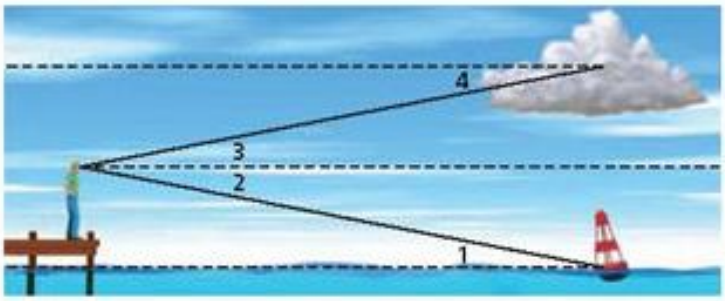
8.4 Homework: page 565: 1-6, 8- 9, 15, 17, 18, 19, 21-25

Vocabulary Apply the vocabulary from this lesson to answer each question.

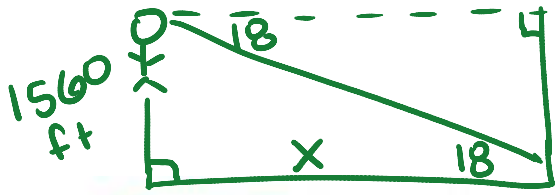
1. An angle of ? is measured from a horizontal line to a point above that line. (*elevation* or *depression*)
2. An angle of ? is measured from a horizontal line to a point below that line. (*elevation* or *depression*)

Classify each angle as an angle of elevation or angle of depression.

3. ∠1 elevation
4. ∠2 depression
5. ∠3 elevation
6. ∠4 depression



8. **Aviation** 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.

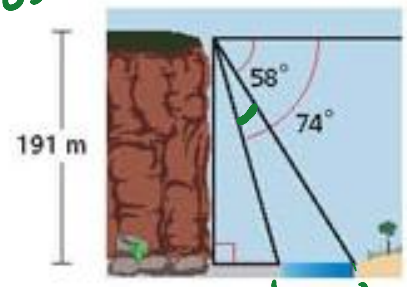


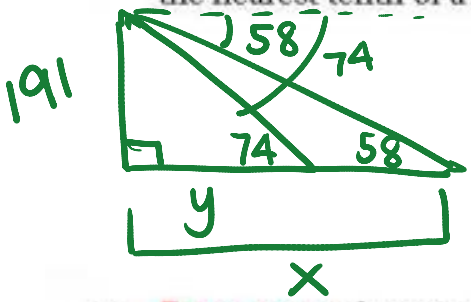
$\frac{\tan(18)}{1} = \frac{1560}{x}$

$x = \frac{1560}{\tan(18)}$

$x \approx 4{,}801$ ft

9. **Surveying** From the top of a canyon, the angle of depression to the far side of the river is 58°, and the angle of depression to the near side of the river is 74°. The depth of the canyon is 191 m. What is the width of the river at the bottom of the canyon? Round to the nearest tenth of a meter.





$\tan(58) = \frac{191}{x}$

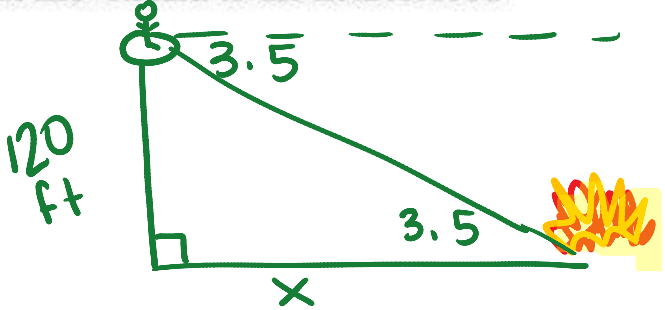
$x \approx 119.4$

$\tan(74) = \frac{191}{y}$

$y \approx 54.8$

$x - y = 64.6$ m

15. **Forestry** A forest ranger in a 120 ft observation tower sees a fire. The angle of depression to the fire is 3.5°. What is the horizontal distance between the tower and the fire? Round to the nearest foot.



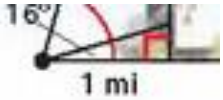
$\frac{\tan(3.5)}{1} = \frac{120}{x}$

$x \approx 1{,}962$ ft

Tell whether each statement is true or false. If false, explain why.

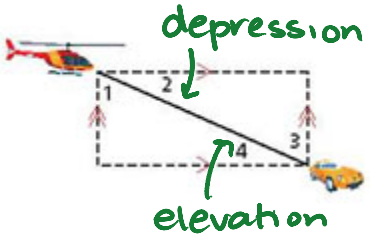
17. The angle of elevation from your eye to the top of a tree increases as you walk toward the tree. True

18. If you stand at street level, the angle of elevation to a building's tenth-story window is greater than the angle of elevation to one of its ninth-story windows. True



19. As you watch a plane fly above you, the angle of elevation to the plane gets closer to 0° as the plane approaches the point directly overhead.
False, the ∠ of elevation gets closer to 90°

Use the diagram for Exercises 21 and 22.

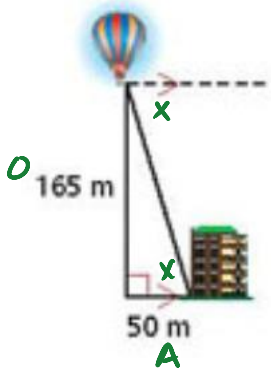


21. Which angles are not angles of elevation or angles of depression? ∠1, ∠3

22. The angle of depression from the helicopter to the car is 30°. Find m∠1, m∠2, m∠3, and m∠4.
60° 30° 60° 30°

23. **Critical Thinking** Describe a situation in which the angle of depression to an object is decreasing. you tell me!

24. An observer in a hot-air balloon sights a building that is 50 m from the balloon's launch point. The balloon has risen 165 m. What is the angle of depression from the balloon to the building? Round to the nearest degree.



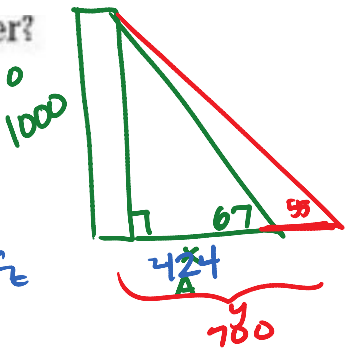
$\tan x = \frac{165}{50}$ $x \approx 73°$

$x = \tan^{-1}\left(\frac{165}{50}\right)$

25. **Multi-Step** A surveyor finds that the angle of elevation to the top of a 1000 ft tower is 67°.

a. To the nearest foot, how far is the surveyor from the base of the tower?

b. How far back would the surveyor have to move so that the angle of elevation to the top of the tower is 55°? Round to the nearest foot.



a) $\tan 67 = \frac{1000}{x}$ $x \cdot \tan 67 = 1000$ $x = \frac{1000}{\tan 67}$ $x \approx 424$ feet

b) $\tan 55 = \frac{1000}{y}$ $y \cdot \tan 55 = 1000$ $y = \frac{1000}{\tan 55} \approx 700$

c) $700 - 424 = 276$ ft