

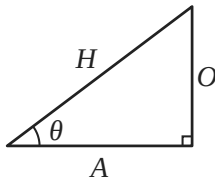
Fix it 1 Label the sides

Trigonometry · ANSWERS

Find H first. Then O and A from the angle you are using, θ .

EXAMPLE

Label the sides from θ .

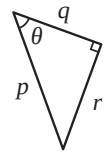


1. H is opposite the right angle: the longest side.
2. O is across from θ : it does not touch θ .
3. A touches θ and is not H.

YOUR TURN

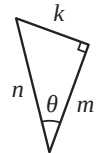
- 1 Which side is O, A and H?

$$O = r, A = q, H = p$$



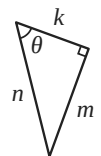
- 2 Which side is O, A and H?

$$O = k, A = m, H = n$$



- 3 The same triangle, θ moved. Which side is O, A and H now?

$$O = m, A = k, H = n$$



Check: H is always the longest side. O never touches θ .

The Maths Habit

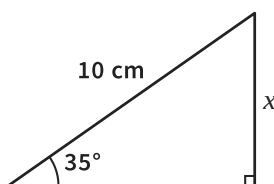
Fix it 2 Which ratio?

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Label only the two sides in play. Then pick the ratio with both letters: SOH (O and H), CAH (A and H), TOA (O and A).

EXAMPLE

Which ratio?

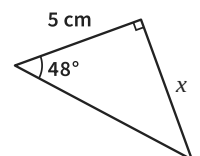


1. The sides in play: x and 10 cm.
2. x is O. 10 cm is H.
3. O and H: SOH, so sin.

YOUR TURN

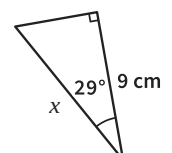
- 1 Which ratio: sin, cos or tan?

tan



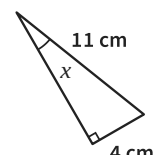
- 2 Which ratio: sin, cos or tan?

cos



- 3 Angle x: which ratio?

sin



Check: Your ratio's two letters are the two sides in the question, no others.

The Maths Habit

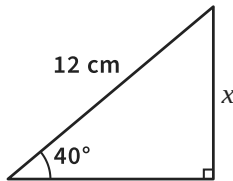
Fix it 3 Numbers in

Trigonometry · ANSWERS

Write the ratio, then put each number where its side goes. The first letter after S, C or T is the numerator.

EXAMPLE

Substitute the numbers into the ratio.



1. O and H: $\sin$.

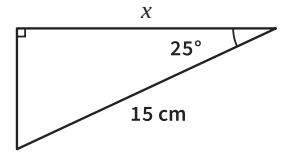
$$2. \sin \theta = \frac{O}{H}$$

$$3. \sin 40^\circ = \frac{x}{12}$$

YOUR TURN

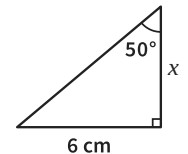
1 Substitute the numbers into the ratio.

$$\cos 25^\circ = \frac{x}{15}$$



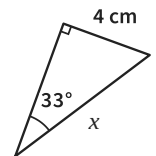
2 Substitute the numbers into the ratio.

$$\tan 50^\circ = \frac{6}{x}$$



3 Substitute the numbers into the ratio.

$$\sin 33^\circ = \frac{4}{x}$$



Check: Read it back: is the numerator really the O (or A) from your angle?

The Maths Habit

Fix it 4 x as the numerator

Trigonometry · ANSWERS

x as the numerator: multiply both sides by the denominator.

EXAMPLE

$\sin 35^\circ = \frac{x}{8}$. Find x to 1 decimal place.

1. x is the numerator: multiply both sides by 8.

$$2. x = 8 \times \sin 35^\circ$$

$$3. x = 4.6$$

YOUR TURN

1 $\cos 50^\circ = \frac{x}{12}$. Find x to 1 decimal place.

$$x = 7.7$$

2 $\tan 22^\circ = \frac{x}{9}$. Find x to 1 decimal place.

$$x = 3.6$$

3 $\sin 64^\circ = \frac{x}{2.5}$. Find x to 1 decimal place.

$$x = 2.2$$

Check: Type $\sin 30^\circ$. Not 0.5? Your calculator is not in degrees: look for D at the top of the screen.

The Maths Habit

Fix it 5 x as the denominator

Trigonometry · ANSWERS

x as the denominator: multiply by x , then divide by the ratio. So $x = \text{number} \div \sin, \cos \text{ or } \tan$.

