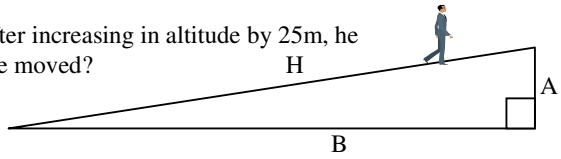
Pythagoras' Theorem

Draw diagrams or label them if they are not drawn and labelled in the question. Show all answers to 2 decimal places. Show all working and include the units in your answer.

1. Tom walks along a straight path with a steady incline. After increasing in altitude by 25m, he finds he has walked 80m. What horizontal distance has he moved?



   a) How far has Tom walked on the path?

   b) Which side of the triangle is the distance Tom walked on the path (A, B, H)?

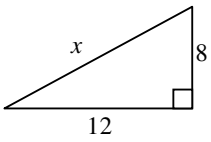
   c) Which side is the horizontal distance of Tom's movement (A, B, H)?

   d) Write the formula for Pythagoras' Theorem.

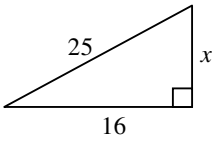
   e) Use the formula to find the answer.

2. Find the value of x in the following. Make sure you write the formula first, with x as the subject, then calculate your answer to 2 decimal places.

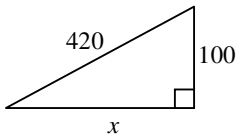
   a)



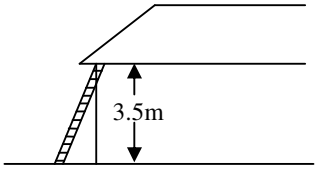
   b)



   c)

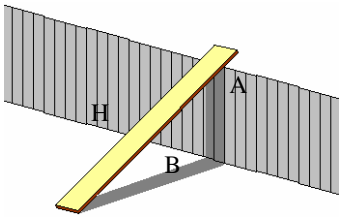


3. A ladder leans against a house, 3.5m from the ground. The bottom of the ladder is 2.5m from the wall. How long is the ladder?



4. A 16m length of rope is used to support a 15m pole (ignoring the length needed for the loops). How far from the base of the pole is the rope anchored?

5. A 2.4m plank is placed against a fence. 30cm (0.3m) of the plank projects past the top of the fence (see diagram). One end of the plank is 1m from the base of the fence.



   a) How much plank is there from the fence to the ground?

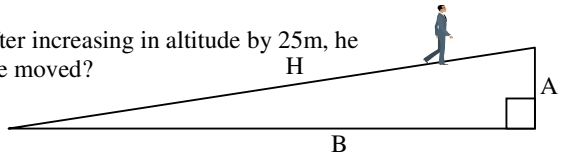
   b) Which side is the length of plank (A, B, H)?

   c) How high is the fence?

Have you made clear, labelled diagrams? Have you included units where needed? Are your answers to 2 decimal places?

Pythagoras' Theorem - Answers

1. Tom walks along a straight path with a steady incline. After increasing in altitude by 25m, he finds he has walked 80m. What horizontal distance has he moved?



(A map would show the horizontal distance travelled)

a) How far has Tom walked on the path?

This is simply 80m.

b) Which side of the triangle is the distance Tom walked on the path (A, B, H)?

The hypotenuse, H

c) Which side is the horizontal distance of Tom's movement (A, B, H)?

The horizontal side, B

d) Write the formula for Pythagoras' Theorem.

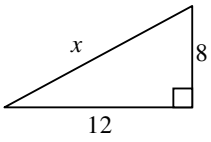
$H^2 = A^2 + B^2$

e) Use the formula to find the answer.

We want B, so $B^2 = H^2 - A^2$; $B^2 = 80^2 - 25^2$; $B^2 = 5775$; B = 75.99m

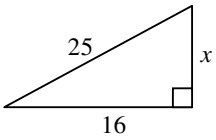
2. Find the value of x in the following. Make sure you write the formula first, with x as the subject, then calculate your answer to 2 decimal places.

a)



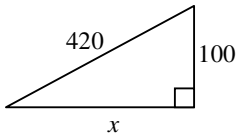
$x^2=8^2+12^2$; $x^2=64+144$; $x^2 = 208$; $x = 14.42$

b)



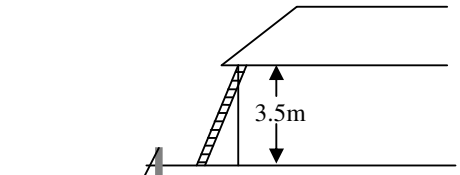
$25^2=x^2+16^2$; $x^2=25^2-16^2$; $x^2=625-256=369$; $x=19.21$

c)



$420^2=100^2+x^2$; $x^2=420^2-100^2$; $x^2=166{,}400$; $x=407.92$

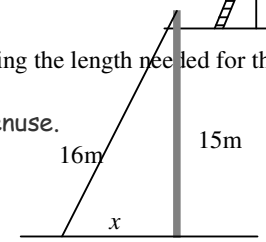
3. A ladder leans against a house, 3.5m from the ground. The bottom of the ladder is 2.5m from the wall. How long is the ladder?



The ladder is the hypotenuse.

$x^2=3.5^2+2.5^2$; $x^2=18.5$; $x=4.30$m

4. A 16m length of rope is used to support a 15m pole (ignoring the length needed for the loops). How far from the base of the pole is the rope anchored?



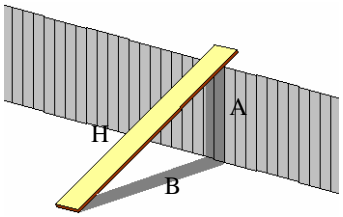
It helps to draw a diagram. The rope is the hypotenuse.

$16^2=15^2+x^2$; $x^2=16^2-15^2$

$x^2=256-225=31$

$x=5.57$m

5. A 2.4m plank is placed against a fence. 30cm (0.3m) of the plank projects past the top of the fence (see diagram). One end of the plank is 1m from the base of the fence.



a) How much plank is there from the fence to the ground? 2.4-0.3 = 2.1m

b) Which side is the length of plank (A, B, H)? H

c) How high is the fence? Length A: $2.1^2=A^2+1^2$; $A^2=2.1^2-1^2$

A2=3.41; A (the height of the fence) = 1.85m

