

1.2 Problem Solving Using SohCahToa

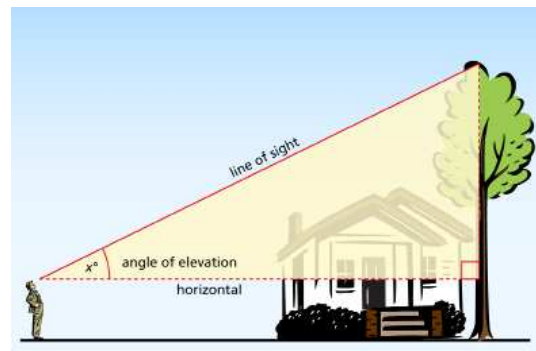
Process

- 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

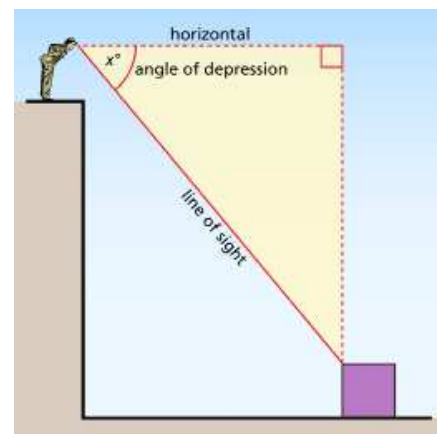
Angle of Elevation:

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



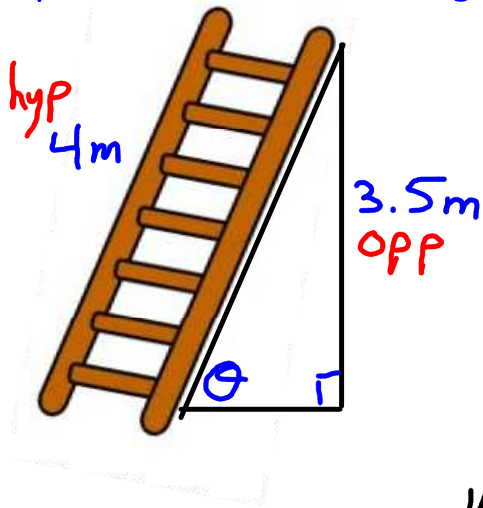
Angle of Depression:

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



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.



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

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

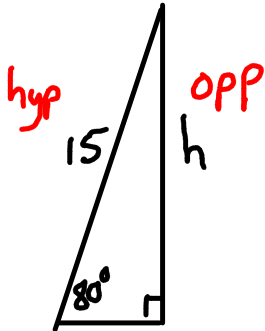
$$\theta = \sin^{-1}\left(\frac{3.5}{4}\right)$$

$$\theta = 61^\circ$$

\therefore the angle is
 61°

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?

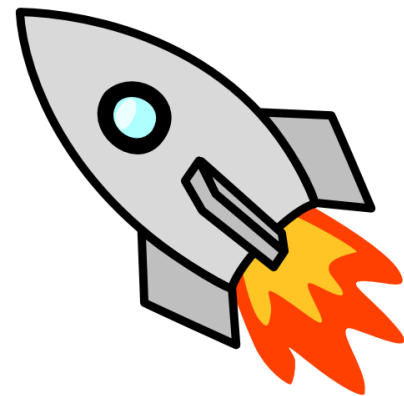


$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\sin 80^\circ = \frac{h}{15}$$

$$15 \cdot \sin 80^\circ = h$$
$$h = 14.8$$

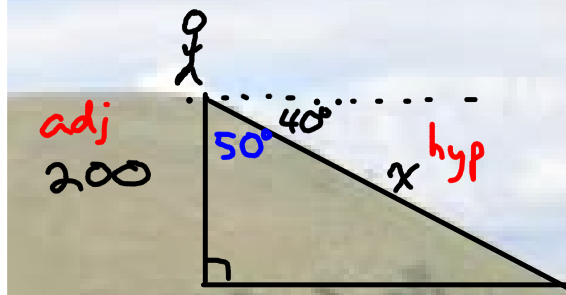
\therefore It is 14.8 Km high



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?

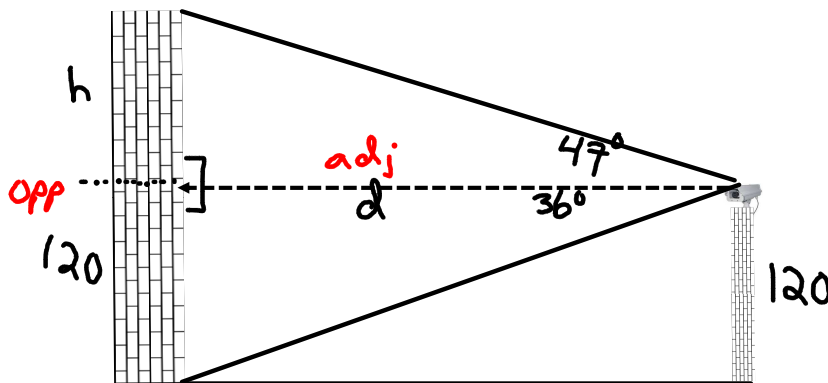
$$\begin{aligned}\cos \theta &= \frac{\text{adj}}{\text{hyp}} \\ \cos 50^\circ &= \frac{200}{x} \\ x &= \frac{200}{\cos 50^\circ} \\ &= 311.1\end{aligned}$$

