

Starter

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

$$2c + 3d = 9.6 \text{ ①}$$

(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

$$3c + 4d = 13.3 \text{ ②}$$

(c) Calculate the amount of material required to make one cloak and the amount of material required to make one dress. 4

$$\begin{aligned} -3 \times \text{①}: & -6c - 9d = -28.8 \\ 2 \times \text{②}: & 6c + 8d = 26.6 \\ \hline & -d = -2.2 \\ & d = 2.2 \\ \text{① } 2c + 3d &= 9.6 \\ 2c + 6.6 &= 9.6 \\ 2c &= 3 \\ c &= 1.5 \\ \text{cloak} &= 1.5\text{m}^2 \\ \text{dress} &= 2.2\text{m}^2 \end{aligned}$$

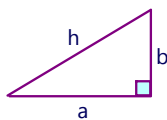
Today's Learning:

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

Pythagoras' Theorem 13/10/16

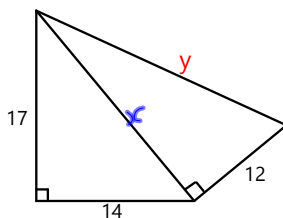
For every right angled triangle, $h^2 = a^2 + b^2$

hypotenuse is the longest side,
always opposite the right angle



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

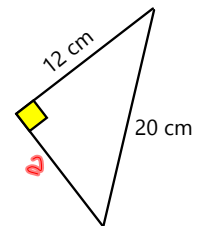
e.g. 1) Calculate the length y:



$$\begin{aligned} h^2 &= a^2 + b^2 \\ x^2 &= 17^2 + 14^2 \\ x^2 &= 485 \\ x &= \sqrt{485} \\ h^2 &= a^2 + b^2 \\ y^2 &= (\sqrt{485})^2 + 12^2 \\ &= 485 + 144 \\ y^2 &= 629 \\ y &= \sqrt{629} = 25.1 \end{aligned}$$

2) Calculate the length L:

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



Proofs with Pythagoras

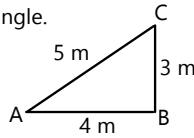
13/10/16

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

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

$$\begin{aligned} a^2 + b^2 &= 4^2 + 3^2 \\ &= 16 + 9 \\ &= 25 \end{aligned}$$

$$\begin{aligned} h^2 &= 5^2 \\ &= 25 \end{aligned}$$



Since $h^2 = a^2 + b^2$, ABC is a right-angled triangle. \neq

Starter

MARK:

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.

$$\textcircled{1} 5a + 3c = 158.25$$

(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.

$$\textcircled{2} 3a + 2c = 98$$

(c) Calculate the cost of a ticket for an adult and the cost of a ticket for a child.

$$\begin{aligned} 2 \times \textcircled{1}: 10a + 6c &= 316.5 \\ -3 \times \textcircled{2}: -9a - 6c &= -294 \end{aligned}$$

$$\begin{aligned} a &= 22.5 \\ 5(22.5) + 3c &= 158.25 \end{aligned}$$

$$112.5 + 3c = 158.25$$

$$3c = 45.75$$

$$c = 15.25$$

$$\text{child's} = \pounds 15.25$$

$$\text{adult's} = \pounds 22.50$$

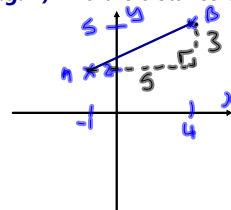
Further Pythagoras' Theorem

14/10/16

Today's Learning:

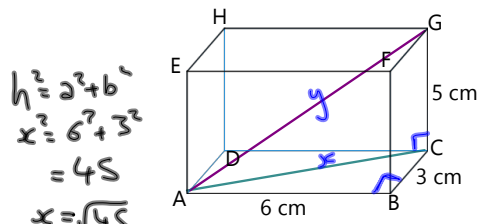
To use pythagoras to find the distance between two points and use it to find 3D distances.

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



$$\begin{aligned} h^2 &= a^2 + b^2 \\ d^2 &= 3^2 + 5^2 \\ d^2 &= 34 \\ d &= \sqrt{34} = 5.83 \end{aligned}$$

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



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

$$x^2 = 6^2 + 3^2$$

$$= 45$$

$$x = \sqrt{45}$$

$$h^2 = d^2 + b^2$$

$$y^2 = 45 + 5^2$$

$$= 70$$

$$y = \sqrt{70} = 8.4 \text{ cm}$$