

✚ *homework check:* lesson 1-2

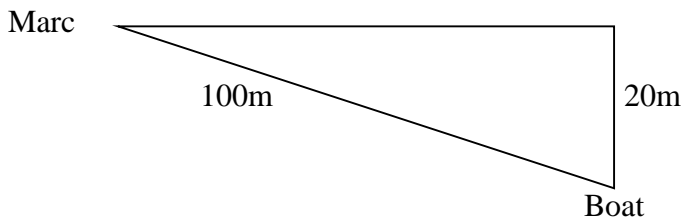
✚ *note:* Solving Word Problems using Trig Ratios

An **angle of elevation or inclination** is an upward angle made from the horizontal upward to the line of sight. An **angle of depression** is a downwards angle made from the horizontal downwards to the line of sight.

We use these words in problems to describe locations. For example,

- a) Marc can see a boat on the water from a nearby cliff 20 m above the water. He estimates the boat is 100 m away. Find the angle of depression.

Step One: *Draw a picture.*



Step 2: *Solve the problem using the appropriate ratio.*

$$\sin M = \frac{O}{H}$$

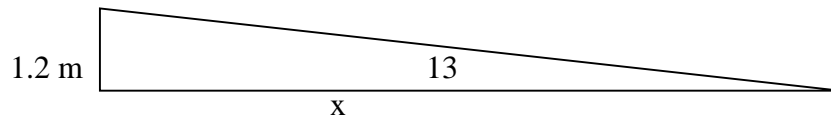
$$\sin M = \frac{20}{100}$$

$$M = \sin^{-1}\left(\frac{20}{100}\right)$$

$$M = 11.5^\circ$$

- b) A wheelchair ramp has an angle of inclination of 13 degrees. If the vertical height of the ramp is 1.2 m, what is the horizontal distance of the ramp?

Step One: Draw a picture.



Step 2: Solve the problem using the appropriate ratio.

$$\tan 13 = \frac{O}{A}$$

$$\tan 13 = \frac{1.2}{x}$$

$$x \tan 13 = 1.2$$

$$x = \frac{1.2}{\tan 13}$$

$$x = 5.2m$$

✚ homework assignment: Foundations for College Mathematics 11 p. 21 # 1 – 15 (odd numbers only)

Directions: For each problem, your solution must include a complete sketch if one is not provided. Round answers to the nearest tenth.

1. A wheelchair ramp is needed at the entrance of a restaurant. The ramp is to be 12 m long and have a rise of 0.8 m. Calculate the angle of inclination of the ramp.

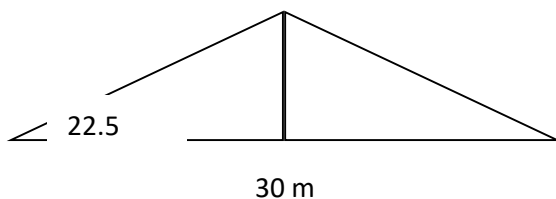
(4)

2. A 8.5 m flagpole is 12 m away from a pedestrian. What is the angle of elevation from where the pedestrian is standing to the top of the flagpole?

(4)

3. A rafter makes an angle of 22.5 degrees with the roof joist, as shown. How tall is the board supporting the middle of the roof?

(3)



4. Terry uses a ladder that is 12 feet tall. To be safe the ladder must make an angle of elevation of between 70 – 85 degrees to be safe. If he places the ladder 3 feet from the wall, is it safe?

(4)

5. A rescue helicopter sights a boat in distress at an angle of 40 degrees from the water. The helicopter is hovering 40 m above the water. What is the distance between the helicopter and the boat?

(4)

6. An expedition team decides to have a practice run prior to their trek. Once team starts to walk due north from the camp while the team two heads 65 degrees east of north at a pace of 3 km/h. How far from the first team is team two after 2 hours?

(4)

7. The CN tower is 555 m high. Lina looks up at the tower at an angle of 24 degrees. How far is she from the base of the tower?

(4)

8. From the top of a 300 m cliff, the angles of depression to two boats on the water are 20 degrees and 30 degrees. If the boats are in a straight line from the cliff, how far apart are the boats?

(5)