

Trigonometry #5

Draw diagrams, or label the diagrams given, for these problems. Write all answers to 2 decimal places. **REMEMBER TO INCLUDE UNITS IN YOUR ANSWER.**

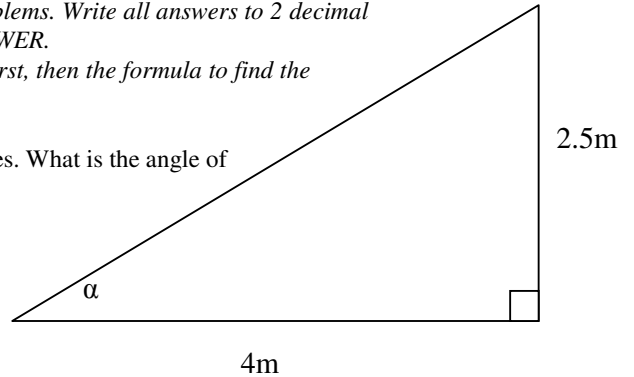
Show the formula for the appropriate trigonometric ratio first, then the formula to find the angle. The first question has been set out for you.

1. A stair case has a rise of 2.5 metres over a run of 4 metres. What is the angle of the stairs to the horizontal?

$$\tan \alpha = \underline{\hspace{2cm}}$$

$$\alpha = \tan^{-1} \underline{\hspace{2cm}}$$

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



2. A 2m pole casts a shadow of 1.4m on flat ground. At what angle is the sun to the pole (the top angle)?
3. A 6.4m ladder leans against a brick wall, and reaches up to 5.6m. At what angle to the ground is the ladder?
4. Two ships set out at the same time from the same place. The first heads due east (directly to the east) for 16km and then heads north. The second ship heads a little east of north, and meets the first ship after 30km of straight travel.

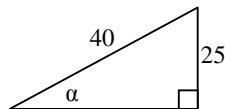
At what angle north of east did the second ship travel? (Definitely need a diagram here!)

At what bearing (angle from the north) did the second ship travel?

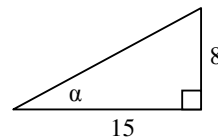
FOR QUESTIONS 1 – 4: Have you drawn meaningful diagrams? Have you included units in the answer? Are your answers to 2 decimal places?

5. Find the value of x in the following. Make sure you write the formula first, with x as the subject, then calculate your answer to 2 decimal places.

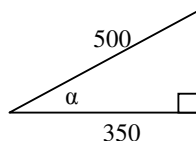
a)



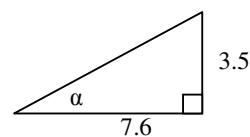
b)



c)



d)



Trigonometry #5 - Answers

Draw diagrams, or label the diagrams given, for these problems. Write all answers to 2 decimal places. REMEMBER TO INCLUDE UNITS IN YOUR ANSWER.

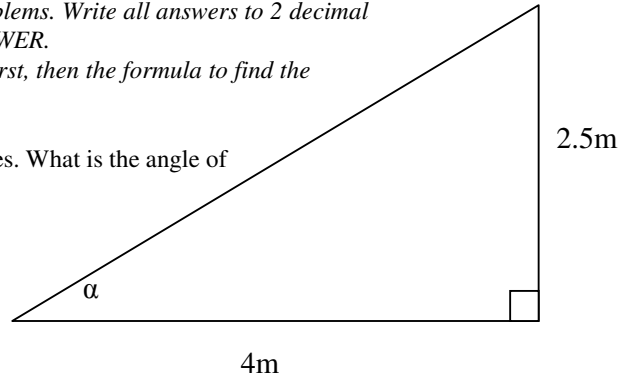
Show the formula for the appropriate trigonometric ratio first, then the formula to find the angle. The first question has been set out for you.

1. A stair case has a rise of 2.5 metres over a run of 4 metres. What is the angle of the stairs to the horizontal?

$$\tan \alpha = 2.5/4$$

$$\alpha = \tan^{-1}(2.5/4) = \tan^{-1}0.625$$

$$\alpha = \underline{32.01^\circ}$$

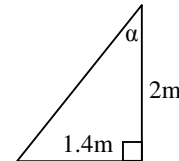


2. A 2m pole casts a shadow of 1.4m on flat ground. At what angle is the sun to the pole (the top angle)?

$$\tan \alpha = 1.4/2$$

$$\alpha = \tan^{-1}0.7$$

$$\alpha = \underline{34.99^\circ}$$

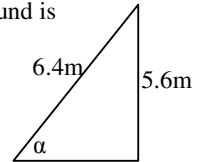


3. A 6.4m ladder leans against a brick wall, and reaches up to 5.6m. At what angle to the ground is the ladder?

$$\sin \alpha = 5.6/6.4$$

$$\alpha = \sin^{-1}(5.6/6.4)$$

$$\alpha = \underline{61.04^\circ}$$



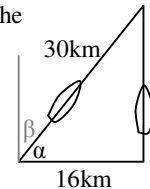
4. Two ships set out at the same time from the same place. The first heads due east (directly to the east) for 16km and then heads north. The second ship heads a little east of north, and meets the first ship after 30km of straight travel.

At what angle north of east did the second ship travel? (Definitely need a diagram here!)

The angle north of east is α . $\cos \alpha = 16/30$; $\alpha = \cos^{-1}(16/30)$; $\alpha = \underline{57.77^\circ}$

At what bearing (angle from the north) did the second ship travel?

The bearing is β , which is $90^\circ - \alpha$. $\beta = 90 - 57.77 = \underline{32.23^\circ}$



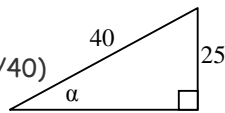
FOR QUESTIONS 1 – 4: Have you drawn meaningful diagrams? Have you included units in the answer? Are your answers to 2 decimal places?

5. Find the value of x in the following. Make sure you write the formula first, with x as the subject, then calculate your answer to 2 decimal places.

a)

$$\alpha = \sin^{-1}(25/40)$$

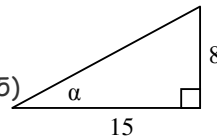
$$\alpha = \underline{38.68^\circ}$$



b)

$$\alpha = \tan^{-1}(8/15)$$

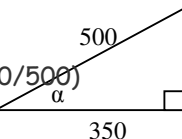
$$\alpha = \underline{28.07^\circ}$$



c)

$$\alpha = \cos^{-1}(350/500)$$

$$\alpha = \underline{45.57^\circ}$$



d)

$$\alpha = \tan^{-1}(3.5/7.6)$$

$$\alpha = \underline{24.73^\circ}$$

