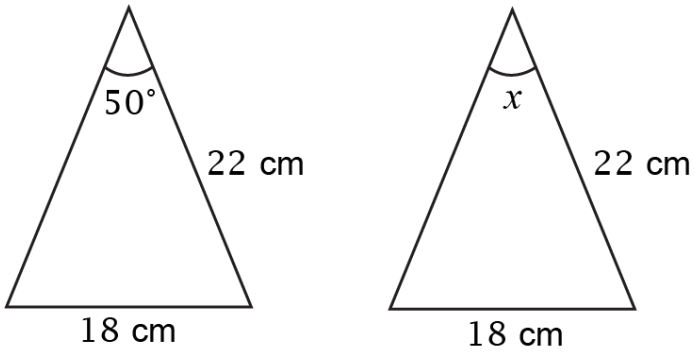


What is the size of the angle labelled m?

$\square$ °

Question 10

The triangles below are **congruent**.



What is the size of the angle labelled x?

$\square$ °

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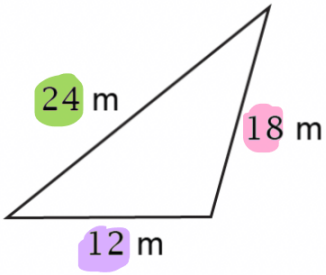
Ex 9.5

A calculator is permitted throughout this exercise.

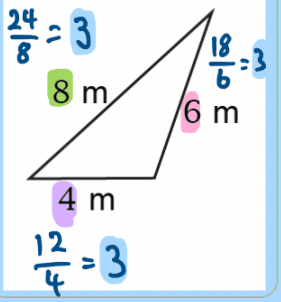
Worked Example for Simple Questions



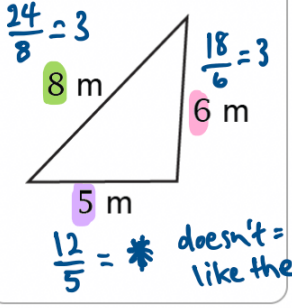
* Compare the ratios of corresponding sides in the answers
* A is 3 times smaller on all sides, so is similar

Which triangle is similar to the triangle above?

A



B



12/5 = * doesn't = 3 like the other sides

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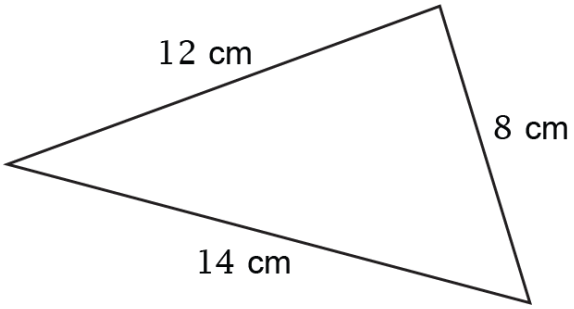
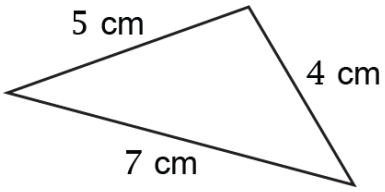
Question 1



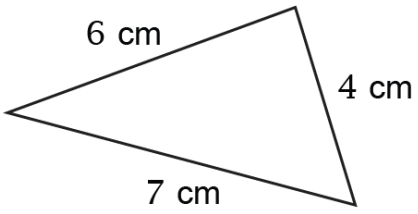
Which triangle is similar to the triangle above?

Circle the correct option

A



B



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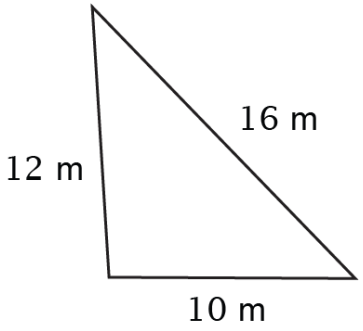
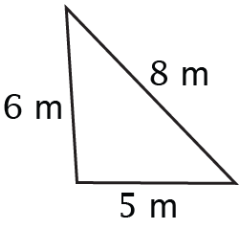
Question 2



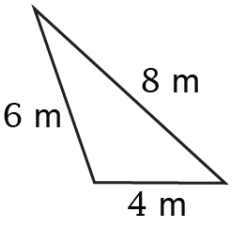
Which triangle is similar to the triangle above?

Circle the correct option

A



B



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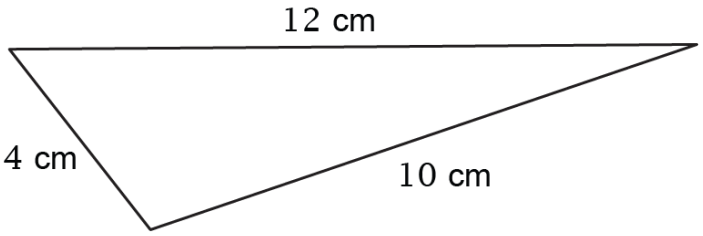
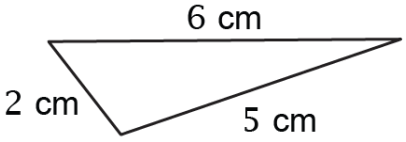
Question 3



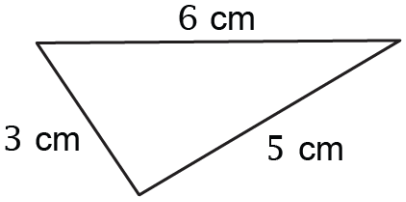
Which triangle is similar to the triangle above?

