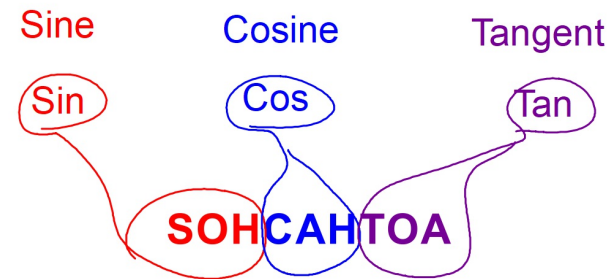


Geometry: Tuesday, March 17, 2020

Right Triangle Trigonometry:

Sections 8-3 to 8-5

The three basic Trig Ratios:



Sec 8-3: The Tangent Ratio

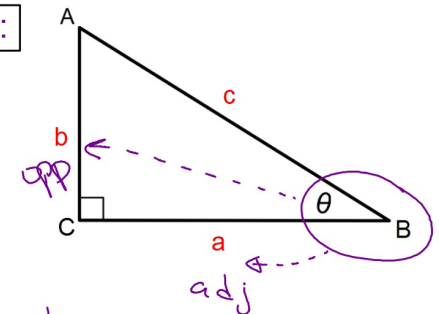
Right Triangle Trigonometry:

The Tangent Ratio

SOHCAHTOA

Tangent of angle θ :

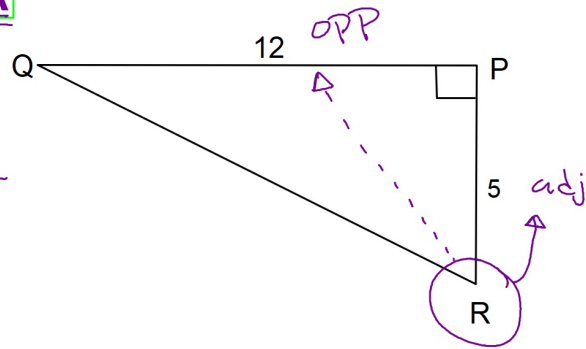
$$\tan \theta = \frac{\text{Leg Opposite } \theta}{\text{Leg Adjacent to } \theta} = \frac{b}{a}$$



Write each as a ratio

SOHCAHTOA

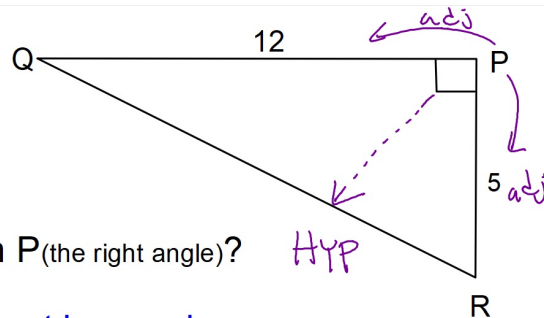
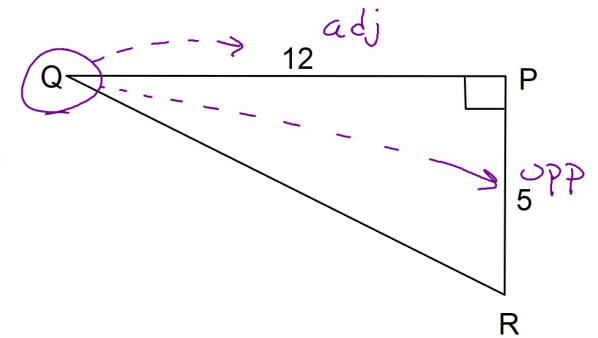
$$\tan R = \frac{12}{5}$$



Write each as a ratio

SOHCAHTOA

$$\tan Q = \frac{5}{12}$$



Why don't we do $\tan P$ (the right angle)?

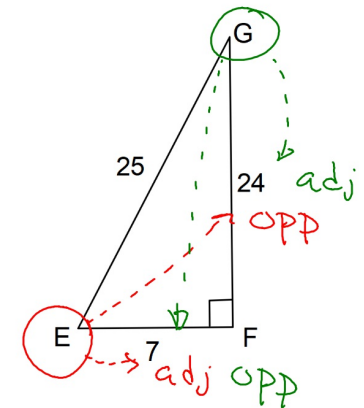
There are two adjacent legs and no opposite leg!

Write each as a ratio

SOHCAHTOA

$$\tan E = \frac{24}{7}$$

$$\tan G = \frac{7}{24}$$

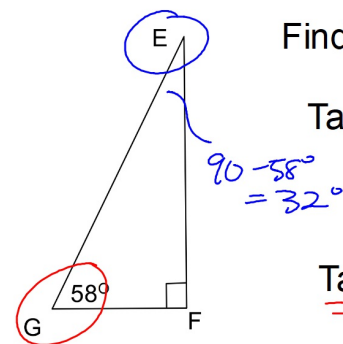


When an angle is given in degrees you can use your calculator to find the tangent of that angle. This will be the same value as if you could write the ratio of OPP/ADJ and turn it into its decimal form.

Make sure your calculator is in **DEGREE MODE**. On a Ti83 or Ti84 press the MODE key and arrow key down to the fourth line. You'll see **RADIAN** **DEGREE** make sure that **DEGREE** is highlighted. The default setting on the Ti graphing calculator is **RADIAN**.

Other scientific and graphing calculators can use either radians or degrees so you'll have to check your's to be sure it's in the degree mode.

Radians is just another unit that angles are measured with.

