1.2 Problem Solving Using SohCahToa

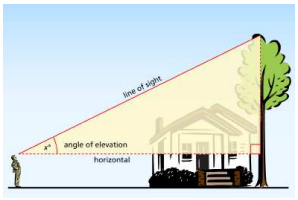
Process

What do we need trig for ?

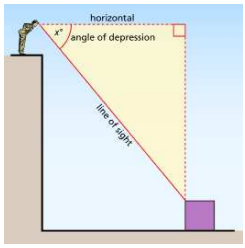
1) Draw a diagram if one is not given. DO NOT skip this step!
2) Label the diagram with all important info.
3) Mark the given angle, name the sides and choose the right trig ratio.
4) Write an equation to represent the problem.
5) Solve for the missing value.
6) Write a concluding statement.

Important Vocabulary

Angle of Elevation:
The angle between the horizontal and the line of sight up to an object.



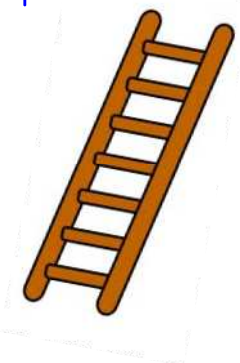
Angle of Depression:
The angle between the horizontal and the line of sight down to an object.

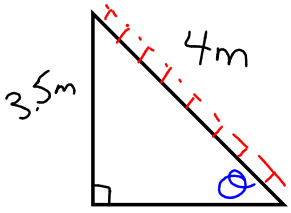


Sep 14-12:00 AM

Ex. 1

A carpenter leans a 4 m ladder against a wall. It reaches 3.5 m up the wall. Find the angle the ladder makes with the floor.





Dealing with? Hyp & Opp

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

$\sin\theta = \frac{3.5}{4}$

$\theta = \sin^{-1}\left(\frac{3.5}{4}\right)$

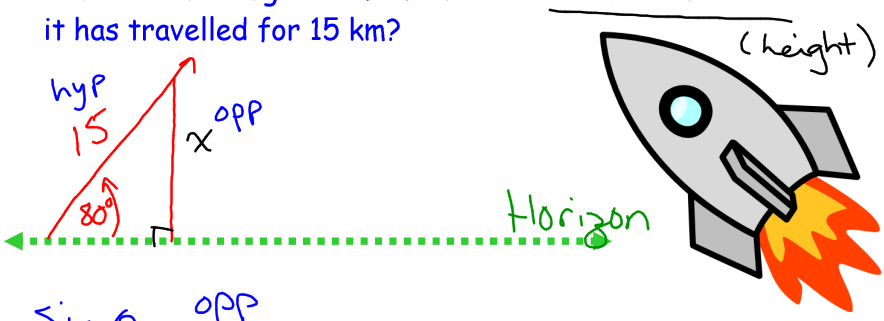
$\doteq 61^\circ$

∴ The ladder makes a 61° angle with the floor.

Sep 14-12:33 AM

Ex. 2

A rocket is launched at an angle of elevation of 80° and it travels in a straight line. What is the rocket's altitude when it has travelled for 15 km?



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

$\sin 80° = \frac{x}{15}$

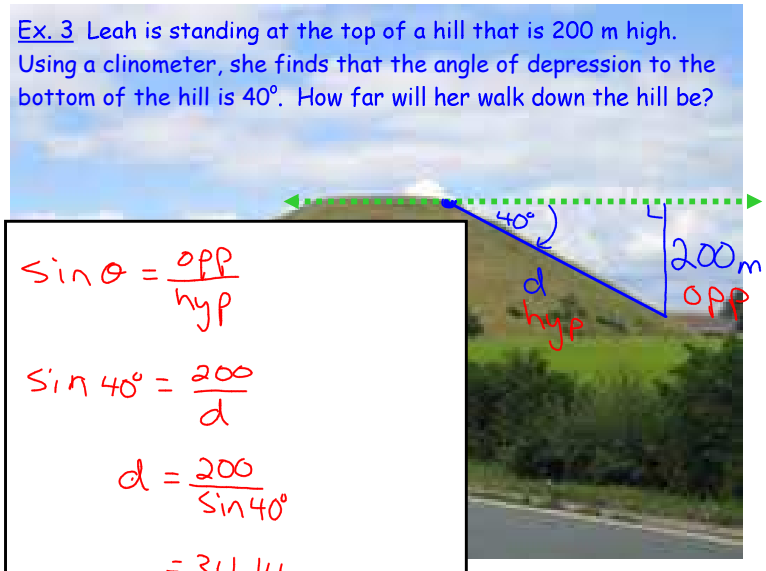
$15(\sin 80°) = x$

$14.77 = x$

∴ The altitude of the rocket is 14.77 km

Jan 29-2:00 PM

Ex. 3 Leah is standing at the top of a hill that is 200 m high. Using a clinometer, she finds that the angle of depression to the bottom of the hill is 40°. How far will her walk down the hill be?



