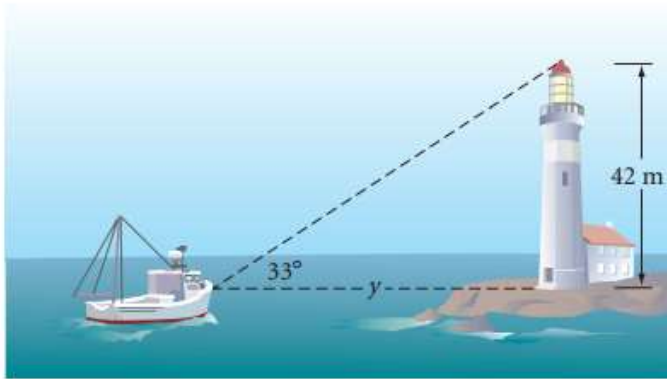


1. According to a Chinese legend from the Han dynasty (206 B.C.E.–220 C.E.), General Han Xin flew a kite over the palace of his enemy to determine the distance between his troops and the palace. If the general let out 800 meters of string and the kite was flying at a 35° angle of elevation, how far away was the palace from General Han Xin's position?
2. Benny is flying a kite directly over his friend Frank, who is 125 meters away. When he holds the kite string down to the ground, the string makes a 39° angle with the level ground. How high is Benny's kite?
3. The angle of elevation from a ship to the top of a 42-meter lighthouse on the shore measures 33° . How far is the ship from the lighthouse? (Assume the horizontal line of sight meets the bottom of the lighthouse.)



4. A salvage ship's sonar locates wreckage at a 12° angle of depression. A diver is lowered 40 meters to the ocean floor. How far does the diver need to walk along the ocean floor to the wreckage?

5. A ship's officer sees a lighthouse at a 42° angle to the path of the ship. After the ship travels 1800 m, the lighthouse is at a 90° angle to the ship's path. What is the distance between the ship and the lighthouse at this second sighting?
6. A meteorologist shines a spotlight vertically onto the bottom of a cloud formation. He then places an angle-measuring device 165 meters from the spotlight and measures an 84° angle of elevation from the ground to the spot of light on the clouds. How high are the clouds?



The distance from the ground to a cloud formation is called the cloud *ceiling*.

7. Meteorologist Wendy Stevens uses a theodolite (an angle-measuring device) on a 1-meter tall tripod to find the height of a weather balloon. She views the balloon at a 44° angle of elevation. A radio signal from the balloon tells her that it is 1400 meters from her theodolite.



- a. How high is the balloon?
- b. How far is she from the point directly below the balloon?