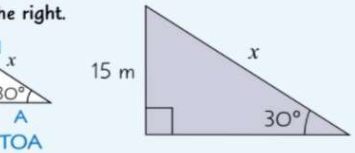
# Knowledge Organiser: Year 9 Maths; Pythagoras and Trigonometry (Part 2)

## Trigonometry — Examples

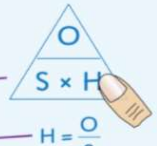
Here are some lovely examples using the method from the previous page to help you through the trials of trig.

### Examples:

**1** Find the length of $x$ in the triangle to the right.




1) Label the sides
2) Write down — SOH CAH TOA
3) O and H involved
4) Write down the formula triangle

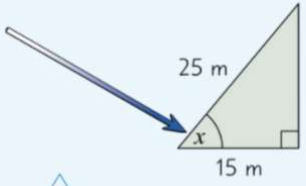



5) You want H so cover it up to give $H = \frac{O}{S}$
6) Put in the numbers

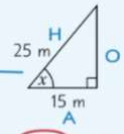
15 ÷ sin 30 =

$$x = \frac{15}{\sin 30°} = \frac{15}{0.5} = 30 \text{ m}$$

**2** Find the angle $x$ in the triangle to the right.




1) Label the sides




2) Write down — SOH CAH TOA
3) A and H involved
4) Write down the formula triangle


5) You want the angle so cover up C to give $C = \frac{A}{H}$
6) Put in the numbers

15 ÷ 25 =

$$\cos x = \frac{15}{25} = 0.6$$

7) Find the inverse.

shift cos 0.6 =

$$\Rightarrow x = \cos^{-1}(0.6) = 53.1301...° = 53.1° \text{ (1 d.p.)}$$

When you're finding an angle you'll have to find the INVERSE at the end. Press SHIFT or 2ndF, followed by sin, cos or tan — your calculator will display $\sin^{-1}$, $\cos^{-1}$ or $\tan^{-1}$

## Trigonometry — Common Values

Now that you're in the swing of trigonometry questions it's time to put those calculators away. Sorry.

### Learn these Common Trig Values

The tables below contain a load of useful trig values. You might get asked to work out some exact trig answers in your non-calculator exam, so having these in your brain will come in handy.

| | | |
|---|---|---|
| $\sin 30° = \frac{1}{2}$ | $\sin 60° = \frac{\sqrt{3}}{2}$ | $\sin 45° = \frac{1}{\sqrt{2}}$ |
| $\cos 30° = \frac{\sqrt{3}}{2}$ | $\cos 60° = \frac{1}{2}$ | $\cos 45° = \frac{1}{\sqrt{2}}$ |
| $\tan 30° = \frac{1}{\sqrt{3}}$ | $\tan 60° = \sqrt{3}$ | $\tan 45° = 1$ |

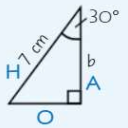
If you're asked for exact answers, don't convert them to decimals at the end.

| | |
|---|---|
| | $\tan 0° = 0$ |
| $\cos 90° = 0$ | $\cos 0° = 1$ |
| $\sin 90° = 1$ | $\sin 0° = 0$ |

Have a look at the examples below — they might help cement a few values into your head.

### EXAMPLES:

**1.** Without using a calculator, find the exact length of side b in the right-angled triangle shown.




1) It's a right-angled triangle so use SOH CAH TOA to pick the correct trig formula to use.


$A = C \times H$

2) Put in the numbers from the diagram in the question.

$b = \cos 30° \times 7$

3) You know the value of cos 30°, so substitute this in.

$$b = \frac{\sqrt{3}}{2} \times 7 = \frac{7\sqrt{3}}{2} \text{ cm}$$

**2.** Without using a calculator, show that $\cos 60° + \sin 30° = 1$

Put in the right values for cos 60° and sin 30°, then do the sum.

$$\cos 60° = \frac{1}{2} \quad \sin 30° = \frac{1}{2}$$

$$\cos 60° + \sin 30° = \frac{1}{2} + \frac{1}{2} = 1$$

# How do we use Knowledge Organisers in Mathematics?

## How can you use knowledge organisers at home to help us?

- **Retrieval Practice:** Read over a section of the knowledge organiser, cover it up and then write down everything you can remember. Repeat until you remember everything.
- **Flash Cards:** Using the Knowledge Organisers to help on one side of a piece of paper write a question, on the other side write an answer. Ask someone to test you by asking a question and seeing if you know the answer.
- **Mind Maps:** Turn the information from the knowledge organiser into a mind map. Then reread the mind map and on a piece of paper half the size try and recreate the key phrases of the mind map from memory.
- **Sketch it:** Draw an image to represent each fact; this can be done in isolation or as part of the mind map/flash card.
- **Teach it:** Teach someone the information on your knowledge organiser, let them ask you questions and see if you know the answers.

## How will we use knowledge organisers in Mathematics?

Knowledge organisers will be used before I complete a Learning Check or Common Assessment. I will spend part of the lesson looking over each of the key topics of the half term before completing the Learning Check or Common Assessment.

I will also use these at home to complete my own independent learning and revision of these key topics.

GLUE HERE