Circle the correct option

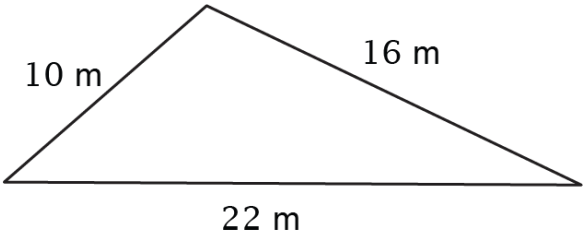
A



B



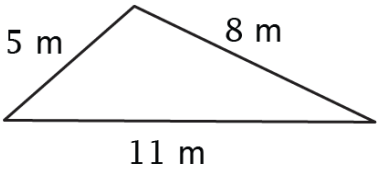
Question 4



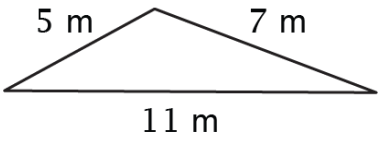
Which triangle is similar to the triangle above?

Circle the correct option

A



B



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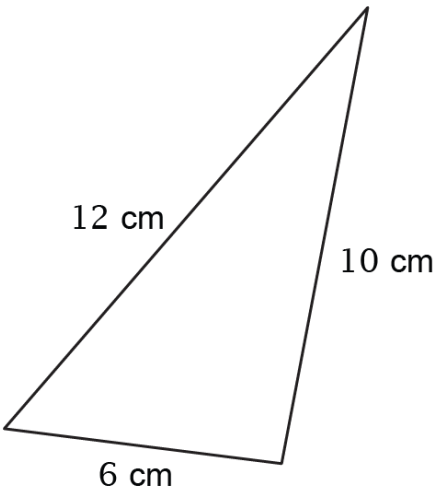
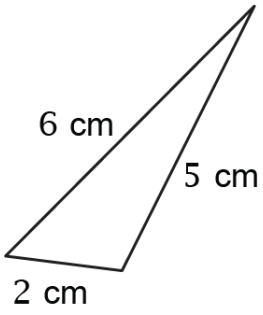
Question 5



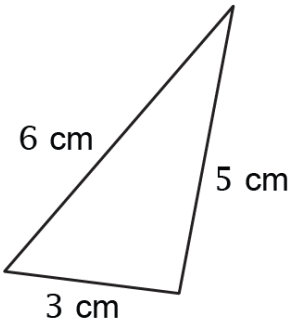
Which triangle is similar to the triangle above?

Circle the correct option

A



B



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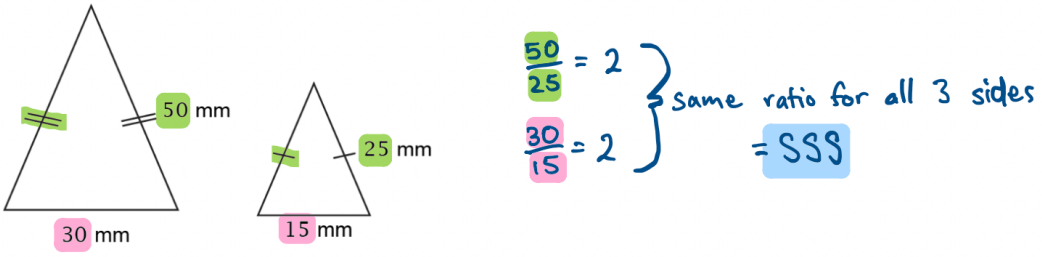
Worked Example for Standard Questions

Which of the following similarity tests can be used to show the two triangles are similar?



A

AAA: all three matching angles are the same size

B

SSS: all three matching sides are in the same ratio

C

SAS: two matching sides are in the same ratio, the angle between the sides is the same size

D

RHS: both have a right angle, and the hypotenuse and another side are in the same ratio

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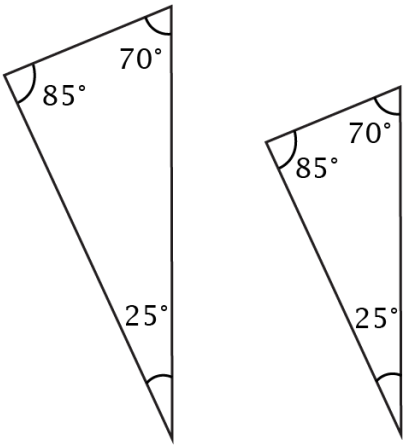
Question 6

Which of the following similarity tests can be used to show the two triangles are similar?



Circle the correct option

A

AAA: all three matching angles are the same size

B

SSS: all three matching sides are in the same ratio

C

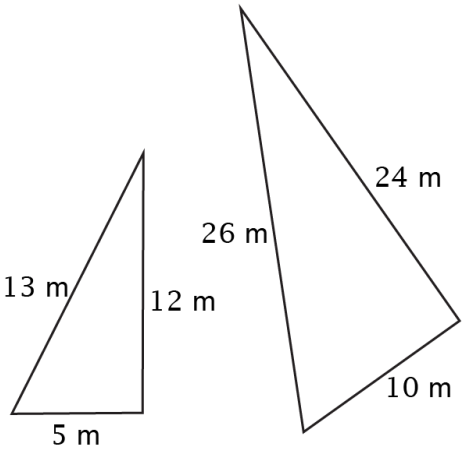
SAS: two matching sides are in the same ratio, the angle between the sides is the same size

D

RHS: both have a right angle, and the hypotenuse and another side are in the same ratio

Question 7

Which of the following similarity tests can be used to show the two triangles are similar?



Circle the correct option

A

AAA: all three matching angles are the same size

B

SSS: all three matching sides are in the same ratio

C

SAS: two matching sides are in the same ratio, the angle between the sides is the same size

D

RHS: both have a right angle, and the hypotenuse and another side are in the same ratio

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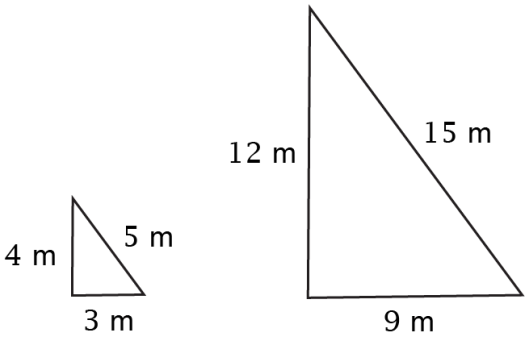
Question 8

Which of the following similarity tests can be used to show the two triangles are similar?



Circle the correct option

A

AAA: all three matching angles are the same size

B

SSS: all three matching sides are in the same ratio

C

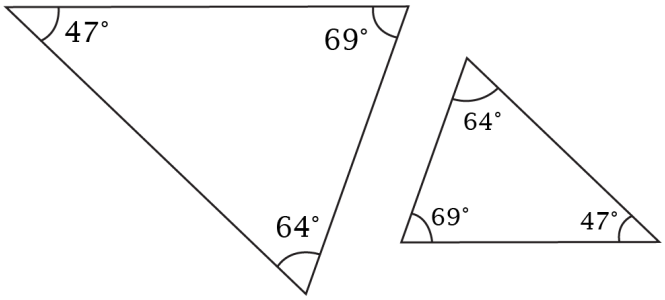
SAS: two matching sides are in the same ratio, the angle between the sides is the same size

D

RHS: both have a right angle, and the hypotenuse and another side are in the same ratio

Question 9

Which of the following similarity tests can be used to show the two triangles are similar?



Circle the correct option

A

AAA: all three matching angles are the same size

B

SSS: all three matching sides are in the same ratio

C

SAS: two matching sides are in the same ratio, the angle between the sides is the same size

D

RHS: both have a right angle, and the hypotenuse and another side are in the same ratio

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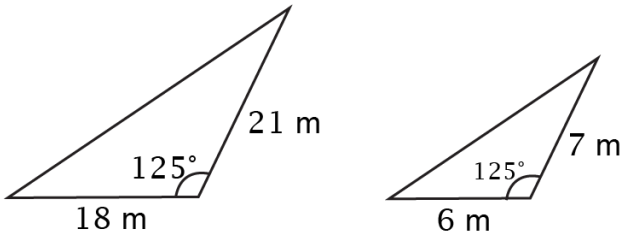
Question 10

Which of the following similarity tests can be used to show the two triangles are similar?



Circle the correct option

A

AAA: all three matching angles are the same size

B

SSS: all three matching sides are in the same ratio

C

SAS: two matching sides are in the same ratio, the angle between the sides is the same size

D

RHS: both have a right angle, and the hypotenuse and another side are in the same ratio

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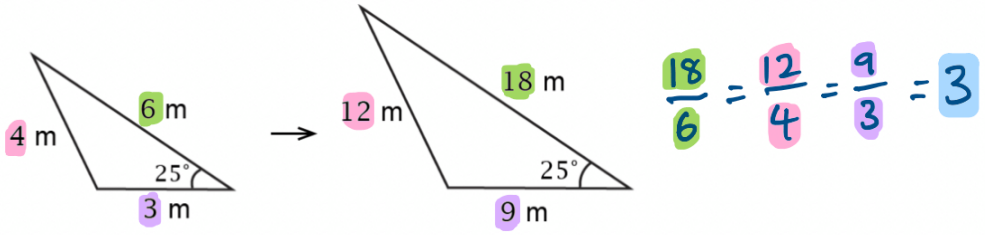
Using Similarity to find Unknown Sides

Ex 9.7

A scientific calculator is permitted throughout this exercise.

Worked Example for Simple Questions

Below are a pair of **similar** triangles.

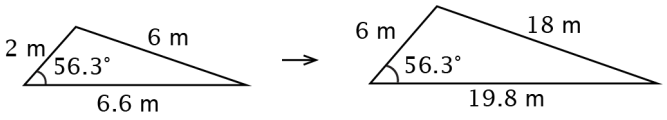


$\frac{18}{6} = \frac{12}{4} = \frac{9}{3} = 3$

What **scale factor** has been used to **enlarge** the triangle? 3

Question 1

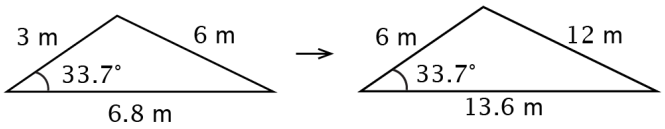
Below are a pair of **similar** triangles.



What **scale factor** has been used to **enlarge** the triangle?

Question 2

Below are a pair of **similar** triangles.



What **scale factor** has been used to **enlarge** the triangle?

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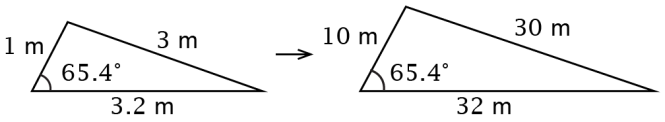
Using Similarity to find Unknown Sides

Question 3

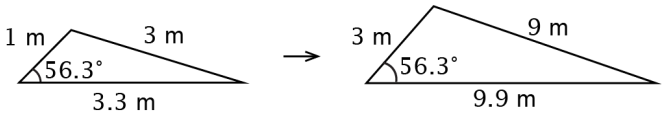
Below are a pair of **similar** triangles.



What **scale factor** has been used to **enlarge** the triangle?

Question 4

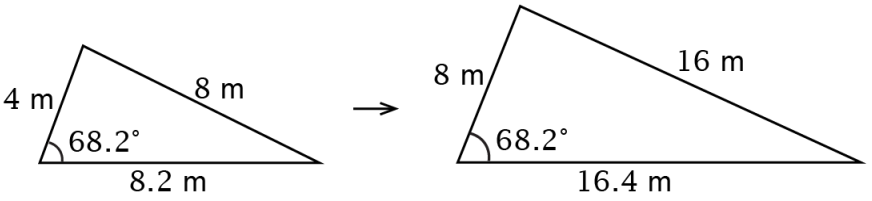
Below are a pair of **similar** triangles.



What **scale factor** has been used to **enlarge** the triangle?

Question 5

Below are a pair of **similar** triangles.



What **scale factor** has been used to **enlarge** the triangle?

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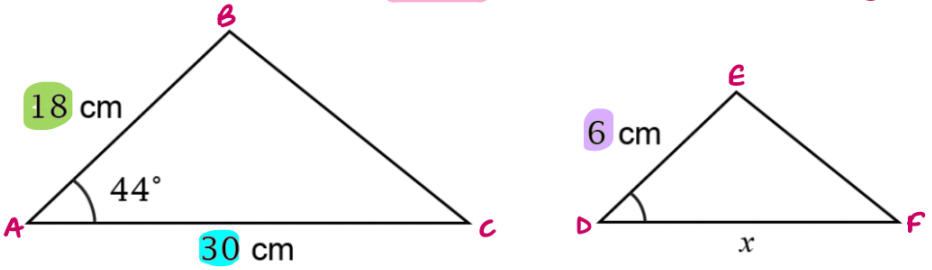
Using Similarity to find Unknown Sides

Worked Example for Standard Questions

The following triangles are similar. ← ΔABC is an enlargement of ΔDEF



Use the scale factor to calculate the length, x.

$x =$ 10 cm

1. Find the scale factor (k)

$$k = \frac{\overline{AB}}{\overline{DE}} = \frac{18}{6} = 3$$

2. Use the scale factor to find x

$$\frac{\overline{AC}}{\overline{DF}} = k$$

$$\frac{30}{x} = 3$$

$$x = \frac{30}{3} = 10$$

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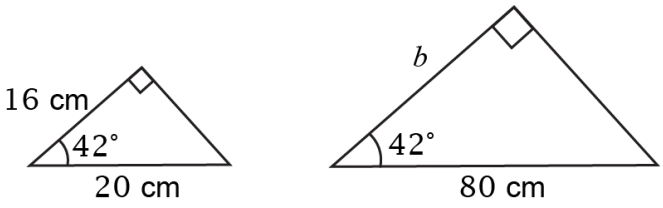
Question 6

The following triangles are similar.

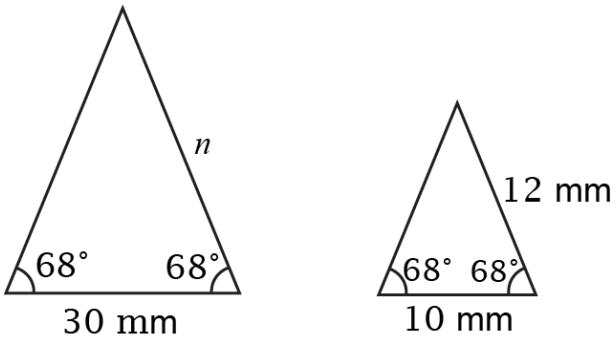


Use the scale factor to calculate the length, b.

$b =$ ☐ cm

Question 7

The following triangles are similar.

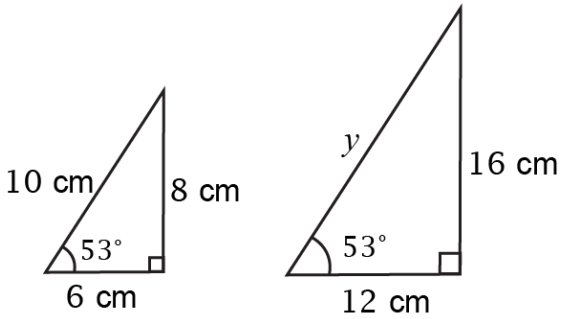


Use the scale factor to calculate the length, n.

$n =$ ☐ mm

Question 8

The following triangles are similar.

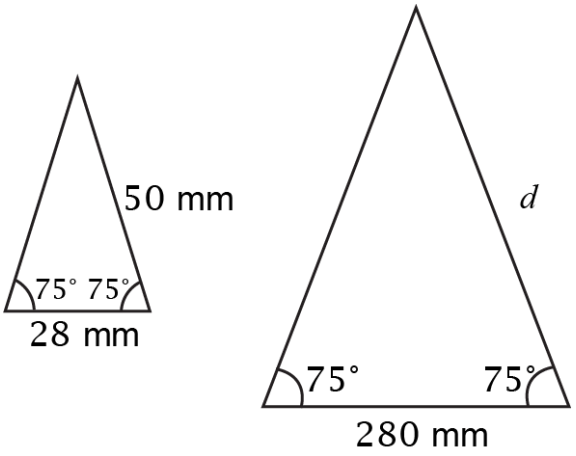


Use the scale factor to calculate the length, y.

$y =$ ☐ cm

Question 9

The following triangles are similar.



Use the scale factor to calculate the length, d.

$d =$ ☐ mm

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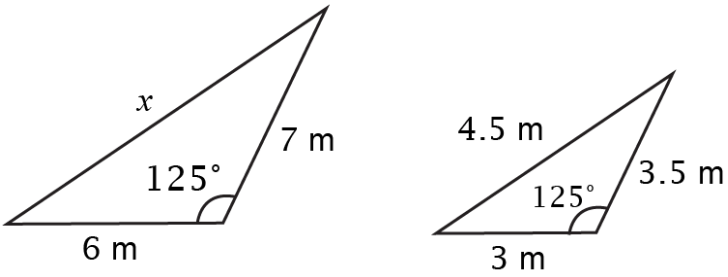
Using Similarity to find Unknown Sides

Question 10

The following triangles are similar.



Use the scale factor to calculate the length, x.

$x =$ ☐ m

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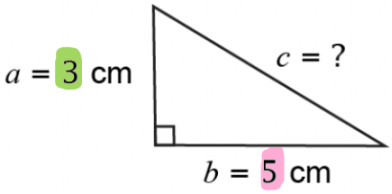
Pythagoras' Theorem Unknown Hypotenuse

Ex 9.9

A scientific calculator is permitted throughout this exercise.

Worked Example for Simple Questions

Pythagoras' theorem is given by: $c = \sqrt{a^2 + b^2}$



$C = \sqrt{a^2 + b^2}$

$= \sqrt{3^2 + 5^2}$

The length of the hypotenuse (longest side) is given by:

A	B	C	D
$\sqrt{3^2 - 5^2}$	$\sqrt{3^2 + 5^2}$	$3^2 + 5^2$	$\sqrt{3 + 5}$

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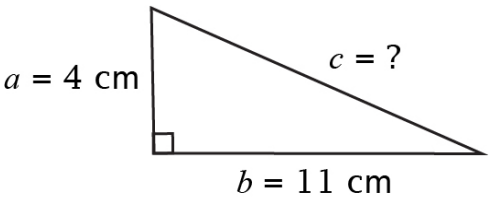
Pythagoras' Theorem Unknown Hypotenuse

Question 1

Pythagoras' theorem is given by: $c = \sqrt{a^2 + b^2}$



The length of the hypotenuse (longest side) is given by:

Circle the correct option

A

$\sqrt{4 + 11}$

B

$4^2 + 11^2$

C

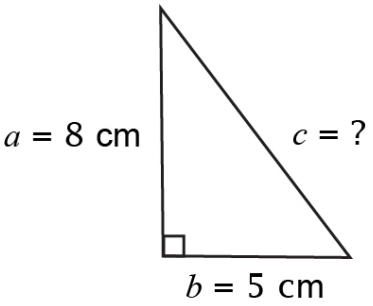
$\sqrt{4^2 + 11^2}$

D

$\sqrt{11^2 - 4^2}$

Question 2

Pythagoras' theorem is given by: $c = \sqrt{a^2 + b^2}$



The length of the hypotenuse (longest side) is given by:

Circle the correct option

A

$\sqrt{8^2 - 5^2}$

B

$\sqrt{8^2 + 5^2}$

C

$\sqrt{8 + 5}$

D

$8^2 + 5^2$

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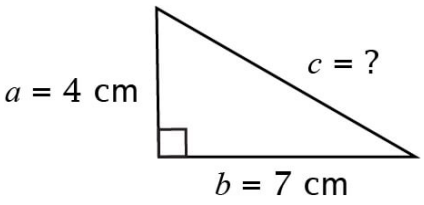
Pythagoras' Theorem Unknown Hypotenuse

Question 3

Pythagoras' theorem is given by: $c = \sqrt{a^2 + b^2}$



The length of the hypotenuse (longest side) is given by:

Circle the correct option

A

$4^2 + 7^2$

B

$\sqrt{4^2 + 7^2}$

C

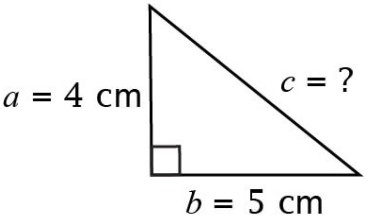
$\sqrt{4 + 7}$

D

$\sqrt{4^2 - 7^2}$

Question 4

Pythagoras' theorem is given by: $c = \sqrt{a^2 + b^2}$



The length of the hypotenuse (longest side) is given by:

Circle the correct option

A

$\sqrt{4^2 - 5^2}$

B

$4^2 + 5^2$

C

$\sqrt{4 + 5}$

D

$\sqrt{4^2 + 5^2}$

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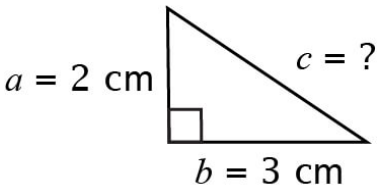
Pythagoras' Theorem Unknown Hypotenuse

Question 5

Pythagoras' theorem is given by: $c = \sqrt{a^2 + b^2}$



The length of the hypotenuse (longest side) is given by:

Circle the correct option

A

$\sqrt{2 + 3}$

B

$2^2 + 3^2$

C

$\sqrt{2^2 + 3^2}$

D

$\sqrt{2^2 - 3^2}$

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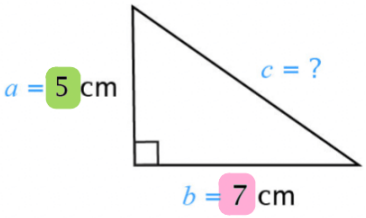
Worked Example for Standard Questions

Pythagoras' theorem is given by: $c^2 = a^2 + b^2$



What is the length of the hypotenuse (c) correct to two decimal places?

$c =$ 8·60

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

$\sqrt{c^2} = \sqrt{5^2 + 7^2}$ ← inverse of squared is $\sqrt{}$

$c = \sqrt{5^2 + 7^2}$

$c \approx 8 \cdot 60$

Check



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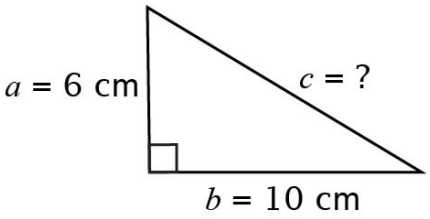
Pythagoras' Theorem Unknown Hypotenuse

Question 6

Pythagoras' theorem is given by: $c^2 = a^2 + b^2$

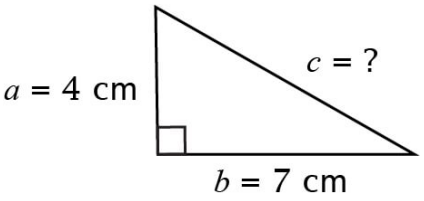


What is the length of the hypotenuse (c) correct to two decimal places?

$c =$ ____

Question 7

Pythagoras' theorem is given by: $c^2 = a^2 + b^2$

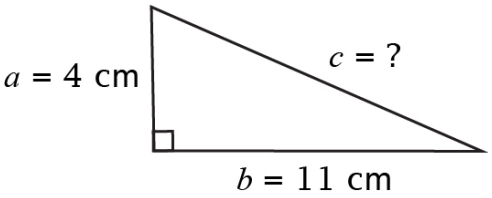


What is the length of the hypotenuse (c) correct to two decimal places?

