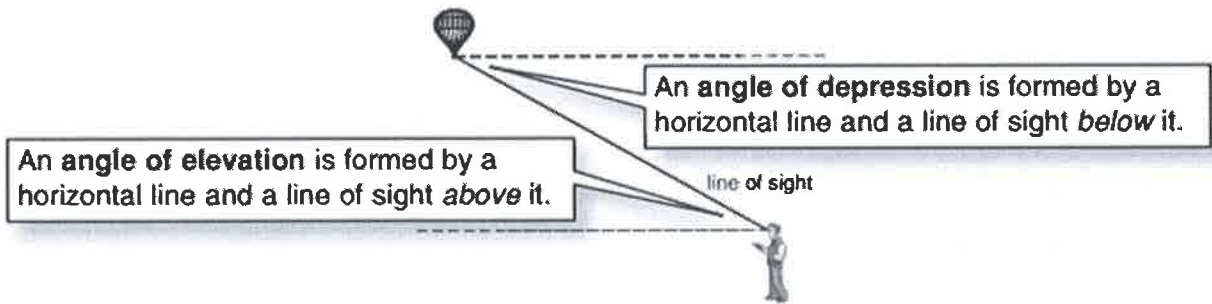




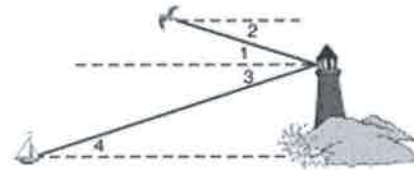
- I can apply trigonometric ratios to real life problems.

Angles of Elevation and Depression

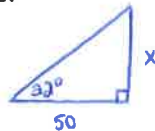
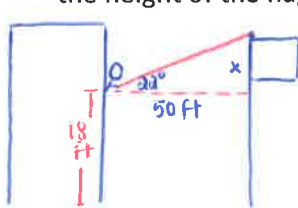


Use the figure below for questions 1 – 4. Classify each angle as an angle of elevation or an angle of depression.

- $\angle 1$ elevation
- $\angle 2$ depression
- $\angle 3$ depression
- $\angle 4$ elevation



5. Noah is looking out Mrs. D’Emanuele’s window and sees the top of the school flagpole at an angle of elevation of 22° . Noah is 18 feet above the ground and 50 feet from the flagpole. Find the height of the flagpole.



$$\tan 22 = \frac{x}{50}$$

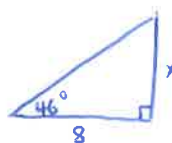
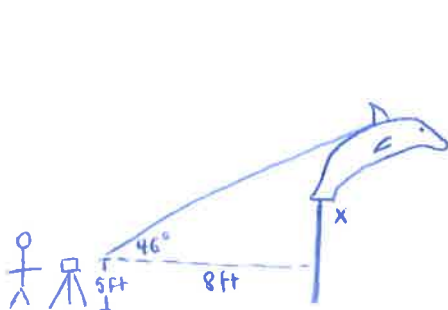
$$x = 50 \tan 22$$

$$x \approx 20.2 \text{ ft}$$

$$\text{Flagpole} = 18 + 20.2 = 38.2$$

The flagpole is
38.2 ft tall

6. At a topiary garden, Maddie is 8 feet from a shrub that is shaped like a dolphin. From where she is standing, she measures the angle of elevation to the top of the shrub is 46° , using a transit that is 5 feet of the ground. What is the best estimate for the height of the shrub?



$$\tan 46 = \frac{x}{8}$$

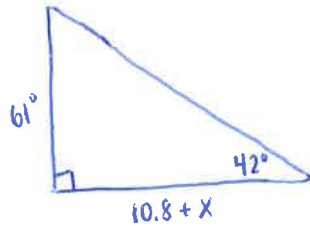
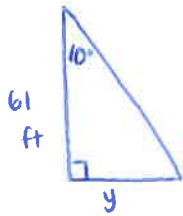
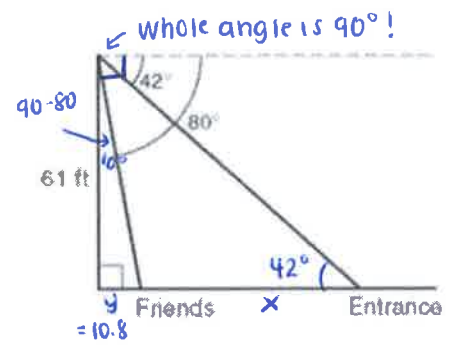
$$x = 8 \tan 46$$

$$x \approx 8.3$$

$$\text{Shrub} = 8.3 + 5 \text{ ft} = 13.3$$

The height of
the shrub is
about 13.3 ft

7. Shane is 61 feet high on a ride at an amusement park. The angle of depression to the park entrance is 42° , and the angle of depression to his friends standing below is 80° . How far from the entrance are his friends standing? Round to the nearest foot.



$$\frac{\tan 10}{1} = \frac{y}{61}$$

$$y = 61 \cdot \tan 10$$

$$y = 10.8$$

$$\frac{\tan 42}{1} = \frac{61}{10.8 + x}$$

$$61 = \tan 42 (10.8 + x)$$

$$61 = 10.8 \tan 42 + x \tan 42 \leftarrow \text{decimals to 4 places}$$

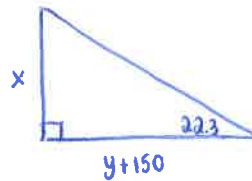
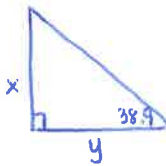
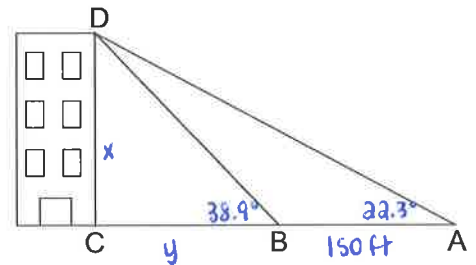
$$61 = 4.7244 + .9004x$$

$$56.2756 = .9004x$$

$$x \approx 56.9$$

His friends are standing about 57 ft from the entrance

8. You are standing at point A and are looking up at a very tall building. You measure the angle of elevation to be 22.3° at point A up to the top of the building. You now walk to point B which is exactly 150 feet directly towards the building from point A. You then measure a new angle of elevation of 38.9° . Using this information, what is the height of the building?



$$\frac{\tan 38.9}{1} = \frac{x}{y}$$

$$x = y \tan 38.9$$

$$\frac{\tan 22.3}{1} = \frac{x}{y+150}$$

$$x = \tan 22.3 (y+150)$$

* Since both equations are equal to x, set them equal! *

$$y \tan 38.9 = \tan 22.3 (y+150)$$

$$y \tan 38.9 = y \tan 22.3 + 150 \tan 22.3$$

$$y \tan 38.9 - y \tan 22.3 = 150 \tan 22.3$$

$$y (\tan 38.9 - \tan 22.3) = 150 \tan 22.3 \leftarrow \text{decimals to 4 places}$$

$$0.3968y = 61.9195$$

$$y \approx 156.0 \text{ ft}$$

$$x = 156 \cdot \tan 38.9$$

$$x = 125.1$$

The building is about 125.1 feet tall