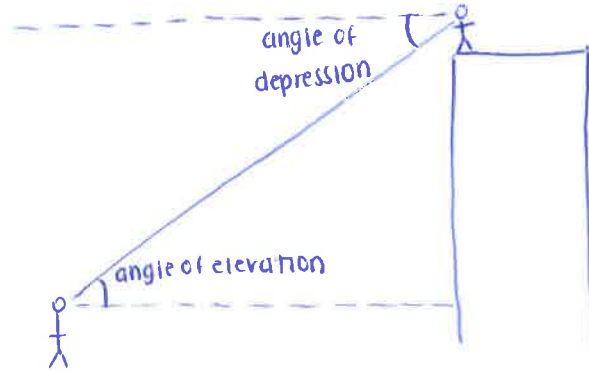




- I can use trigonometric ratios in real world situations.

If you look up at an object, the angle your line of sight makes with a horizontal line is called the **angle of elevation**. If you look down at an object, the angle your line of sight makes with a horizontal line is called the **angle of depression**.



\* Since the angle of elevation & depression are alt. interior angles, they have the same angle measure! \*

1. Michael, whose eyes are six feet off the ground, is standing 36 feet away from the base of the building, and he looks up at a  $50^\circ$  angle of elevation to a point on the edge of the building's roof. To the nearest foot, how tall is the building?

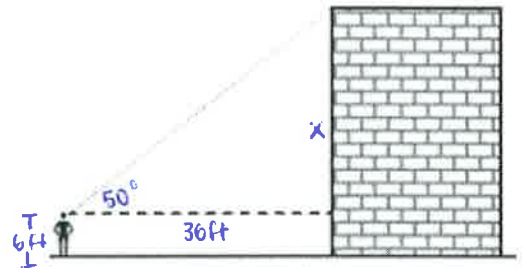
$$\tan 50^\circ = \frac{x}{36}$$

$$x = 36 \cdot \tan 50^\circ$$

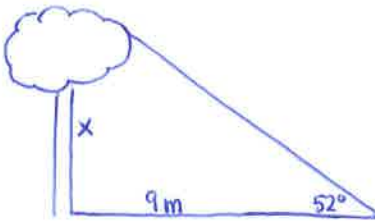
$$x = 42.9$$

$$\text{Height of building} = 6\text{ft} + 42.9\text{ft}$$

$$= 48.9\text{ feet}$$



2. When the angle of elevation to the sun is  $52^\circ$ , a tree casts a shadow that is 9 meters long. What is the height of the tree? Round to the nearest tenth of a meter.



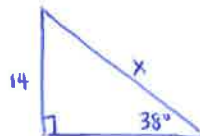
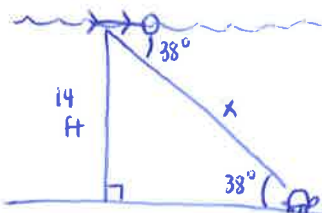
$$\tan 52^\circ = \frac{x}{9}$$

$$x = 9 \cdot \tan 52^\circ$$

$$x = 11.5$$

The tree is about 11.5 feet tall

3. A person snorkeling sees a turtle on the ocean floor at an angle of depression of  $38^\circ$ . She is 14 feet above the ocean floor. How far from the turtle is she? Round to the nearest foot.



$$\sin 38^\circ = \frac{14}{x}$$

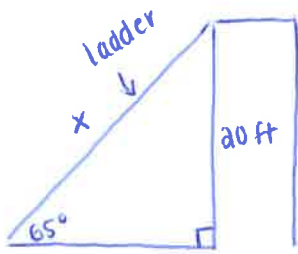
$$14 = x \cdot \sin 38^\circ$$

$$x = \frac{14}{\sin 38^\circ}$$

$$x \approx 22.7$$

She is about 23 feet away from the turtle

4. A ladder leaning against a building makes an angle of  $65^\circ$  with the ground and reaches a point on the building 20 feet above the ground. What is the length of the ladder to the nearest foot?



$$\frac{\sin 65}{1} = \frac{20}{x}$$

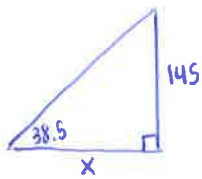
$$20 = x \cdot \sin 65$$

$$x = \frac{20}{\sin 65}$$

$$x \approx 22.1$$

The ladder is about 22 ft long

5. You are standing on top of a 75 foot building looking up at the top of a 220 foot building. The angle of elevation you measure is  $38.5^\circ$ . How far apart are the buildings?



$$\frac{\tan 38.5}{1} = \frac{145}{x}$$

$$145 = x \tan 38.5$$

$$x = \frac{145}{\tan 38.5}$$

$$x \approx 182.3$$

The buildings are about 182.3 ft apart

