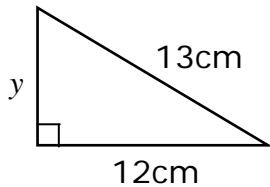


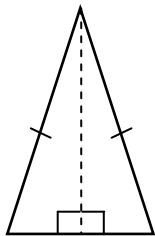
Pythagoras’ theorem only applies to **right-angled triangles**.

Finding a shorter side



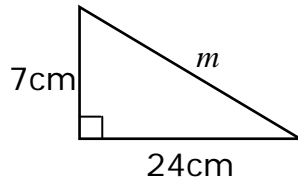
$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 y^2 + 12^2 &= 13^2 \\
 y^2 + 144 &= 169 \\
 y^2 &= 169 - 144 \\
 y^2 &= 25 \\
 y &= \sqrt{25} \\
 &= 5\text{cm}
 \end{aligned}$$

Isosceles triangles can be split into two identical right-angled triangles.

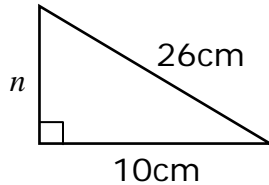


Remember to give workings for your answers!

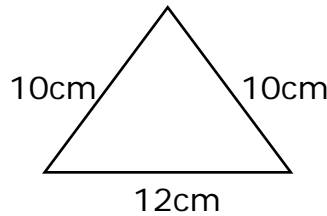
1. Calculate the length of *m*.



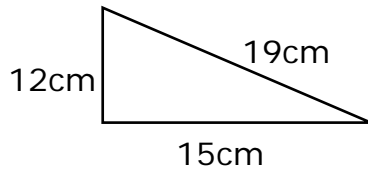
2. Calculate the value of *n*.



3. Calculate the height of this triangle.



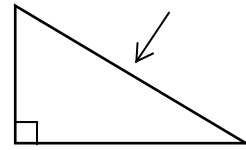
4. Is this triangle right-angled? You **must** show your working.



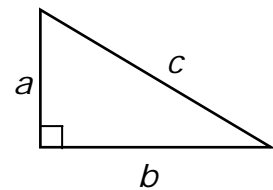
5. Calculate the length of the longest diagonal in a cuboid with sides 3cm, 7cm and 10cm. *Hint: draw a sketch to help you.*

The **hypotenuse** is ...

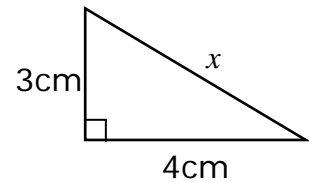
1. the longest side
2. opposite the right angle.



$a^2 + b^2 = c^2$
where *c* is the length of the hypotenuse.



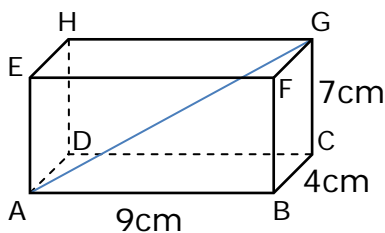
Finding the hypotenuse



$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 3^2 + 4^2 &= x^2 \\
 x^2 &= 25 \\
 x &= \sqrt{25} \\
 &= 5\text{cm}
 \end{aligned}$$

3D Pythagoras

Find the length of the diagonal AG in the cuboid ABCDEFGH.



AG is a side of the triangle ACG. We know CG is 7cm, but we need to find the length of AC:

$$\begin{aligned}
 (AB)^2 + (BC)^2 &= (AC)^2 \\
 9^2 + 4^2 &= (AC)^2 \\
 (AC)^2 &= 97
 \end{aligned}$$

$$\begin{aligned}
 (AC)^2 + (CG)^2 &= (AG)^2 \\
 97 + 7^2 &= (AG)^2 \\
 (AG)^2 &= 97 + 49
 \end{aligned}$$

$$\begin{aligned}
 AG &= \sqrt{146} \\
 &= 12.1\text{cm (3s.f.)}
 \end{aligned}$$

Teaching notes

This resource contains a selection of questions accompanied by revision notes. The notes are colour coded to give students an indication of the GCSE grade they are working towards, useful in self or peer assessment:

- blue: grades G – E
- green: grades D/C
- red: grades B – A*

You can choose whether to reveal the grades before or after students complete the questions.

Suggested uses

- Use as an individual revision sheet, homework, cover work, open book test, etc.
- Photocopy onto A3 and use as a poster during revision season.
- Laminate and tape to the desk for small group revision. You could create 'revision stations' with other Desktop revision resources on www.teachitmaths.co.uk (quick search: 'desktop').

Answers

$$1. \quad m^2 = 7^2 + 24^2$$

$$m = \sqrt{625}$$

$$= 25\text{cm}$$

$$2. \quad n^2 + 10^2 = 26^2$$

$$n = \sqrt{576}$$

$$= 24\text{cm}$$

3. Split the isosceles triangle into two right-angled triangles:

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

$$x^2 = 100 - 36$$

$$x = \sqrt{64}$$

$$= 8\text{cm}$$

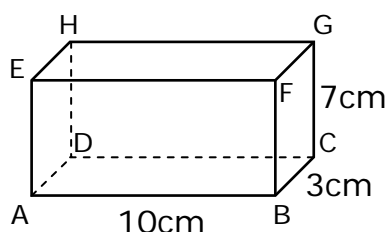
$$4. \quad 12^2 + 15^2 = 19^2$$

$$144 + 225 = 361$$

$$369 \neq 361$$

so the triangle is **not** right-angled.

5. Sketch the cuboid, find $(AC)^2$, then find AG :



$$10^2 + 3^2 = (AC)^2$$

$$(AC)^2 = 109$$

$$109 + 7^2 = (AG)^2$$

$$AG = \sqrt{158}$$

$$= 12.6\text{cm (3s.f.)}$$