

GCSE Maths: Trigonometry: finding sides (SOH CAH TOA) (Higher): worksheet

GCSE Maths - Pythagoras and Trigonometry - Higher - Lesson 20.4

Name: _____

Date: _____

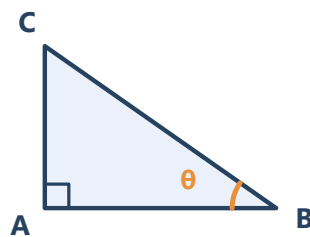
Score: _____

24 questions. Write your answers in the spaces. Answers and step-by-step help are free at websink.site/gcse/maths/ch20-pythagoras-trigonometry/higher/trigonometry-finding-sides-soh-cah-toa/

Exercise 20E Labelling sides and choosing the ratio Non-calculator

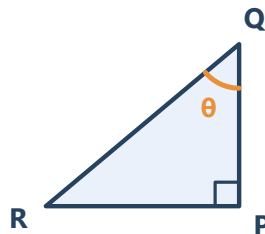
- 1 The angle θ is marked in each right-angled triangle. Name the hypotenuse, the opposite side and the adjacent side.

(a)



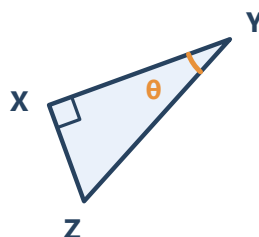
Answer: _____

(b)



Answer: _____

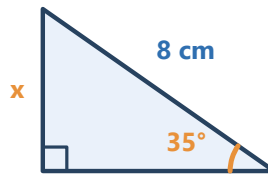
(c)



Answer: _____

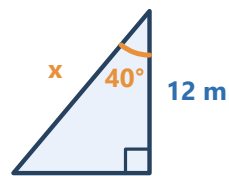
- 2 Which ratio, sin, cos or tan, would you use to find x ? Write down the ratio only.

(a)



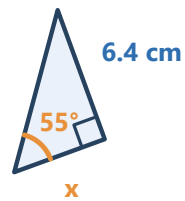
Answer:

(b)



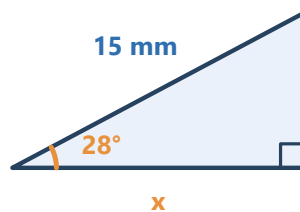
Answer:

(c)



Answer:

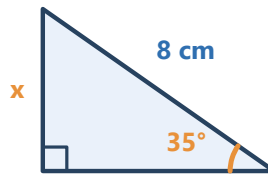
(d)



Answer:

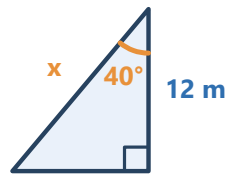
3 Write down an equation that you could use to find x . Do **not** solve it.

(a)



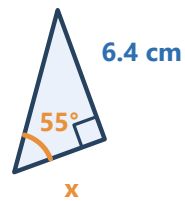
Answer:

(b)



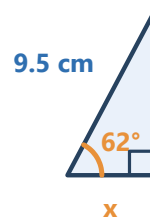
Answer:

(c)



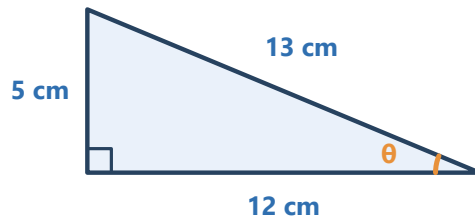
Answer:

(d)



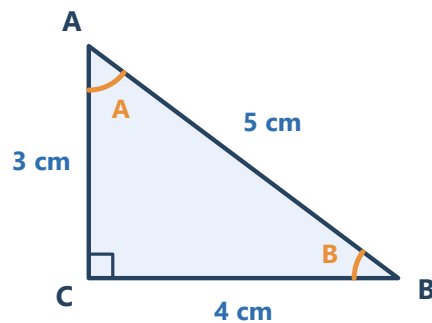
Answer:

4 For the triangle shown, write down $\sin \theta$, $\cos \theta$ and $\tan \theta$ as fractions.



Answer:

- 5 The triangle ABC has a right angle at C. For angle A, write down the opposite and adjacent sides. Then do the same for angle B. What do you notice?