\therefore She will have 311m to walk



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) Find d

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

$$\tan 36^\circ = \frac{120}{d}$$

$$d = \frac{120}{\tan 36^\circ}$$

$$d = 165.2$$

\therefore The buildings are
165m apart



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

$$\tan 47^\circ = \frac{h}{165.2}$$

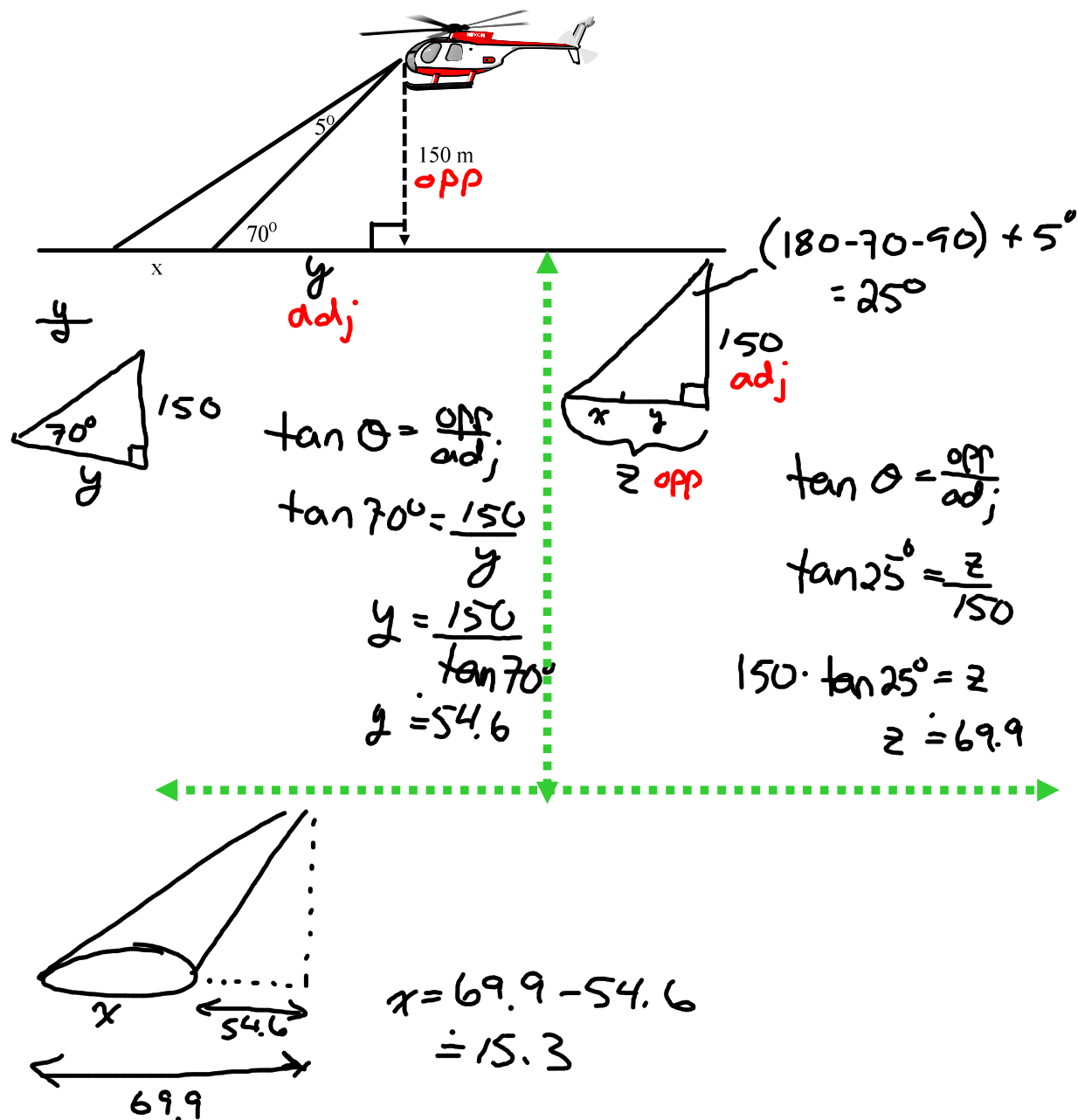
$$165.2 \cdot \tan 47^\circ = h$$

$$h = 177$$

$$120 + 177 = 297$$

\therefore The other building is 297m tall

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?



\therefore The beam is 15.3m wide

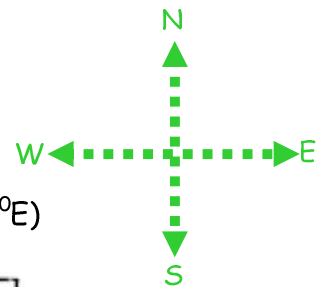
Homework

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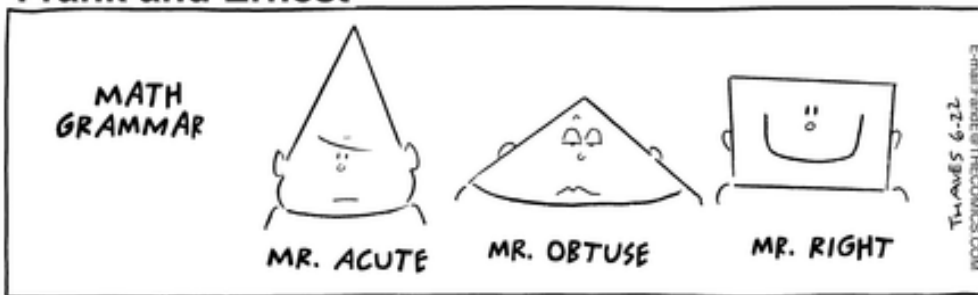
Recall: Directions



20° from the horizontal
travel 20 m south
 45° East of North ($N 45^\circ E$)



Frank and Ernest



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