

Trigonometry

GCSE Maths · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

In a right-angled triangle, the angle is 40° and the hypotenuse is 12 cm. Find the side opposite the angle.

Step 1 · Opposite and hypotenuse $\rightarrow \sin$

$$\sin 40^\circ = x/12$$

Step 2 · Multiply by 12

$$x = 12 \sin 40^\circ = 7.713\dots$$

Answer: 7.71 cm

Check: Opposite is shorter than the hypotenuse ✓

2. Now try one with the steps

A right-angled triangle has opposite 7 cm and adjacent 10 cm. Find the angle θ .

Step 1 · Opposite and adjacent $\rightarrow \tan$

Step 2 · Inverse tan

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. A right-angled triangle has an angle of 30° and a hypotenuse of 10 cm. Find the side opposite the angle, in cm. [2]

2. A right-angled triangle has adjacent 8 cm and opposite 6 cm. Find the angle, to 1 decimal place. [2]

3. Find the hypotenuse of a right-angled triangle with shorter sides 5 cm and 12 cm, in cm. [2]

4. A right-angled triangle has an angle of 52° and the adjacent side is 9 cm. Find the opposite side, to 1 decimal place, in cm. [2]

5. A right-angled triangle has hypotenuse 20 cm and an angle of 25° . Find the side adjacent to the angle, to 1 decimal place, in cm. [2]

6. A 6 m ladder leans against a wall and reaches 5 m up. Find the angle between the ladder and the ground, to 1 decimal place. [3]

7. A right-angled triangle has an angle of 65° and the opposite side is 14 cm. Find the hypotenuse, to 1 decimal place, in cm. [3]

8. A right-angled triangle has an angle of 40° and the adjacent side is 7 cm. Find the hypotenuse, to 2 decimal places, in cm. [3]

9. From 50 m away, the angle of elevation of the top of a building is 28° . Find its height, to 1 decimal place, in m. [3]

10. From the top of a 40 m cliff, the angle of depression of a boat is 12° . How far is the boat from the foot of the cliff, to 1 decimal place, in m? [3]

11. A ramp rises 1.2 m over a horizontal distance of 9 m. Find its angle with the ground, to 1 decimal place. [2]

12. A plane flies 120 km on a bearing of 060° . How far east of its start is it, to 1 decimal place, in km? [3]

13. An isosceles triangle has equal sides of 10 cm and a base of 12 cm. Find a base angle, to 1 decimal place. [3]

14. A rectangle is 8 cm by 5 cm. Find the angle between a diagonal and a longer side, to 1 decimal place. [2]

15. A right-angled triangle has hypotenuse 13 cm and one side 5 cm. Find its smallest angle, to 1 decimal place. [3]

4. Before you hand it in

Using SOH CAH TOA when only sides are involved

If the question involves only sides of a right-angled triangle, use Pythagoras. Use trig when an angle is given or wanted.

$\theta = \tan^{-1}(0.7)$ when finding an angle

To find an ANGLE use $\sin^{-1}$, $\cos^{-1}$ or $\tan^{-1}$ (SHIFT then sin/cos/tan).

$h = 5 \times \sin 28^\circ$ for the hypotenuse

$\sin 28^\circ = 5/h \rightarrow h = 5 \div \sin 28^\circ$. Check: the hypotenuse must be the longest side.

Labelling the side next to θ as 'opposite'

Opposite is across from θ ; adjacent touches θ . Label the hypotenuse first, then the others.