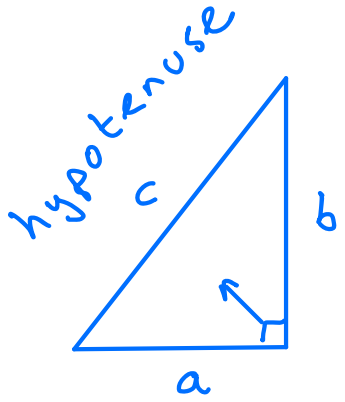
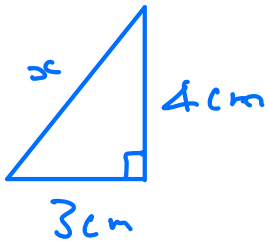
Pythagoras Theorem



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

Ex 1



Find x

By Pythagoras

$$3^2 + 4^2 = x^2$$

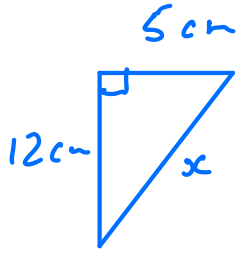
$$9 + 16 = x^2$$

$$25 = x^2$$

$$\sqrt{25} = x$$

$$\underline{x = 5\text{ cm}}$$

Ex 2



Find x

By Pythagoras

$$5^2 + 12^2 = x^2$$

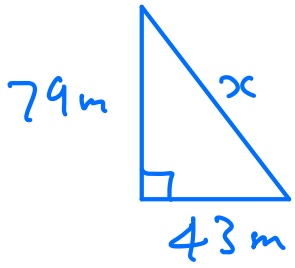
$$25 + 144 = x^2$$

$$169 = x^2$$

$$\sqrt{169} = x$$

$$\underline{x = 13\text{ cm}}$$

Ex 3



Find x

By Pythagoras

$$43^2 + 79^2 = x^2$$

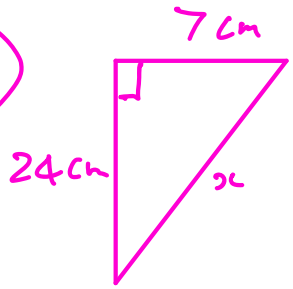
$$8090 = x^2$$

$$\sqrt{8090} = x$$

$$x = 89.9\text{m}$$

Exercise Find x

1)



By Pythagoras

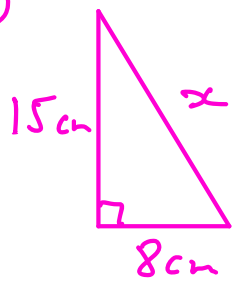
$$7^2 + 24^2 = x^2$$

$$625 = x^2$$

$$\sqrt{625} = x$$

$$x = 25\text{cm}$$

2)



By Pythagoras

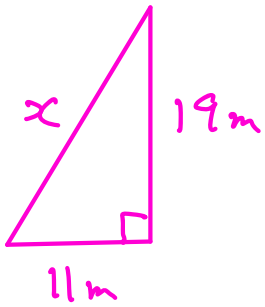
$$8^2 + 15^2 = x^2$$

$$289 = x^2$$

$$\sqrt{289} = x$$

$$x = 17\text{cm}$$

3)



By Pythagoras

$$11^2 + 19^2 = x^2$$

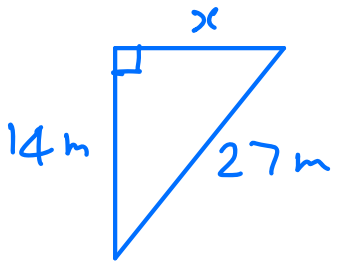
$$482 = x^2$$

$$\sqrt{482} = x$$

$$x = 22.0\text{m}$$

Further Examples

1)



Find x

By Pythagoras

$$x^2 + 14^2 = 27^2$$

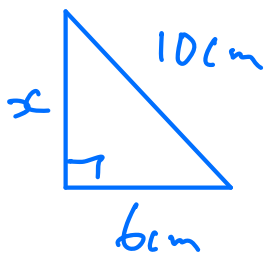
$$x^2 = 27^2 - 14^2$$

$$x^2 = 553$$

$$x = \sqrt{553}$$

$$x = 23.1\text{m}$$

2)



