

Wednesday, March 18, 2020

The Sine and Cosine Ratios

Sec 7-1 For Alg 2

Sec 8-4 for Geometry

Review the Tangent Ratio:

SOHCAHTOA

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

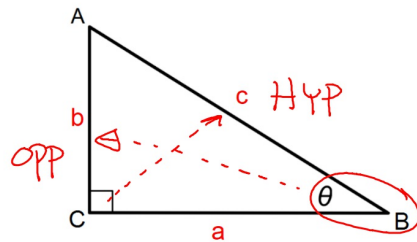
The Sine Ratio:

SOHCAHTOA

Sine of an angle

$$\sin \theta = \frac{\text{Leg Opposite } \theta}{\text{Hypotenuse}}$$

$$\sin \theta = \frac{b}{c}$$



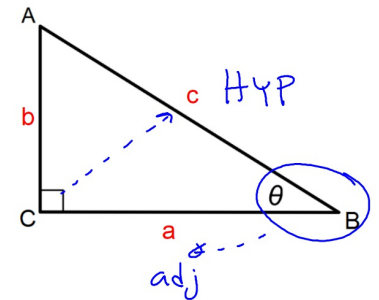
The Cosine Ratio:

SOHCAHTOA

Cosine of an angle

$$\cos \theta = \frac{\text{Leg Adjacent to } \theta}{\text{Hypotenuse}}$$

$$\cos B = \frac{a}{c}$$



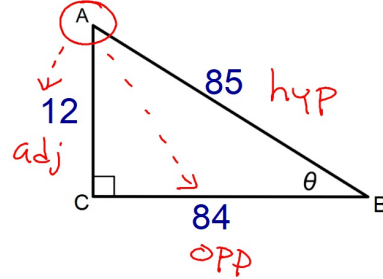
Write each trigonometric ratio as a fraction.

SOHCAHTOA

$$\sin A = \frac{84}{85}$$

$$\cos A = \frac{12}{85}$$

$$\tan A = \frac{84}{12}$$



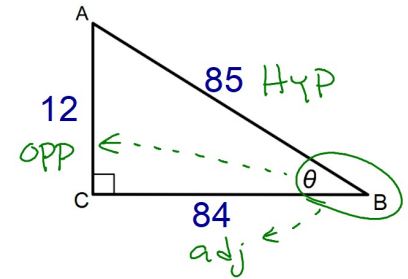
Write each trigonometric ratio as a fraction.

SOHCAHTOA

$$\sin B = \frac{12}{85}$$

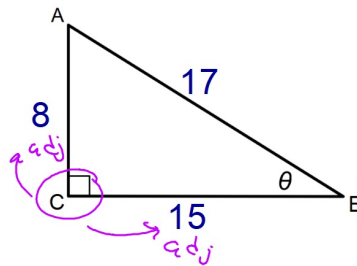
$$\cos B = \frac{84}{85}$$

$$\tan B = \frac{12}{84}$$



In right triangle trigonometry
why don't we find the $\sin C$
or $\cos C$?

There is no Opposite Leg
and there are two
Adjacent Legs.



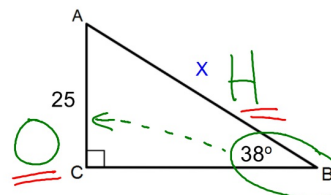
In Right Triangle Trigonometry we can only find
the Sin, Cos, and Tan of **ACUTE** angles.



Finding missing sides using Sine and Cosine.

Find the value of x the nearest hundredth.

SOHCAHTOA



To find X:

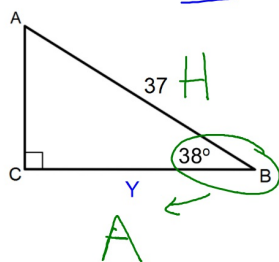
- 1st: label sides as opp leg(O), adj leg (A), or hypotenuse (H)
- 2nd: decide if you need to use Sin, Cos, or Tan.
- 3rd: set up an equation using the appropriate trig ratio.
- 4th: solve for the unknown.

$$\frac{\sin 38^\circ}{1} = \frac{25}{x}$$

$$x = \frac{(25)(1)}{\sin 38^\circ} = \frac{25}{\sin 38^\circ} = \boxed{40.61}$$

Find the value of y to the nearest hundredth.

SOHCAHTOA



To find Y:

Follow the same procedure as you did to find X

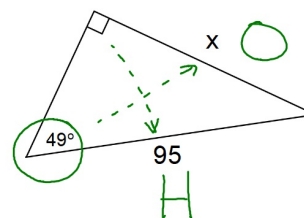
$$37 \cdot \cos 38^\circ = \frac{y}{37} \cdot 37$$

$$y = 37 \cos 38^\circ$$

$$\boxed{y = 29.16}$$

Find the value of x to the nearest hundredth.

SOHCAHTOA



$$95 \cdot \sin 49^\circ = \frac{x}{95} \cdot 95$$

$$x = 95 \sin 49^\circ$$

$$\boxed{x = 71.70}$$

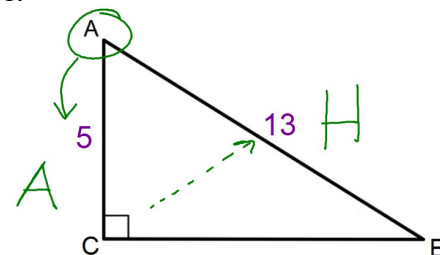
Find a missing angle using Sine and Cosine.

After setting up the appropriate equation using SOHCAHTOA you'll use either Inverse Sine ($\sin^{-1}$) or Inverse Cosine ($\cos^{-1}$) to turn the ratio back into the angle.

Find the measure of angle A to the nearest hundredth of a degree.

SOHCAHTOA

Angle A:



$$\cos A = \frac{5}{13}$$

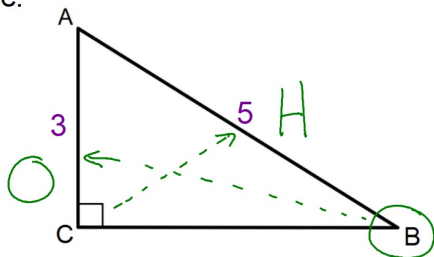
$$\angle A = \cos^{-1}\left(\frac{5}{13}\right)$$

$$\angle A = 67.38^\circ$$

Find the measure of angle B to the nearest hundredth of a degree.

SOHCAHTOA

Angle B:



$$\sin B = \frac{3}{5}$$

$$\angle B = \sin^{-1}\left(\frac{3}{5}\right)$$

$$\angle B = 36.87^\circ$$

You can now try the practice problems in Practice #3 that can be found on the link on my blog.

