



GUIDED PRACTICE #1-2S KEY

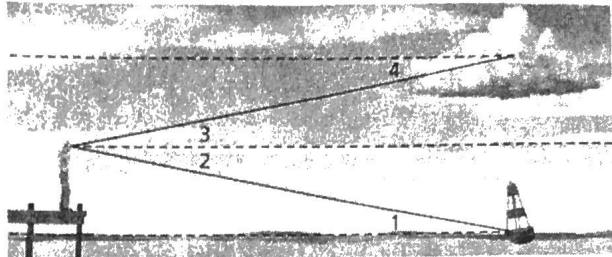
Vocabulary Apply the vocabulary from this lesson to answer each question.

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)

SEE EXAMPLE 1

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

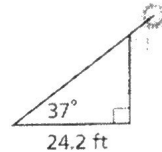
3. $\angle 1$ **E**
4. $\angle 2$ **D**
5. $\angle 3$ **E**
6. $\angle 4$ **D**



SEE EXAMPLE 2

2. **Measurement** When the angle of elevation to the sun is 37° , a flagpole casts a shadow that is 24.2 ft long. What is the height of the flagpole to the nearest foot?

18 Ft



SEE EXAMPLE 3

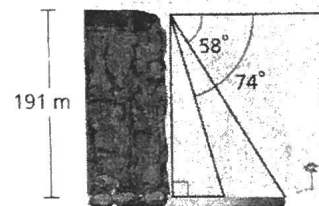
3. **Aviation** The pilot of a traffic helicopter sights an accident at an angle of depression of 18° . The helicopter's altitude is 1560 ft. What is the horizontal distance from the helicopter to the accident? Round to the nearest foot.

4801 ft

SEE EXAMPLE 4

4. **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.

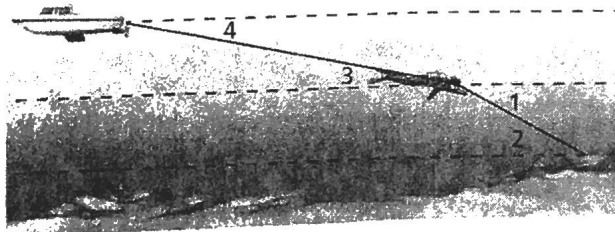
64.6 m



PRACTICE AND PROBLEM SOLVING

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

10. $\angle 1$ **D**
11. $\angle 2$ **E**
12. $\angle 3$ **E**
13. $\angle 4$ **D**



14. **Geology** To measure the height of a rock formation, a surveyor places her transit 100 m from its base and focuses the transit on the top of the formation. The angle of elevation is 67° . The transit is 1.5 m above the ground. What is the height of the rock formation? Round to the nearest meter.

237 m

Independent Practice

For Exercises	See Example
10-13	1
14	2
15	3
16	4

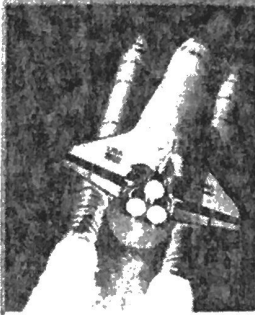
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Practice

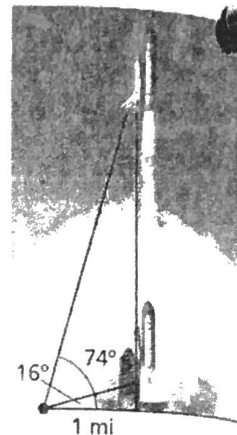
LINK

Space Shuttle



During its launch, a space shuttle accelerates to more than 27,359 km/h in just over 8 minutes. So the shuttle travels 3219 km/h faster each minute.

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. **1962 ft**
16. **Space Shuttle** Marion is observing the launch of a space shuttle from the command center. When she first sees the shuttle, the angle of elevation to it is 16° . Later, the angle of elevation is 74° . If the command center is 1 mi from the launch pad, how far did the shuttle travel while Marion was watching? Round to the nearest tenth of a mile. **3.2 mi**

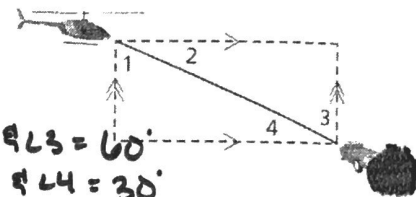


Tell whether each statement is true or false. If false, explain why.

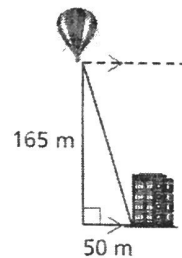
17. The angle of elevation from your eye to the top of a tree increases as you walk toward the tree. **T**
18. If you stand at street level, the angle of elevation to a building's tenth-story window is greater than the angle of elevation to one of its ninth-story windows. **T**
19. As you watch a plane fly above you, the angle of elevation to the plane gets closer to 0° as the plane approaches the point directly overhead. **F**
20. An angle of depression can never be more than 90° . **T**

Use the diagram for Exercises 21 and 22.

21. Which angles are not angles of elevation or angles of depression? **$\angle 1$ & $\angle 3$**
22. The angle of depression from the helicopter to the car is 30° . Find $m\angle 1$, $m\angle 2$, $m\angle 3$, and $m\angle 4$. **$m\angle 1$ & $\angle 3 = 60^\circ$
 $m\angle 2$ & $\angle 4 = 30^\circ$**



23. **Critical Thinking** Describe a situation in which the angle of depression to an object is decreasing.
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. **73°**



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? **424 ft**
- 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. **276 ft**

- HOT** 26. **Write About It** Two students are using shadows to calculate the height of a pole. One says that it will be easier if they wait until the angle of elevation to the sun is exactly 45° . Explain why the student made this suggestion.

Real-World Connections



27. The pilot of a rescue helicopter is flying over the ocean at an altitude of 1250 ft. The pilot sees a life raft at an angle of depression of 31° .
- a. What is the horizontal distance from the helicopter to the life raft, rounded to the nearest foot?
- b. The helicopter travels at 150 ft/s. To the nearest second, how long will it take until the helicopter is directly over the raft?