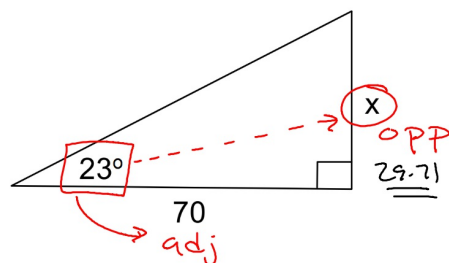


Find each to the nearest hundredth.

$$\tan G = \tan 58^\circ = 1.60$$

$$\tan E = \tan 32^\circ = 0.62$$

Using Tangent to find a missing side. **SOHCAHTOA**

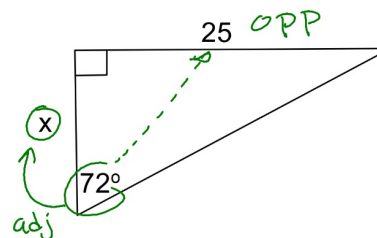


$$70 \cdot \tan 23^\circ = \frac{X}{70} \cdot 70$$

$$X = 70 \cdot \tan 23^\circ$$

$$X = 29.71$$

Using Tangent to find a missing side. **SOHCAHTOA**



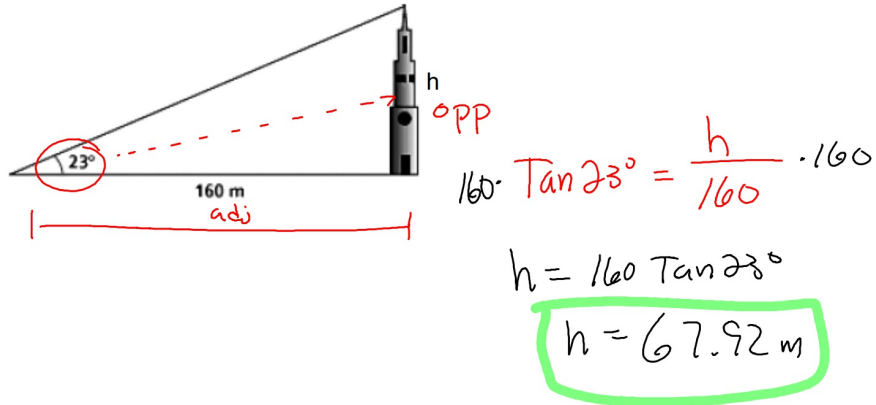
$$\tan 72^\circ = \frac{25}{X}$$

$$X = 25 \cdot 1 \div \tan 72^\circ$$

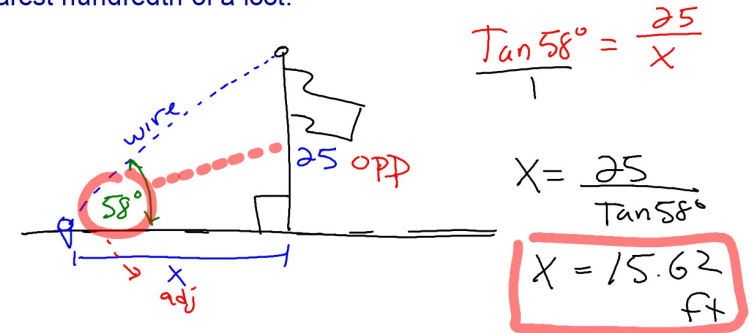
$$X = \frac{25}{\tan 72^\circ}$$

$$X = 8.12$$

You stand 160m from a tower and measure the angle from the ground to the top of the tower as 23° . Use the Tangent Ratio to find the height of the tower.



A wire supporting a tall flag pole is attached at the top of the pole and tied to an anchor in the ground. The wire makes a 58° with the ground. If the flagpole is 25 feet tall find the distance from the anchor to the base of the flag pole to the nearest hundredth of a foot.



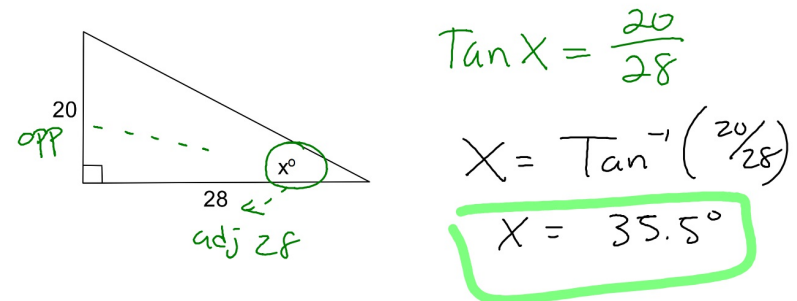
If $\tan X = 0.37$ how would you solve for X ?

The X is inside the Tangent function (it's not \tan times X) we need to "undo" the Tangent function to be able to solve for X .

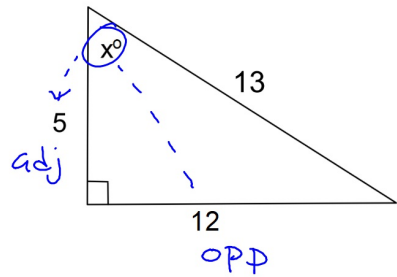
Use the Inverse of Tangent: Called **Inverse Tangent**.

$$X = \tan^{-1}(0.37) = 20.30^\circ$$

Find the value of x to the nearest tenth using the Tangent Ratio.



Find the value of x to the nearest tenth using the Tangent Ratio.



$$\tan X = \frac{12}{5}$$
$$X = \tan^{-1}\left(\frac{12}{5}\right)$$
$$X = 67.4^\circ$$

You can now try the practice problems in Practice #2 that can be found on the link on my blog.

