

Recap from last class

Steps for finding a missing side of a Right Triangle using Primary Trig Ratios

- 1. Identify your reference angle
- 2. Label your triangle using the reference angle
- 3. Decide what ratio to use (using the Have, Need, Use method)
- 4. Cross multiply
- 5. Isolate x
- 6. Conclude

Warm-Up: Determine the value of x, to the nearest one decimal place.

Have: angle 61° CAH
Hyp 25

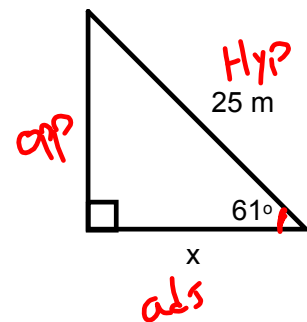
Need: adj

Use $\cos \theta = \frac{\text{adj}}{\text{Hyp}}$

$$\frac{\cos 61}{1} = \frac{x}{25}$$

$$x = 25 \cos 61$$

$$x = 12.1 \text{ m}$$



Solving for an Unknown Angle

Trig ratios can also be used to find the measures of angles of a right triangle that are not known.

\sin^{-1} \cos^{-1} \tan^{-1} \rightarrow angle measurement
 \sin \cos \tan \rightarrow Side length

Ex. 1 Use a calculator to find the measure of each angle A to the nearest degree.

a) $\cos A = 0.4067$

$$A = \cos^{-1} 0.4067$$

$$A = 66^\circ$$

b) $\sin A = 0.7777$

$$A = \sin^{-1} 0.7777$$

$$A = 51^\circ$$

c) $\tan A = 2.246$

$$A = \tan^{-1} 2.246$$

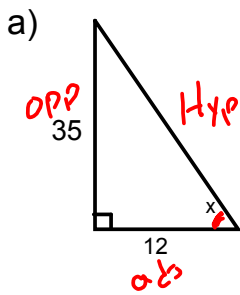
$$= 66^\circ$$

Steps for Solving for an Unknown Angle

1. Identify your reference angle
2. Label your triangle using the reference angle
3. Decide what ratio to use (using the Have, Need, Use method)
4. Inverse function (\sin^{-1} , \cos^{-1} , \tan^{-1})
5. Conclude

Ex. 2: For the following triangles, identify the trig ratio to use, write the equation and solve it to one decimal place using the inverse trig buttons \sin^{-1} \cos^{-1} \tan^{-1} on your calculator.

SOH CAH TOA



Have: opp = 35
adj = 12

Need: angle x

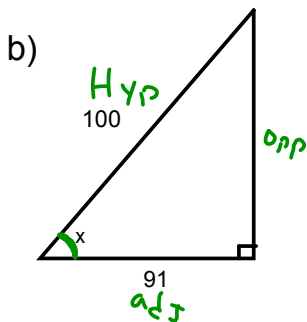
Use: $\tan x = \frac{O}{A}$

$$\tan x = \frac{35}{12}$$

$$\tan x = 2.9167$$

$$x = \tan^{-1} 2.9167$$

$$x = 71^\circ$$



Have: Hyp = 100
Adj = 91

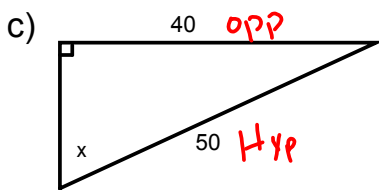
SOH CAH TOA

Need: angle x

Use: $\cos x = \frac{A}{H} \rightarrow \cos x = \frac{91}{100}$

$$\cos x = 0.91 \rightarrow x = \cos^{-1} 0.91$$

$$x = 24^\circ$$



Have: opp = 40
Hyp = 50

Need: angle x

Use: $\sin x = \frac{O}{H}$

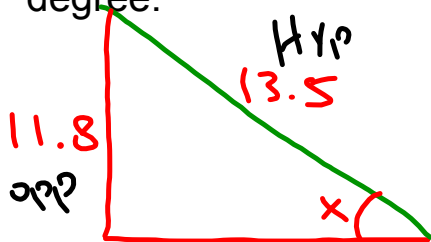
$$\sin x = \frac{40}{50}$$

$$\sin x = 0.8$$

$$x = \sin^{-1} 0.8$$

$$x = 53^\circ$$

Ex. 3 A storm caused a 13.5m hydro pole to lean over. The top of the pole is now 11.8m above the ground. Find the measure of the angle between the hydro pole and the ground, to the nearest degree.



Have : Hyp = 13.5
opp = 11.8

need = angle x

use $\rightarrow \sin x = \frac{o}{h}$

$$\sin x = \frac{11.8}{13.5}$$

$$\sin x = 0.8741$$

$$x = \sin^{-1} 0.8741$$

$$x = 61^\circ$$

\therefore the angle between the Hydro pole and the ground is 61°