EXAMPLE

$\sin 30^\circ = \frac{6}{x}$. Find x .

1. x is the denominator: multiply both sides by x .
2. $x \times \sin 30^\circ = 6$
3. $x = 6 \div \sin 30^\circ = 12$

YOUR TURN

- 1 $\cos 40^\circ = \frac{7}{x}$. Find x to 1 decimal place.

$$x = \underline{\hspace{2cm} 9.1 \hspace{2cm}}$$

- 2 $\tan 55^\circ = \frac{10}{x}$. Find x to 1 decimal place.

$$x = \underline{\hspace{2cm} 7.0 \hspace{2cm}}$$

- 3 $\sin 25^\circ = \frac{3}{x}$. Find x to 1 decimal place.

$$x = \underline{\hspace{2cm} 7.1 \hspace{2cm}}$$

Check: If x is the hypotenuse, your answer must be bigger than the side you were given.

The Maths Habit

Fix it 6 The inverse

Trigonometry · ANSWERS

Finding an angle: substitute the numbers into the ratio, then SHIFT and sin, cos or tan.

EXAMPLE

$\sin x = \frac{5}{8}$. Find x to 1 decimal place.

1. To turn a ratio back into an angle, use the inverse.
2. $x = \sin^{-1}(5 \div 8)$
3. On the calculator: SHIFT, sin, $(5 \div 8)$.
4. $x = 38.7^\circ$

YOUR TURN

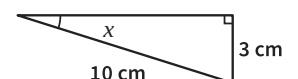
- 1 $\cos x = 0.4$. Find x to 1 decimal place.

$$x = \underline{\hspace{2cm} 66.4^\circ \hspace{2cm}}$$

- 2 $\tan x = \frac{7}{4}$. Find x to 1 decimal place.

$$x = \underline{\hspace{2cm} 60.3^\circ \hspace{2cm}}$$

- 3 Find angle x to 1 decimal place.



$$x = \underline{\hspace{2cm} 17.5^\circ \hspace{2cm}}$$

Check: An angle in a right angled triangle is between 0° and 90° . Type the sin of your answer: you get the ratio back.

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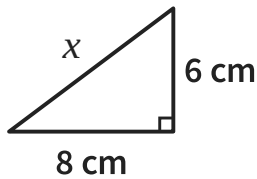
Fix it 7 Trig or Pythagoras?

Trigonometry · ANSWERS

An angle in the question, given or wanted: trigonometry. Only sides: Pythagoras.

EXAMPLE

Trig or Pythagoras?

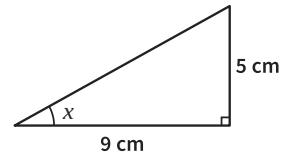


1. No angle given, none wanted.
2. Two sides known, one wanted: Pythagoras.
3. $x = \sqrt{8^2 + 6^2} = 10$ cm

YOUR TURN

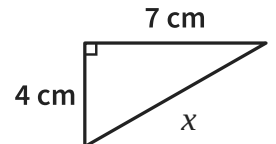
- 1 Trig or Pythagoras?

Trig: an angle is wanted



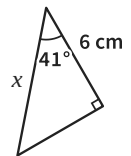
- 2 Trig or Pythagoras?

Pythagoras: no angle



- 3 Trig or Pythagoras?

Trig: an angle is given



Check: Pythagoras never gives an angle. Trigonometry always uses one.

The Maths Habit

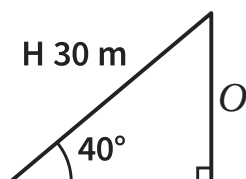
Fix it 8 From words

Trigonometry · ANSWERS

Sketch the triangle first. Mark the right angle and the angle you know or want, then label O, A and H.

EXAMPLE

A kite string 30 m long makes 40° with the ground. How high is the kite?



1. Sketch it: the ground, the height, the string.
2. Mark the right angle and the 40° .
3. The string is H. The height is O.

YOUR TURN

- 1 A slide 4 m long makes 35° with the ground. Sketch it. Which is H: the slide or its height?

H: the slide (the height is O)

- 2 A tree casts a shadow 12 m long. The sun's angle of elevation is 40° . Which side is the shadow from the 40° ?

A: the shadow

- 3 From a cliff top 50 m up, the angle of depression of a boat is 20° . What is the angle at the boat?

20° : the same as the depression

Check: An angle of depression from the top equals the angle of elevation from the bottom.

The Maths Habit