

Trigonometry #1

1. Complete the equation using whole words: Sine =

Cosine =

Tangent =

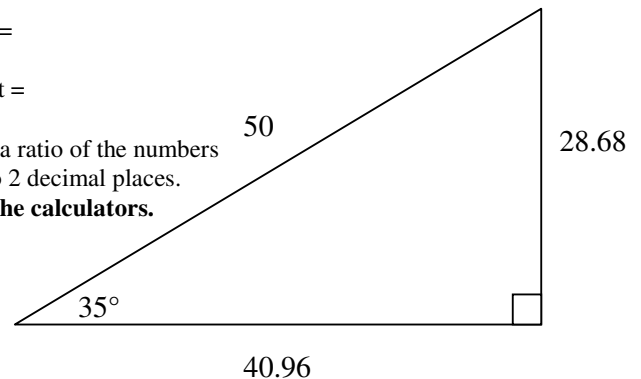
2. Use the **diagram** to solve. First, write the answer as a ratio of the numbers shown, then use your calculator to find the answer to 2 decimal places.

Do not calculate using the trigonometry keys on the calculators.

a) $\sin 35^\circ$

b) $\tan 35^\circ$

c) $\cos 35^\circ$



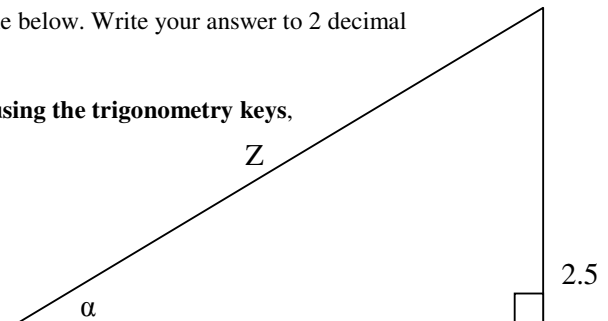
3. Use Pythagoras' theorem to find side Z in the triangle below. Write your answer to 2 decimal places.

4. Find, from your answer to question 3, and **without using the trigonometry keys**,

a) $\tan \alpha$

b) $\cos \alpha$

c) $\sin \alpha$



5. A ramp is used to move loads onto the back of a truck from the ground. The ramp is 3 metres long, and the platform is 0.85 metres above the ground level.
- a) Sketch a diagram of the ramp, showing the plank and the platform as a right triangle. Label the right angle and the hypotenuse as well as any numbers.
- b) Which trigonometric ratio (Sine, Cosine or Tangent) can be worked out from the information, for the angle that the ramp makes with the ground?
- c) Calculate that ratio, and write your answer to 2 decimal places.
6. A shroud is a rope that supports a mast on a ship. It connects the top of the mast to the side of the ship. If a mast is 15m tall, and the ship is 5m wide, what is the angle that the shroud makes with the top of the mast?
- a) Sketch a diagram of the mast and shroud. Label the right angle and the hypotenuse, and any numbers. **Remember that the distance from the mast to the side of the ship is half the width of the ship.**
- b) Which ratio can be worked out from the information, for that angle between the pole and the rope at the top?
- c) Calculate that ratio to 2 decimal places.
7. **Bonus** a) Find the ratio of \sin / \cos (notice we are dividing a ratio by another ratio, or a fraction by a fraction), using the symbols O, A and H for Opposite, Adjacent and Hypotenuse.
- b) From your result, what can you say about the ratio of \sin / \cos (look carefully!)?

Trigonometry #1 - Answers

1. Complete the equation using whole words: Sine = $\frac{\text{Opposite}}{\text{Hypotenuse}}$

Cosine = $\frac{\text{Adjacent}}{\text{Hypotenuse}}$

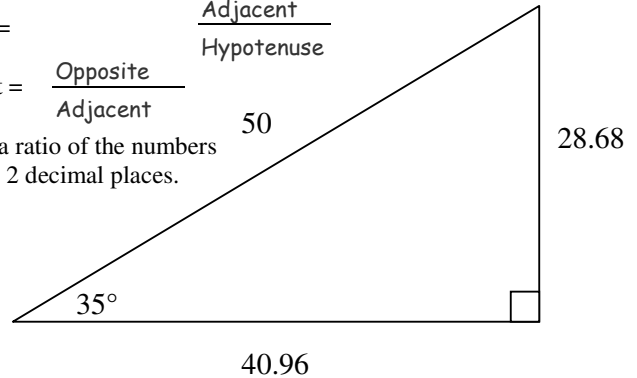
Tangent = $\frac{\text{Opposite}}{\text{Adjacent}}$

