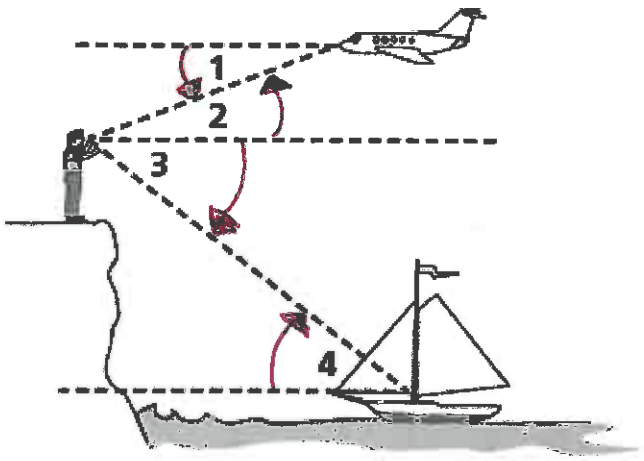
Real World Application

Angle of Elevation – The angle ***above horizontal*** that an observer must look to see an object that is higher than the observer.

Angle of Depression - The angle ***below horizontal*** that an observer must look to see an object that is lower than the observer.

3.



a. Angle 2 is the *angle of elevation* from the person to the plane. Identify another angle of elevation in the diagram.

∠4 is the ∠ of elevation from the ship to the person.

b. Angle 3 is the *angle of depression* from the person to the ship. Identify another angle of depression in the diagram.

∠1 is the ∠ of depression from the plane to the person.

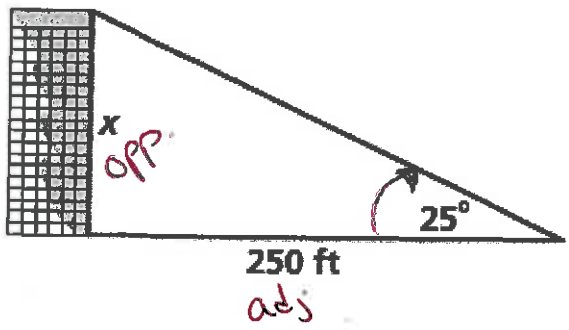
c. Describe the relationship between ∠1 (*an angle of depression*) and ∠2 (*an angle of elevation*) and explain how you know.

∠1 ≅ ∠2. Since the horizontal lines will be parallel.

|| lines cut by a trans. make alt. int ∠'s ≅.

4. Practice Problems:

a. The angle of elevation from an observer to the top of a building is 25°. If the observer is 250 ft. from the foot of the building, how tall is the building *(to the nearest foot)*?



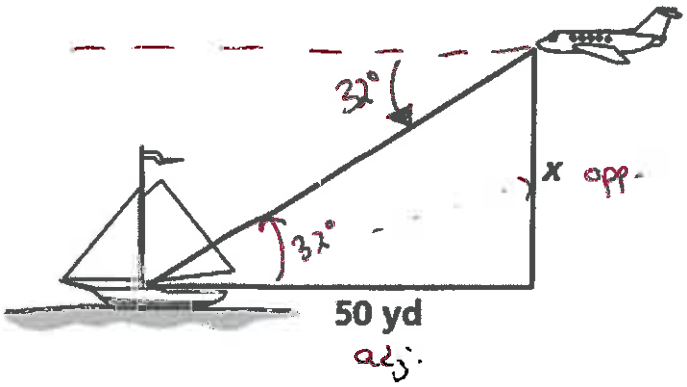
$\tan(25) = \frac{x}{250}$

$x = 250 \tan(25)$

≈ 117 ft.

b. A pilot spots a boat at an angle of depression of 32°. If the horizontal distance from the plane to the boat is 50 yards, find the vertical distance of the plane, to the nearest **foot**.

(**HINT:** *the angle of depression is **not** part of the triangle drawn in the diagram. First, correctly identify the angle of depression and determine how it can be used to obtain one of the acute angles of the triangle.)*



< elevation ≅ < depression

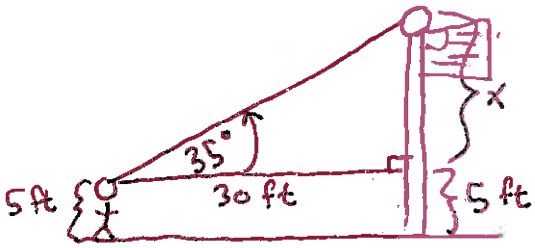
$\tan(32) = \frac{x}{50}$

$x = 50\tan(32)$

$= 31$ yards

$= 93$ feet.

c. A person, whose eye level is 5 ft., is standing 30 ft. from a flagpole can see the top of the pole at a 35° angle of elevation. Draw a diagram to represent the situation, and find the height of the pole to the nearest foot.



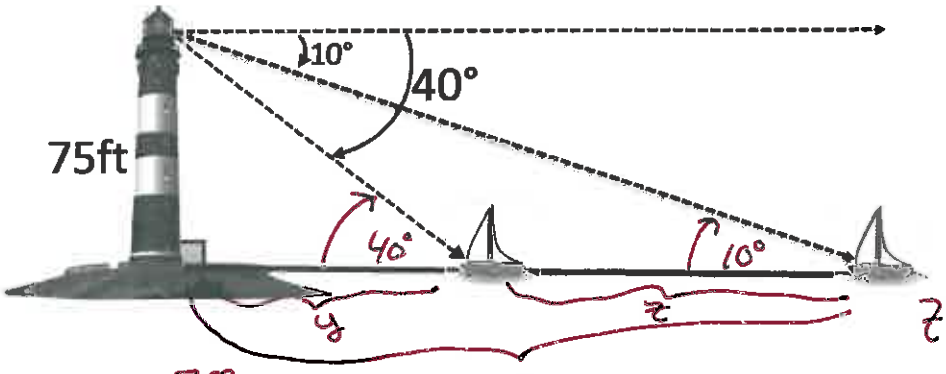
$\tan(35) = \frac{x}{30}$

$x = 30\tan(35)$

$= 21$ ft.

flag pole $= 21 + 5 =$ 26 ft.

d. An observer at the top of a 75ft. light house spots a ship at a 10° angle of depression. Thirty seconds later, the angle of depression from the observer to the ship is 40°. How far did the ship travel over the thirty seconds, *to the nearest foot*? How fast is the ship traveling, *to the nearest ft/sec*?



$\tan(40) = \frac{75}{y}$

$y = \frac{75}{\tan(40)}$

$= 89$ ft.

$\tan(10) = \frac{75}{x}$

$x = \frac{75}{\tan(10)}$

$= 425$ ft.

$z = x - y$

$= 425 - 89$

$= 336$ ft

the boat traveled 336 ft in 30 seconds.

that makes its speed $\frac{336}{30}$ ft/sec.

or 11.2 ft/sec.