Name: Homework

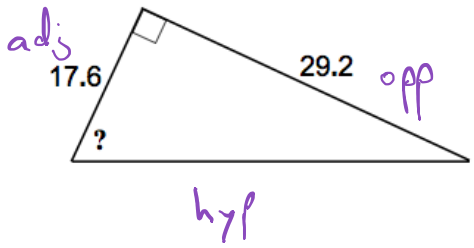
Trigonometry – 02

Steps to follow when using SOH CAH TOA

1. **Identify the angle**
2. **Label the sides** {opposite, adjacent, hypotenuse}
3. **Identify which side HAVE** and which side you **WANT**
4. Write "**SOH – CAH – TOA**" and decide which one will work
5. Write the **formula** (ex.: $\frac{\sin A}{1} = \frac{opposite}{hypotenuse}$)
6. **Plug-in** the values and **solve** for the missing piece.

1) Find the angle marked '**?**' in the right triangle below

Round your answer to the nearest decimal place.



$S\frac{O}{H}$ $C\frac{A}{H}$ $T\frac{O}{A}$

$\frac{\tan x}{1} = \frac{29.2}{17.6}$

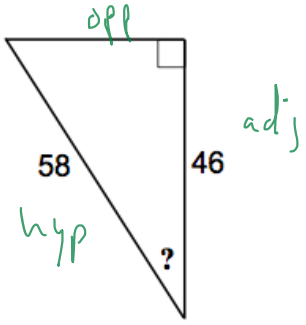
$\frac{29.2(1)}{17.6} = 1.659090091$ $\tan^{-1}$

$\tan^{-1}\tan x = 1.659090091$ $\tan^{-1}$

$X = 58.9$

2) Find the angle marked '**?**' in the right triangle below

Round your answer to the nearest decimal place.



$S\frac{O}{H}$ $C\frac{A}{H}$ $T\frac{O}{A}$

$\frac{\cos x}{1} = \frac{46}{58}$

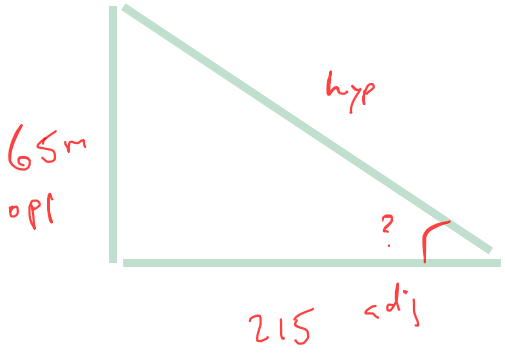
$\frac{46(1)}{58} = \cos x$

$\cos^{-1}$ $\cos^{-1}$

$0.7931034\overline{5} = \cos x$

$37.5 = x$

3) A construction crane is 65 m tall.
A construction worker is standing 215 m away from the crane.
What is the angle of elevation between the ground in front of the worker and the top of the crane?



SOH CAH TOA

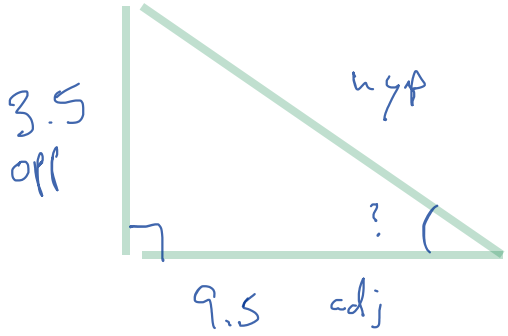
$\frac{\tan x}{1} = \frac{65}{215}$

$\frac{65(1)}{215} = \tan x$ tan-1 tan-1

$0.30232558 = \tan x$

$16.8 = x$

4) Jimmy builds a potato gun and wants to shoot a potato into his bedroom through the window.
He stands 9.5 meters from his house. His bedroom window is 3.5 meters off the ground.
At what angle should he hold the gun relative to the ground to get the potato in his room?