Find x

By Pythagoras

$$x^2 + 6^2 = 10^2$$

$$x^2 = 10^2 - 6^2$$

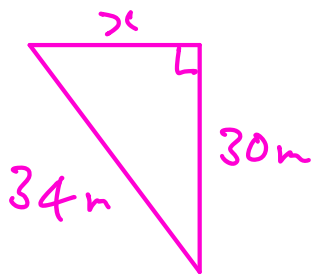
$$x^2 = 64$$

$$x = \sqrt{64}$$

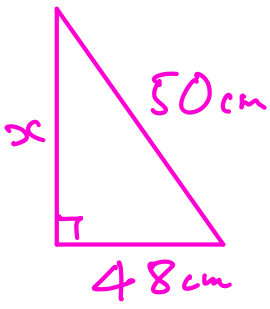
$$x = 8\text{ cm}$$

Exercise Find x

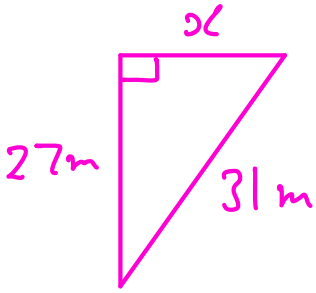
1)



2)



3)



By Pythagoras

$x^2 + 30^2 = 34^2$

$x^2 = 34^2 - 30^2$

$x^2 = 256$

$x = \sqrt{256}$

$x = 16\text{ m}$

By Pythagoras

$x^2 + 48^2 = 50^2$

$x^2 = 50^2 - 48^2$

$x^2 = 196$

$x = \sqrt{196}$

$x = 14\text{ cm}$

By Pythagoras.

$x^2 + 27^2 = 31^2$

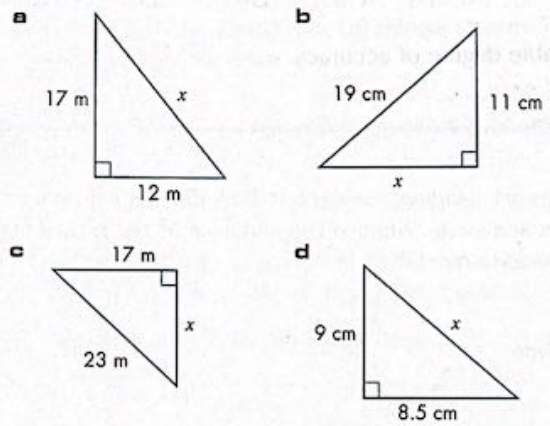
$x^2 = 31^2 - 27^2$

$x^2 = 232$

$x = \sqrt{232}$

$x = 15.2\text{ m}$

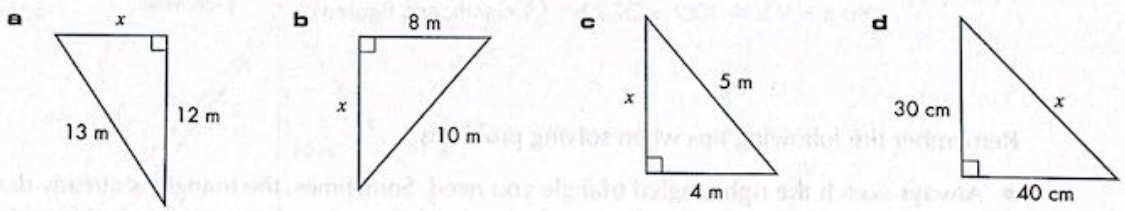
2 For each of the following triangles, calculate the length x, giving your answers to one decimal place.