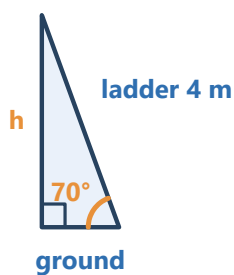


Answer:

- 6 For each situation, choose the ratio you would use. Label the sides of the sketch first.

(a)

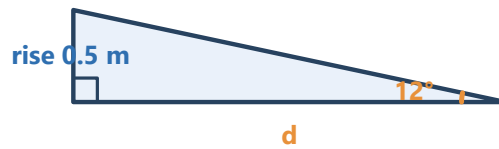
A 4 m ladder makes an angle of 70° with the ground. You want its height h up the wall. Which ratio (sin, cos or tan)?



Answer:

(b)

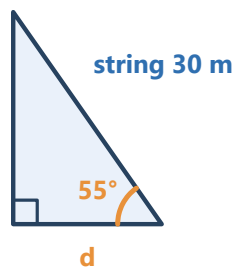
A ramp rises 0.5 m and makes an angle of 12° with the ground. You want the horizontal distance d . Which ratio?



Answer:

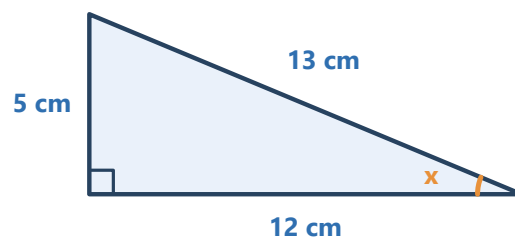
(c)

A kite string is 30 m long and makes an angle of 55° with the level ground. You want the horizontal distance d from the kite to the person. Which ratio?



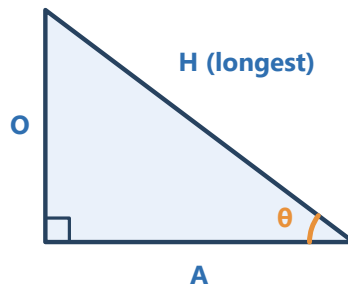
Answer:

- 7 Dev says that $\tan x = \frac{5}{13}$ for this triangle. Explain his mistake and write down the correct value of $\tan x$ as a fraction.



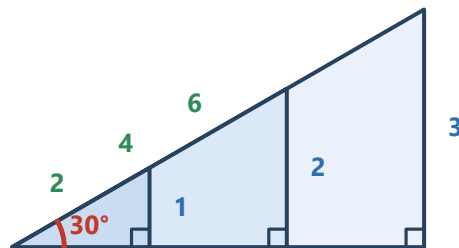
Answer:

- 8 Explain why $\sin \theta$ and $\cos \theta$ can never be bigger than 1 for an angle θ in a right-angled triangle.



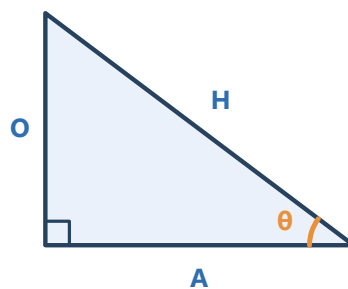
Answer:

- 9 The diagram shows three right-angled triangles that share a 30° angle. Work out $(\text{opposite}) \div (\text{hypotenuse})$ for each triangle and say what you notice.



Answer:

- 10 **Challenge.** For a right-angled triangle with an angle θ , show that $\tan \theta = \sin \theta \div \cos \theta$.