$c =$ ____

Question 8

Pythagoras' theorem is given by: $c^2 = a^2 + b^2$

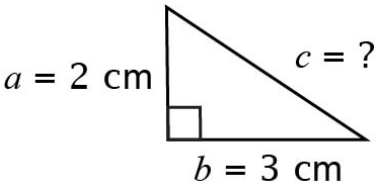


What is the length of the hypotenuse (c) correct to two decimal places?

$c =$ ____

Question 9

Pythagoras' theorem is given by: $c^2 = a^2 + b^2$



What is the length of the hypotenuse (c) correct to two decimal places?

$c =$ ____

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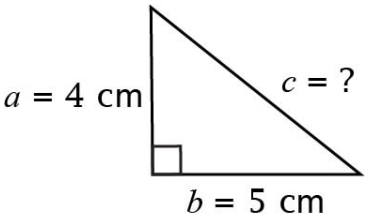
Pythagoras' Theorem Unknown Hypotenuse

Question 10

Pythagoras' theorem is given by: $c^2 = a^2 + b^2$



What is the length of the hypotenuse (c) correct to two decimal places?

$c =$

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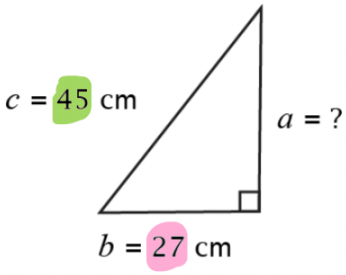
Pythagoras' Theorem Unknown Sides

A scientific calculator is permitted throughout this exercise.

Worked Example for Simple Questions

To find the length of a shorter side, use Pythagoras' theorem in the form: $a = \sqrt{c^2 - b^2}$



$a = \sqrt{c^2 - b^2}$

$= \sqrt{45^2 - 27^2}$

The length of the unknown side, a, is given by:

A $\sqrt{45^2 + 27^2}$

B $45^2 - 27^2$

C $\sqrt{45^2 - 27^2}$

D $\sqrt{45 - 27}$

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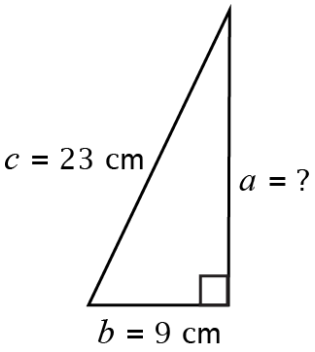
Pythagoras' Theorem Unknown Sides

Question 1

To find the length of a shorter side, use Pythagoras' theorem in the form:

$a = \sqrt{c^2 - b^2}$



The length of the unknown side, a, is given by:

Circle the correct option

A

$23^2 - 9^2$

B

$\sqrt{23^2 + 9^2}$

C

$\sqrt{23 - 9}$

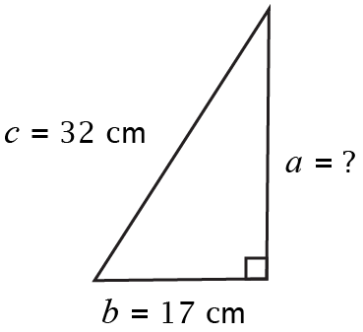
D

$\sqrt{23^2 - 9^2}$

Question 2

To find the length of a shorter side, use Pythagoras' theorem in the form:

$a = \sqrt{c^2 - b^2}$



The length of the unknown side, a, is given by:

Circle the correct option

A

$32^2 - 17^2$

B

$\sqrt{32^2 - 17^2}$

C

$\sqrt{32^2 + 17^2}$

D

$\sqrt{32 - 17}$

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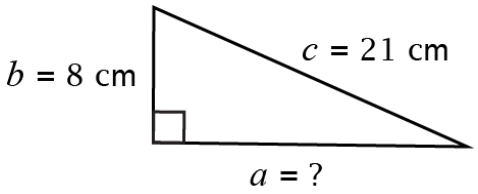
Pythagoras' Theorem Unknown Sides

Question 3

To find the length of a shorter side, use Pythagoras' theorem in the form:

$a = \sqrt{c^2 - b^2}$



The length of the unknown side, a, is given by:

Circle the correct option

A

$\sqrt{21^2 - 8^2}$

B

$\sqrt{21^2 + 8^2}$

C

$\sqrt{21 - 8}$

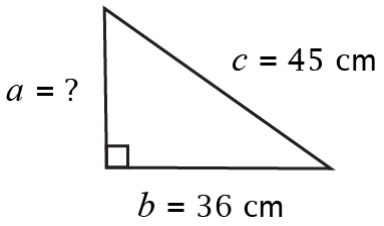
D

$21 - 8$

Question 4

To find the length of a shorter side, use Pythagoras' theorem in the form:

$a = \sqrt{c^2 - b^2}$



The length of the unknown side, a, is given by:

Circle the correct option

A

$\sqrt{45^2 - 36^2}$

B

$\sqrt{45 - 36}$

C

$45^2 - 36^2$

D

$\sqrt{45^2 + 36^2}$

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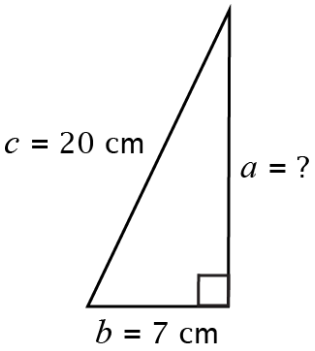
Pythagoras' Theorem Unknown Sides

Question 5

To find the length of a shorter side, use Pythagoras' theorem in the form: $a = \sqrt{c^2 - b^2}$



The length of the unknown side, a, is given by:

Circle the correct option

A

$20 - 7$

B

$\sqrt{20^2 - 7^2}$

C

$\sqrt{20^2 + 7^2}$

D

$\sqrt{20 - 7}$

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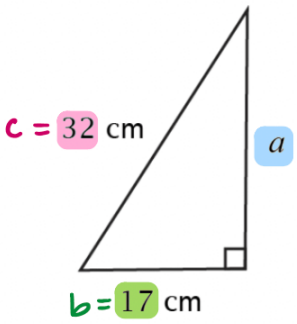
Worked Example for Standard Questions

Pythagoras' theorem is given by: $c^2 = a^2 + b^2$



1. Rearrange to make a the subject

$a = \sqrt{c^2 - b^2}$

2. Label the sides.
c is the longest side (hypotenuse), opposite the right angle.

Find the length of the unknown side, a, correct to **two** decimal places.

$a =$ 27.11 cm

3. Substitute and evaluate.

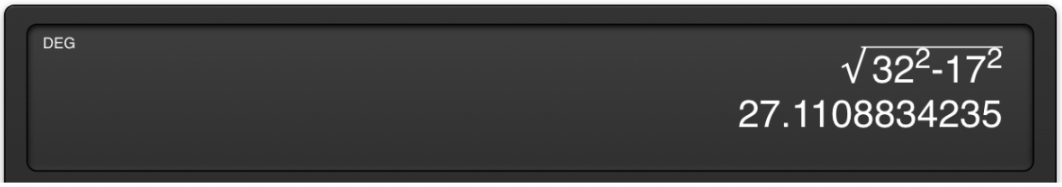
$a = \sqrt{c^2 - b^2}$

$= \sqrt{32^2 - 17^2}$

$= 27.1108\ldots$

≈ 27.11

Check



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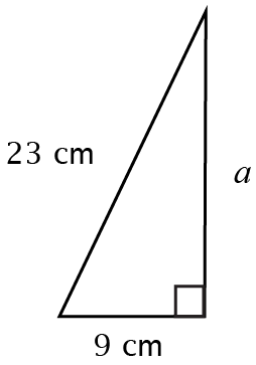
Pythagoras' Theorem Unknown Sides

Question 6

Pythagoras' theorem is given by: $c^2 = a^2 + b^2$

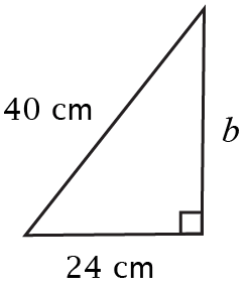


Find the length of the unknown side, a, correct to **two** decimal places.

$a =$ ☐ cm

Question 7

Pythagoras' theorem is given by: $c^2 = a^2 + b^2$

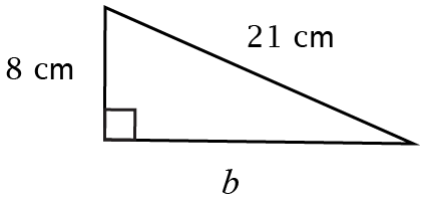


Find the length of the unknown side, b.

$b =$ ☐ cm

Question 8

Pythagoras' theorem is given by: $c^2 = a^2 + b^2$

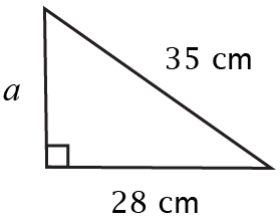


Find the length of the unknown side, b, correct to **two** decimal places.

$b =$ ☐ cm

Question 9

Pythagoras' theorem is given by: $c^2 = a^2 + b^2$



Find the length of the unknown side, a.

$a =$ ☐ cm

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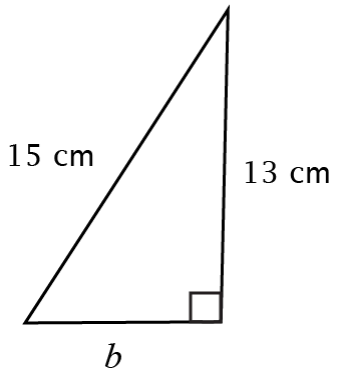
Pythagoras' Theorem Unknown Sides

Question 10

Pythagoras' theorem is given by: $c^2 = a^2 + b^2$



Find the length of the unknown side, b, correct to **two** decimal places.

$b =$ ____ cm

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