2. Use the **diagram** to solve. First, write the answer as a ratio of the numbers shown, then use your calculator to find the answer to 2 decimal places.

a) $\sin 35^\circ = 28.68/50 = \underline{0.57}$

b) $\tan 35^\circ = 28.68/40.96 = \underline{0.70}$

c) $\cos 35^\circ = 40.96/50 = \underline{0.82}$



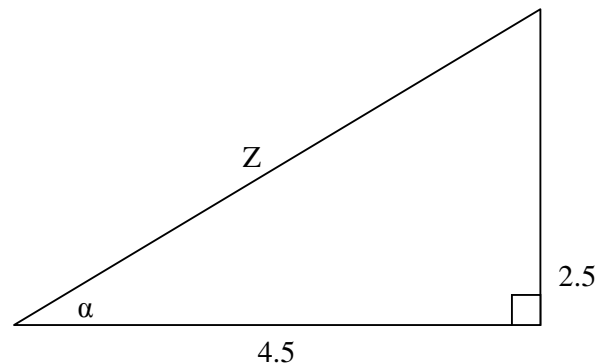
3. Use Pythagoras' theorem to find side Z in the triangle below. Write your answer to 2 decimal places. $Z^2 = 4.5^2 + 2.5^2 = 26.5$; $Z = \underline{5.15}$

4. Find, from your answer to question 3,

a) $\tan \alpha = 2.5/4.5 = \underline{0.55}$

b) $\cos \alpha = \underline{0.87}$

c) $\sin \alpha = \underline{0.49}$

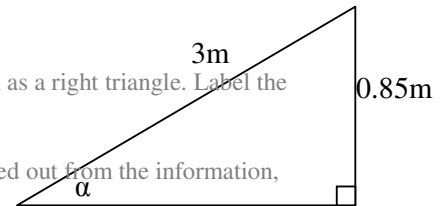


5. A ramp is used to move loads onto the back of a truck from the ground. The ramp is 3 metres long, and the platform is 0.85 metres above the ground level.

a) Sketch a diagram of the ramp, showing the plank and the platform as a right triangle. Label the right angle and the hypotenuse as well as any numbers.

b) Which trigonometric ratio (Sine, Cosine or Tangent) can be worked out from the information, for the angle that the ramp makes with the ground? Sine

c) Calculate that ratio, and write your answer to 2 decimal places. $\sin \alpha = 0.85/3 = \underline{0.28}$

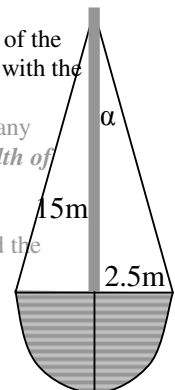


6. A shroud is a rope that supports a mast on a ship. It connects the top of the mast to the side of the ship. If a mast is 15m tall, and the ship is 5m wide, what is the angle that the shroud makes with the top of the mast?

a) Sketch a diagram of the mast and shroud. Label the right angle and the hypotenuse, and any numbers. **Remember that the distance from the mast to the side of the ship is half the width of the ship.**

b) Which ratio can be worked out from the information, for that angle between the pole and the rope at the top? Tangent

c) Calculate that ratio to 2 decimal places. $\tan \alpha = 2.5/15 = 0.17$



7. a) Find the ratio of Sin / Cos (notice we are dividing a ratio by another ratio, or a fraction by a fraction), using the symbols O, A and H for Opposite, Adjacent and Hypotenuse.

$$\frac{\sin}{\cos} = \frac{O/H}{A/H} = \frac{O}{H} \div \frac{A}{H} = \frac{O}{H} \times \frac{H}{A} = \frac{O}{A} \quad (1 \text{ mark})$$

b) From your result, what can you say about the ratio of Sin / Cos (look carefully!)?
Sin/Cos is equal to Tan (O/A)