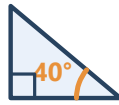


Answer:

Exercise 20F Finding sides with sin, cos and tan Calculator allowed

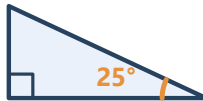
- 1 Use a calculator in degree mode to work out each value. Give each answer correct to 3 decimal places.

(a) $\sin 40^\circ$



Answer:

(b) $\cos 25^\circ$



Answer:

(c) $\tan 63^\circ$



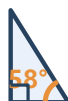
Answer:

(d) $\sin 72^\circ$



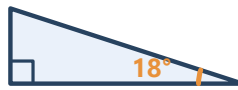
Answer:

(e) $\cos 58^\circ$



Answer:

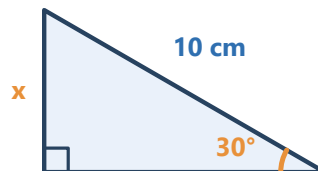
(f) $\tan 18^\circ$



Answer:

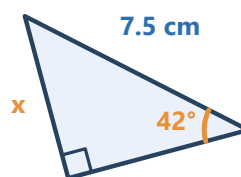
- 2 Work out the length of the side marked x in each triangle. Give your answers correct to 1 decimal place. All the lengths are in centimetres.

(a)



Answer:

(b)



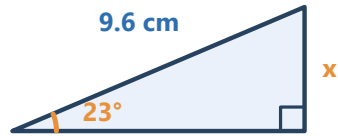
Answer:

(c)



Answer:

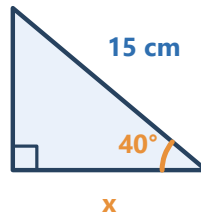
(d)



Answer:

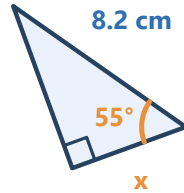
- 3** Work out the length of the side marked x in each triangle. Give your answers correct to 1 decimal place. All the lengths are in centimetres.

(a)



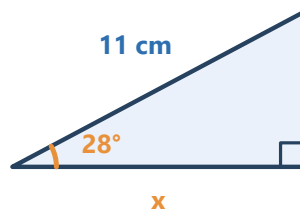
Answer:

(b)



Answer:

(c)



Answer:

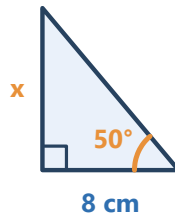
(d)



Answer:

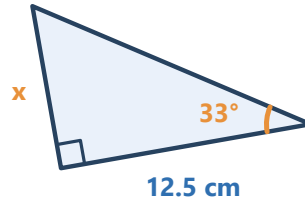
- 4 Work out the length of the side marked x in each triangle. Give your answers correct to 1 decimal place. All the lengths are in centimetres.

(a)



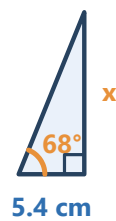
Answer:

(b)



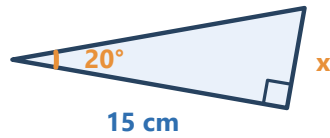
Answer:

(c)



Answer:

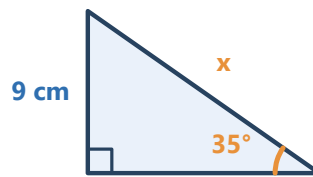
(d)



Answer: _____

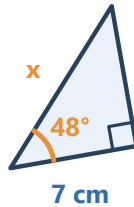
- 5 Work out the length of the side marked x in each triangle. Be careful: in some of them x will be on the bottom of the fraction. Give your answers correct to 1 decimal place. All the lengths are in centimetres.