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

$\sin 40° = \frac{200}{d}$

$d = \frac{200}{\sin 40°}$

$= 311.14$

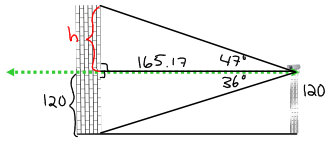
∴ She will need to walk 311m

Jan 29-2:03 PM

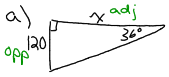
Ex. 4 A video camera is mounted on the top of a 120 m tall building. When the camera tilts down, the angle of depression to the bottom of another building is 36°, when the camera tilts up the angle of elevation to the top of the other building is 47°.

a) How far apart are the two buildings?

b) How tall is the other building?



a)



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

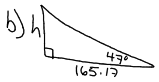
$\tan 36° = \frac{120}{x}$

$x = \frac{120}{\tan 36°}$

$= 165.17$

∴ The two buildings are 165 m apart

b)



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

$\tan 47° = \frac{h}{165.17}$

$165.17(\tan 47°) = h$

$177.12 = h$

Total height

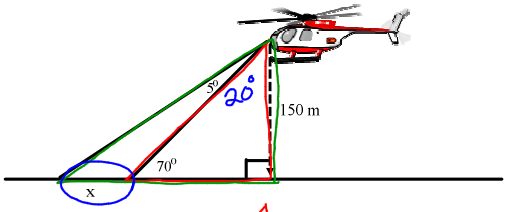
$= 177 + 120$

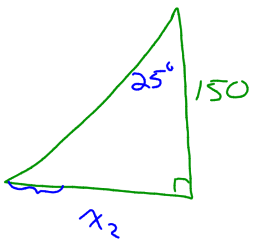
$= 297$ m

∴ The total height of the building is 297m

Jan 29-2:14 PM

Ex. 5 A searchlight is mounted at the front of a search and rescue helicopter. The pilot is flying the helicopter 150 m above the ground and the beam hits the ground at 70° from the horizontal. The beam spreads out at an angle of 5°. How wide is the beam when it hits the ground?



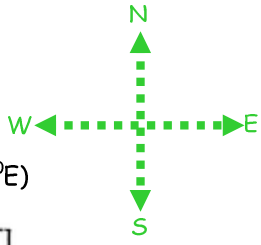


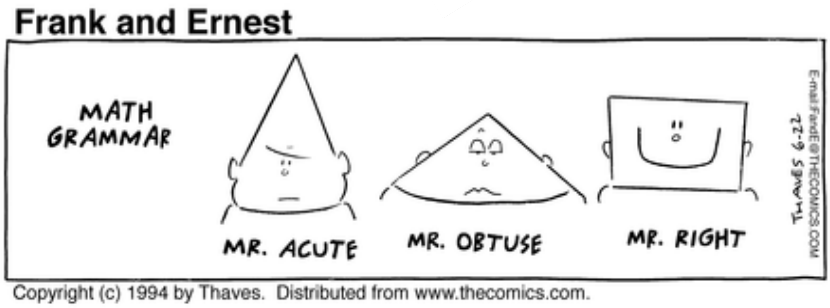
Jan 29-2:26 PM

Homework
page 21 #1,5,6,9,12-13,15

Recall: Directions

20^0 from the horizontal
travel 20 m south
45^0 East of North (N 45^0E)



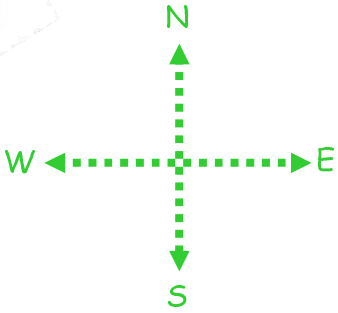


Recall: Directions

20^0 from the horizontal

travel 20 m south

45^0 East of North (N 45^0E)



Sep 7-12:12 PM