

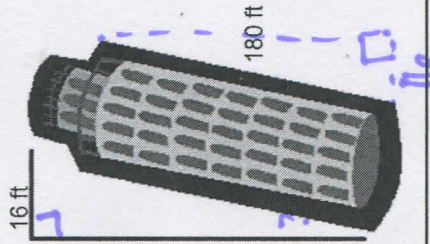
OBJECTIVE 4: Real World Application

TASK 1: Answer these problems, pay attention to units and round to appropriate units.

a) Can you find the angle at which the tower leans?

$\sin X = \frac{16}{180}$

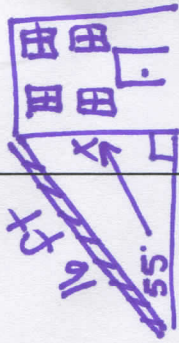
$\sin^{-1}(\frac{16}{180}) = 5^\circ$



b) A 16 ft ladder is propped against a building. The angle it forms with the ground measure 55 degrees. How far up the side of the building does the ladder reach? (HINT: draw your own diagram.)

$\sin 55 = \frac{x}{16}$

$x = 16(\sin 55)$
 $\approx 13.106 \text{ ft}$
 exact
 rounded

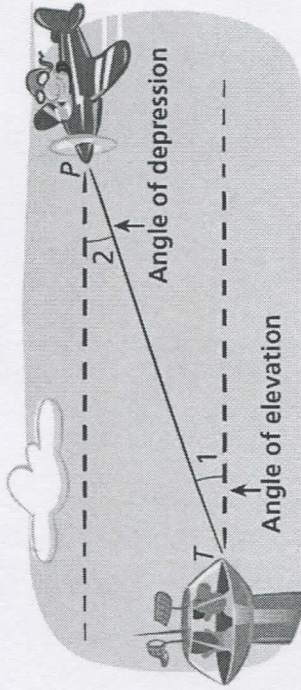


SOH

OBJECTIVE 5: Angle of Elevation and Depression

These angles are created with a HORIZONTAL LINE and another segment!

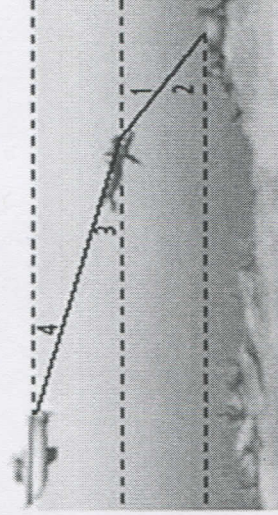
- **Angle of Elevation:** horizontal line then looking up to an object.
- **Angle of Depression:** horizontal line then looking down to an object.
- Angle of Elevation & Angle of Depression are always congruent. Horizontal lines are parallel, so two parallel lines with a diagonal transversal creates congruent alternate interior angles.



TASK 2: Label the four numbers as either angle of elevation or angle of depression.

1 & 4 of Depression

2 & 3 of elevation



TASK 3: Apply the definition of angle of elevation and depression to solve the following word problems. If a diagram is drawn, write on it. If a diagram is not drawn, draw and label one.

- a) Suppose the ranger in a tower 90 feet high spots fire at an angle of depression of 3° . What is the horizontal distance to this fire? Round to the nearest foot.

$$\boxed{1717 \text{ ft}}$$

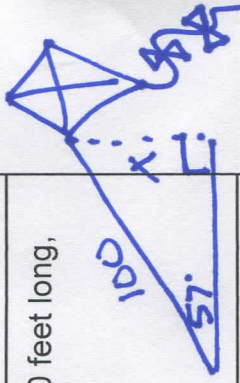


$$\tan 3 = \frac{90}{x} \rightarrow x(\tan 3) = 90 \quad x = \frac{90}{\tan 3} \approx 1717.302$$

- b) Tim is flying a kite one sunny Saturday afternoon at an angle of elevation of 57° . If the kite's string is 100 feet long, how high is the kite? Round to the nearest foot.

$$\boxed{84 \text{ ft}}$$

$$\frac{\sin 57}{1} = \frac{x}{100} \rightarrow x = 100(\sin 57) \approx 83.867$$



- c) The pilot of a traffic helicopter sights an accident at an angle of depression of 18° . The helicopter's altitude is 1560 ft. What is the horizontal distance from the helicopter to the accident? Round to the nearest foot.

$$\boxed{4801 \text{ ft}}$$

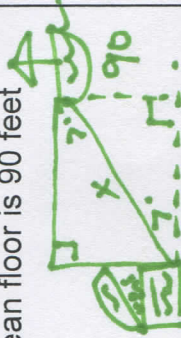
$$\text{TOA} \quad \frac{\tan 18}{1} = \frac{1560}{x} \rightarrow x(\tan 18) = 1560 \quad x = \frac{1560}{\tan 18} \approx 4801.86$$



- d) A boat's radar picks up the signal of a buried treasure at an angle of depression of 7° . If the ocean floor is 90 feet below the boat, to the nearest foot, how far is the boat away from the treasure?

$$\boxed{738 \text{ ft}}$$

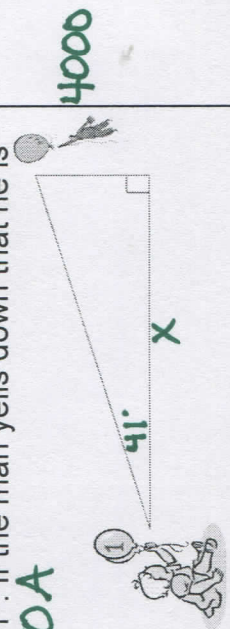
$$\frac{\sin 7}{1} = \frac{90}{x} \rightarrow x(\sin 7) = 90 \rightarrow x = \frac{90}{\sin 7} \approx 738.496$$



- e) Abby sees a man being dragged away by his balloon at an angle of elevation of 41° . If the man yells down that he is 4000 feet high, how far away horizontally is he from Abby to the nearest foot?

$$\boxed{4601 \text{ ft}}$$

$$\tan 41 = \frac{4000}{x} \quad x(\tan 41) = 4000 \rightarrow x = \frac{4000}{\tan 41} \approx 4601.474$$



Still need help with: