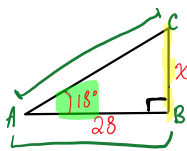


# Determining an unknown side of a triangle

Monday, November 14, 2016 9:14 AM

Given the information below, our first step is to determine how to set up our Trig ratio.



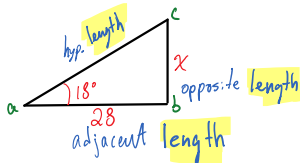
know where the angle is

$$\tan 18^\circ = \frac{x}{28}$$

## GOALS FOR LESSON

- ① Review TRIG Ratios
- ② PRACTICE ALGEBRA
- ③ Know how to solve for a missing side.

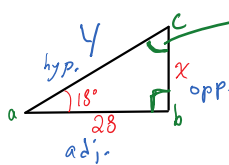
- First step is to label our triangle to determine



length  $\overline{AB}$  = adjacent  
length  $\overline{BC}$  = opposite  
length  $\overline{AC}$  = hypotenuse

- X is opposite of the given angle and is therefore part of the equation. It is also the side we are solving for.

- Let's set up the equation



$$A_2 = 180^\circ - 90 - 18^\circ$$

$$A_2 =$$

Which trig ratio do I use?

$$\tan \theta = \frac{\text{opp. length}}{\text{adjacent length}}$$

Input your substitutions and solve for x.

$$\tan \theta = \frac{\text{opp.}}{\text{adj.}}$$

$$\tan 18^\circ = \frac{x}{28}$$

$$0.3249 = \frac{x}{28}$$

$$28(0.3249) = x$$

$$9.0972 = x$$

$$\boxed{9.1 = x}$$

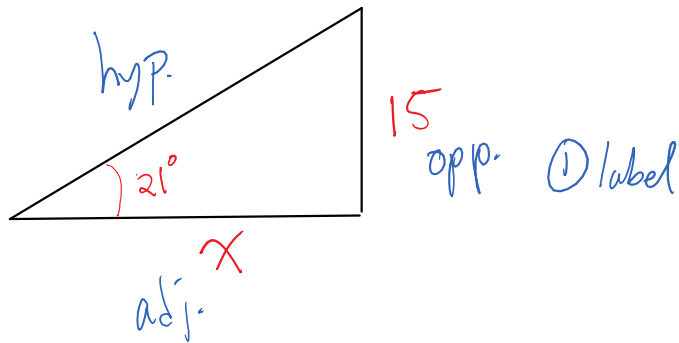
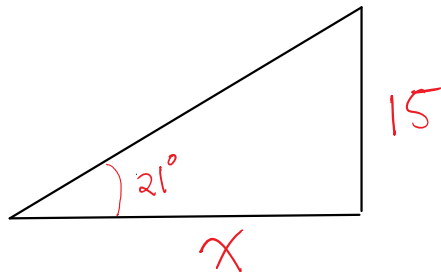
b/c 28 is in the denominator, you multiply each side by 28.

$$28 \cdot 0.3249 = \frac{x}{28} \cdot 28$$

$$28 \cdot 0.3249 = \cancel{\frac{x}{28}} \cdot 28$$

$$28 \cdot 0.3249 = x$$

Using the previous steps, TRY the following



$$\tan \theta = \frac{\text{opp}}{\text{adj.}}$$

$$\tan 21^\circ = \frac{15}{x}$$

$$x \cdot 0.3839 = 15 \cdot \cancel{x}$$

$$\cancel{x} (0.3839) = 15$$

$$x = \frac{15}{0.3839}$$

$$x = 39.1$$

② Ratio/Equation

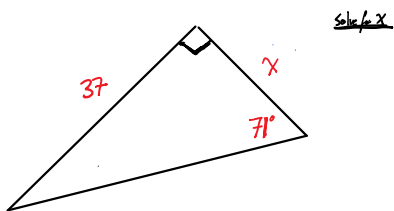
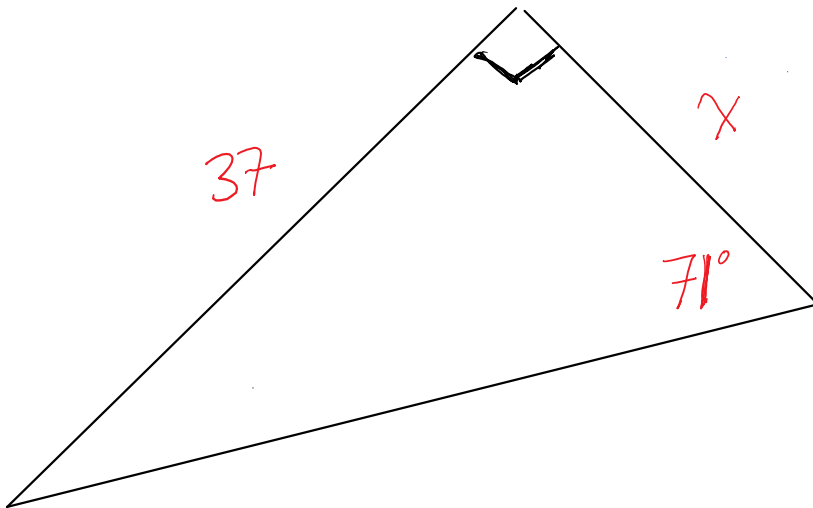
③ substitution

④ solve for  $x$

$$X = 39.1$$

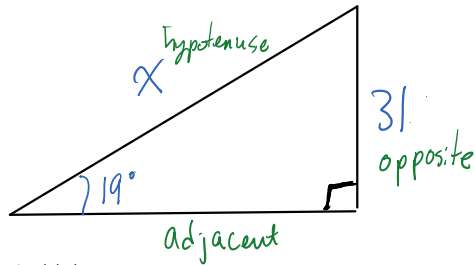
TRY!!

Solve for X



$$\begin{aligned}\tan 71^\circ &= \frac{37}{X} \\ X \cdot 2.9042 &= 37 \\ X &= \frac{37}{2.9042} \\ X &= 12.7\end{aligned}$$

Using the same techniques, described above let's try to solve sides using Sine and Cosine



1. First label
2. Find your ratio
3. Substitute
4. Solve for x

$$\sin \theta = \frac{\text{opp.}}{\text{hyp.}}$$

$$\sin 19 = \frac{31}{x}$$

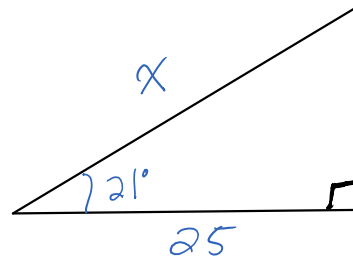
$$x(0.3256) = 31$$

$$\boxed{x = 95.2}$$

$$\frac{\sin 19 = 31}{1 \cdot x}$$

$$x(\sin 19) = 31$$

CROSS  
MULTIPLY



$$\cos \theta = \frac{\text{adj.}}{\text{hyp.}}$$

$$\cos 21 = \frac{25}{x}$$

CROSS MULTIPLY

$$x = \frac{25}{\cos 21}$$

$$\boxed{x = 26.8}$$

HW  $\rightarrow$  Pg. 82 #3, 4, 5, 6, ~~7~~

Pg. 101 #3, 4, 5, 6