SOH CAH TOA

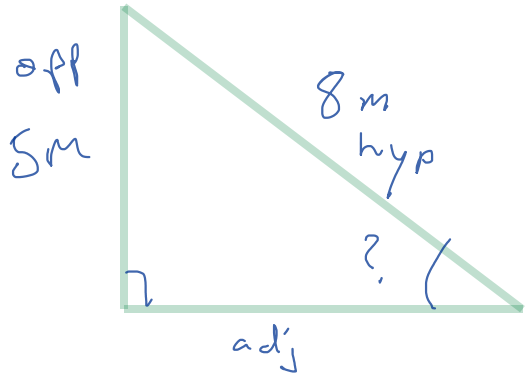
$\frac{\tan x}{1} = \frac{3.5}{9.5}$

$\frac{3.5(1)}{9.5} = \tan x$ tan-1 tan-1

$0.36842105 = \tan x$

$20.2 = x$

5) A ladder is 8 m long. It is leaning up against the wall of a house and reaches 5 m up the wall.
If the ladder is less than 32 degrees from the level ground, it may slip and cause injury to the person climbing it. Is it safe to climb the ladder?



SOH CAH TOA

$\frac{\sin x}{1} = \frac{5}{8}$

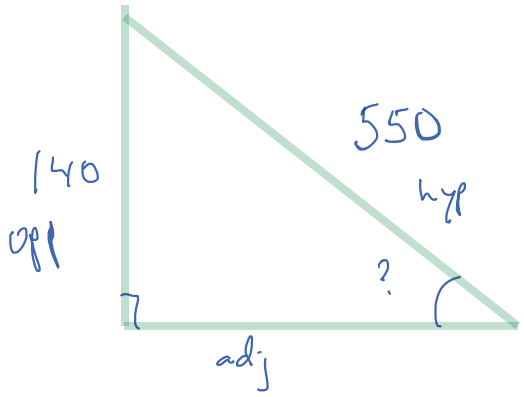
$\frac{5(1)}{8} = \sin x$ sin-1 sin-1

$0.625 = \sin x$

$38.7 = x$

yes safe

6) One section of a mountain railway is 550 m long (hypotenuse).
In that length, the railway rises through a vertical height of 140 meters.
Calculate the angle of inclination of the track (between level ground and the railway track).



SOH CAH TOA

$\frac{\sin x}{1} = \frac{140}{550}$

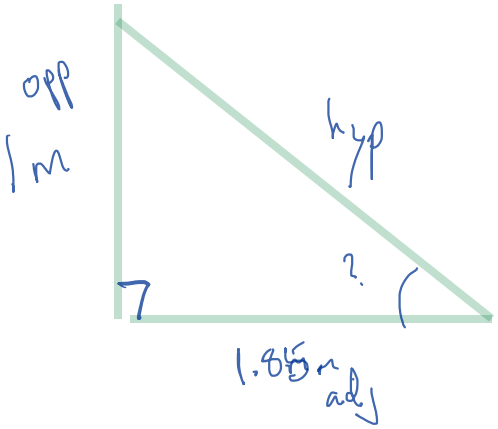
$\frac{140(1)}{550} = \sin x$

$\sin^{-1}(0.2545) = \sin^{-1} x$

$14.7 = x$

7) An upright stick, 1 m tall, casts a shadow that is 1.85 m long along the ground.

a. What is the angle the sun makes with the horizontal ground?



SOH CAH TOA

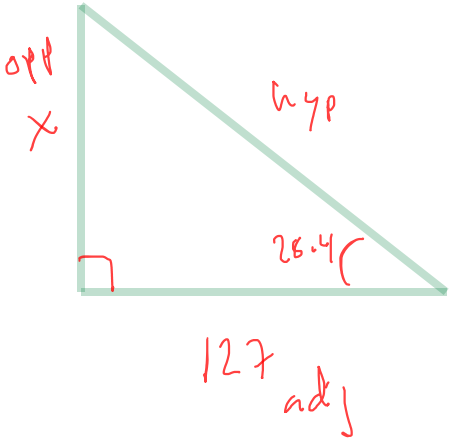
$\frac{\tan x}{1} = \frac{1}{1.85}$

$\frac{1(1)}{1.85} = \tan x$

$\tan^{-1}(0.54054054) = \tan^{-1} x$

$28.4 = x$

b. At the same time, the shadow of a building is found to be 127 meters long. What is the height of the building?



SOH CAH TOA

$\frac{\tan 28.4}{1} = \frac{x}{127}$

$\frac{127(\tan 28.4)}{1} = x$

$68.7 = x$