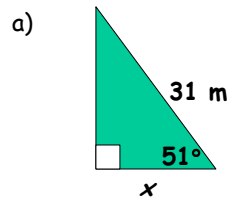


Trigonometry Solving for a Side

Review:

Solve for x . Round to one decimal place.



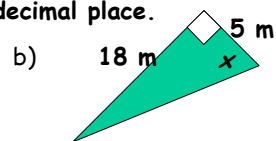
We are solving for a side.

$$\cos 51^\circ = \frac{x}{31}$$

$$0.6293 = \frac{x}{31}$$

$$31 \times 0.6293 = x$$

$$19.5 \text{ m} = x$$



We are solving for an angle.

$$\tan x = \frac{18}{5}$$

$$\tan x = 3.6$$

$$x = \tan^{-1}(3.6)$$

$$x = 74.5^\circ$$

Warmup: Solve for the unknown.

a) $\frac{x}{10} = 5$ b) $\frac{a}{3.6} = 7$ c) $\frac{30}{x} = 5$ d) $\frac{45.92}{x} = 5.6$

$$x = 5 \times 10$$

$$x = 3.6 \times 7$$

$$5x = 30$$

$$5.6x = 45.92$$

$$x = 50$$

$$x = 25.2$$

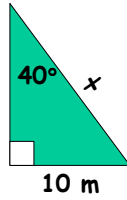
$$x = \frac{30}{5}$$

$$x = \frac{45.92}{5.6}$$

$$x = 6$$

$$x = 8.2$$

c)



Which trig ratio do we use?

SINE

Set up the ratio.

$$\sin 40 = \frac{10}{x}$$

What is different about the set up for this question.

Every question where we were solving for a side, the unknown side was in the numerator (refer back to a). For this one, the unknown is in the denominator.

Solution:

$$\sin 40 = \frac{10}{x}$$

Multiply the x over to the left side.

$$x \sin 40 = 10$$

Evaluate sin 40 and round to four decimal places.

$$x(0.6428) = 10$$

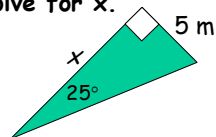
Divide the 0.6428 to the right side.

$$x = \frac{10}{0.6428}$$

$$x = 15.5 \text{ m}$$

Last example:

Solve for x.



Solution:

$$\tan 25^\circ = \frac{5}{x}$$

$$x \tan 25^\circ = 5$$

$$x(0.4663) = 5$$

$$x = \frac{5}{0.4663}$$

$$x = 10.7 \text{ m}$$

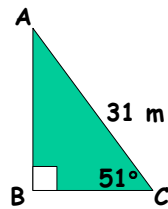
Solving a Triangle.

When we solve a triangle we are finding all the sides and all the angles.

In solving, we may use:

- Trigonometry
- The Pythagorean Relation
- The sum of the angles in a triangle is 180°

Solve this triangle.



The easiest thing to solve for is angle A:

$$\begin{aligned}\angle A &= 180 - 90 - 51 \\ &= 39^\circ\end{aligned}$$

Now solve for side AB or BC.
I'll solve for AB.

$$\sin 51 = \frac{AB}{31}$$

$$0.7771 = \frac{AB}{31}$$

$$31 \times 0.7771 = AB$$

$$24.1m = AB$$

Now solve for BC using the Pythagorean Relation:

$$a^2 + b^2 = c^2$$

$$24.1^2 + b^2 = c^2$$

$$580.81 + b^2 = 961$$

$$b^2 = 961 - 580.81$$

$$b^2 = 380.39$$

$$b = \sqrt{380.39}$$

$$b = 19.5m$$