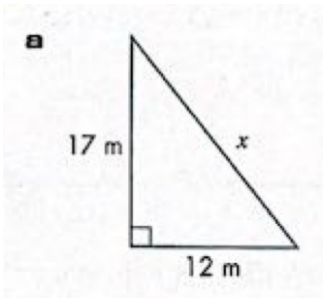


HINTS AND TIPS

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

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

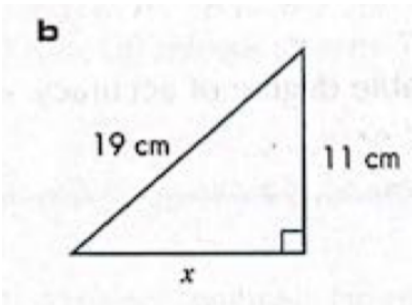




By Pythagoras

$17^2 + 12^2 = x^2$

$433 = x^2$



By Pythagoras

$x^2 + 11^2 = 19^2$

$x^2 = 19^2 - 11^2$

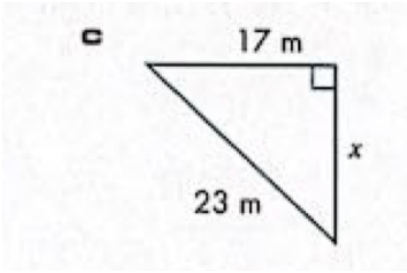
$x^2 = 240$

$\sqrt{433} = x$

$x = 20.8m$

$x = \sqrt{240}$

$x = 15.5cm$



By Pythagoras

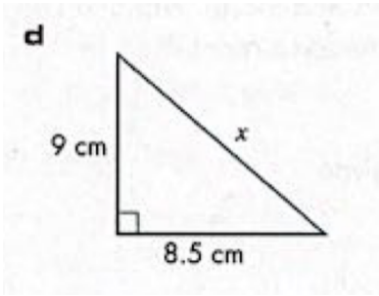
$x^2 + 17^2 = 23^2$

$x^2 = 23^2 - 17^2$

$x^2 = 240$

$x = \sqrt{240}$

$x = 15.5m$



By Pythagoras

$8.5^2 + 9^2 = x^2$

$153.25 = x^2$

$x = 12.4cm$

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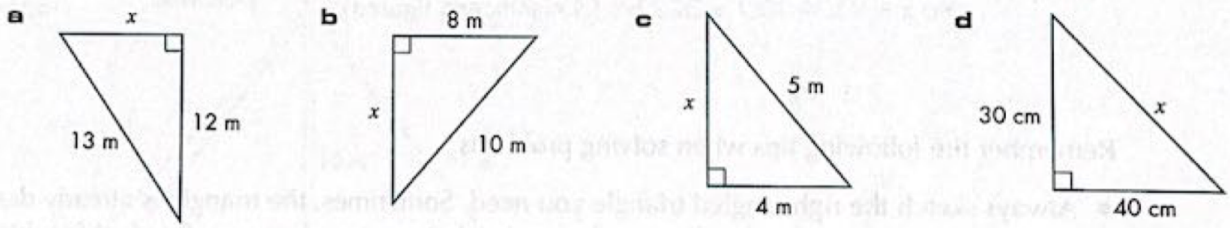
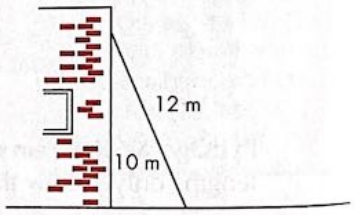
3 For each of the following triangles, find the length marked x.



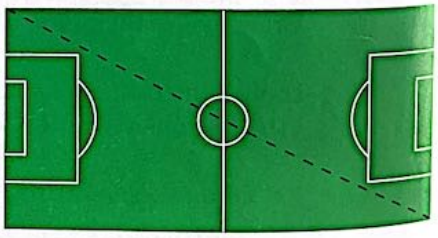
$x = 5m$ $x = 6m$ $x = 3m$ $x = 50m$

EXERCISE 6C

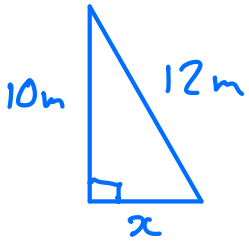
1. A ladder, 12 metres long, leans against a wall. The ladder reaches 10 metres up the wall. How far away from the foot of the wall is the foot of the ladder?



2. A model football pitch is 2 metres long and 0.5 metre wide. How long is the diagonal?



1)



Find x

$x^2 + 10^2 = 12^2$

$x^2 = 12^2 - 10^2$

$x^2 = 44$

$x = \sqrt{44}$

$x = 6.63\text{m}$

6.63 m from wall

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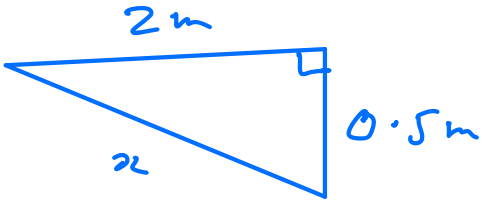
2)



Find x

By Pythagoras

$0.5^2 + 2^2 = x^2$

$4.25 = x^2$

$\sqrt{4.25} = x$

$x = 2.06\text{m}$

Diagonal is 2.06m