(a)



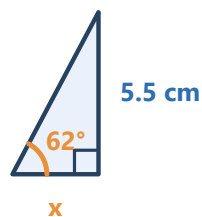
Answer: _____

(b)



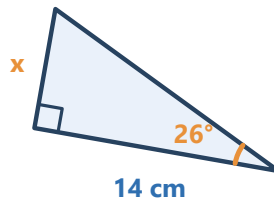
Answer: _____

(c)



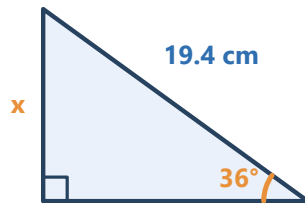
Answer: _____

(d)



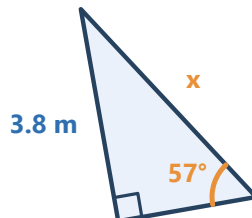
Answer:

- 6 Work out the length x . Give your answer correct to 3 significant figures.



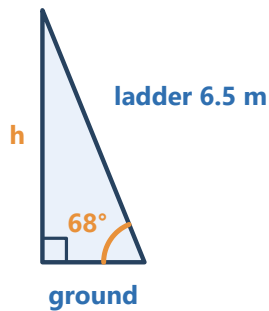
Answer:

- 7 Work out the length x . Give your answer correct to 2 decimal places.



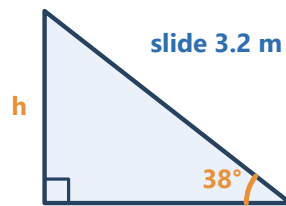
Answer:

- 8 A ladder 6.5 m long leans against a vertical wall. The ladder makes an angle of 68° with the horizontal ground. How high up the wall does the ladder reach? Give your answer correct to 2 decimal places.



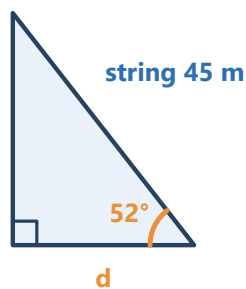
Answer:

- 9 A slide is 3.2 m long and slopes at 38° to the horizontal. Work out the vertical height of the top of the slide above the ground. Give your answer correct to 2 decimal places.



Answer:

- 10 A kite is flying on a string 45 m long. The string makes an angle of 52° with the level ground. Work out the horizontal distance from the person to the point on the ground below the kite. Give your answer correct to 1 decimal place.



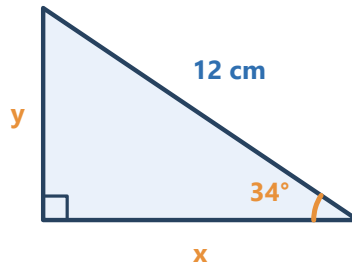
Answer:

- 11 A wheelchair ramp rises 0.6 m and makes an angle of 7° with the ground. How long is the ramp? Give your answer correct to 2 decimal places.



Answer:

- 12 In this right-angled triangle the hypotenuse is 12 cm and one angle is 34° . Find x and y , correct to 1 decimal place.



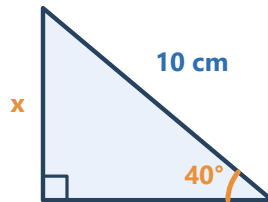
(a) y (opposite the 34° angle)

Answer:

(b) x (next to the 34° angle)

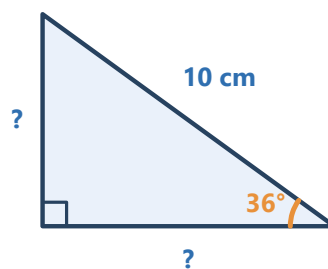
Answer:

- 13** Anya works out x in this triangle as $10 \times \cos 40^\circ = 7.7$ cm. Explain her mistake and find the correct value of x , to 1 decimal place.



Answer:

- 14 Challenge.** A right-angled triangle has a hypotenuse of 10 cm and an angle of 36° . Work out the perimeter of the triangle, correct to 1 decimal place.



Answer: