

4. Charlie is making costumes for a school show.
 One day he made 2 cloaks and 3 dresses.
 The total amount of material he used was 9.6 square metres.
- (a) Write down an equation to illustrate this information. 1
- (b) The following day Charlie made 3 cloaks and 4 dresses.
 The total amount of material he used was 13.3 square metres.
 Write down an equation to illustrate this information. 1
- (c) Calculate the amount of material required to make one cloak and the amount of material required to make one dress. 4

Starter

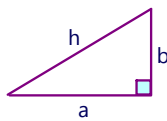
Today's Learning:

Use Pythagoras to find missing lengths in right-angled triangles.

Pythagoras' Theorem

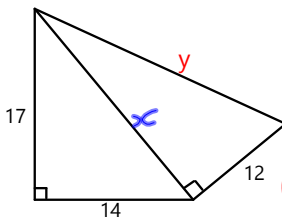
For every right angled triangle, $h^2 = a^2 + b^2$

hypotenuse is the longest side, always opposite the right angle



(this also means $a^2 = h^2 - b^2$)

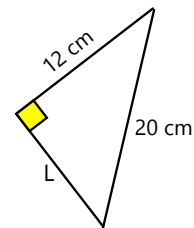
e.g. 1) Calculate the length y:



$$\begin{aligned}
 x^2 &= 17^2 + 14^2 \\
 x^2 &= 485 \\
 x &= \sqrt{485} \\
 &= 22.0227 \\
 y^2 &= 22.0227^2 + 12^2 \\
 y^2 &= 485 + 144 \\
 &= 629 \\
 y &= \sqrt{629} = 25.1 \text{ (1dp)}
 \end{aligned}$$

2) Calculate the length L:

$$\begin{aligned}
 h^2 &= a^2 + b^2 \\
 20^2 &= L^2 + 12^2 \\
 20^2 - 12^2 &= L^2 \\
 \hline
 256 &= L^2 \\
 L &= \sqrt{256} \\
 &= 16 \text{ cm}
 \end{aligned}$$



$$a^2 = h^2 - b^2$$

Starter

Work on the Exam Level Questions on Pythagoras' Theorem.

Proof with Pythagoras

We can check a triangle is right angled by checking if pythagoras works.

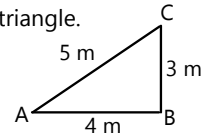
e.g. Prove ABC is a right-angled triangle.

if right-angled, $h^2 = a^2 + b^2$.

$$h^2 = 5^2 = 25$$

$$a^2 + b^2 = 4^2 + 3^2 = 16 + 9 = 25$$

$$h^2 = a^2 + b^2, \text{ so ABC is right-angled.}$$

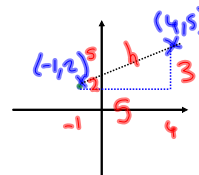


Today's Learning:

To use pythagoras to find the distance between two points and use it to find 3D distances.

Further Pythagoras' Theorem

e.g. 1) Find the distance between the points (-1, 2) and (4, 5)



$$\begin{aligned} h^2 &= 3^2 + 5^2 \\ &= 9 + 25 \\ &= 34 \\ h &= \sqrt{34} = 5.8 \text{ (1.d.p.)} \end{aligned}$$

Starter

3. Two groups of people go to a theatre.
 Bill buys tickets for 5 adults and 3 children.
 The total cost of his tickets is £158.25.
- (a) Write down an equation to illustrate this information. MARK: 1
- (b) Ben buys tickets for 3 adults and 2 children.
 The total cost of his tickets is £98.
 Write down an equation to illustrate this information. 1
- (c) Calculate the cost of a ticket for an adult and the cost of a ticket for a child. 4

e.g. 2) Find the distance from A to G

Handwritten calculations for finding the distance from A to G:

$$3\sqrt{5} \times 3\sqrt{5} = 9\sqrt{25} = 9 \times 5$$

$$y^2 = (3\sqrt{5})^2 + 5^2 = 45 + 25 = 70$$

$$y = \sqrt{70} \text{ cm}$$

$$h^2 = a^2 + b^2$$

$$x^2 = 6^2 + 3^2 = 36 + 9 = 45$$

$$x = \sqrt{45} = 3\sqrt{5}$$