1) A kite with a string 150 feet long makes an angle of 45° with the ground. Assuming the string is straight, how high is the kite?

2) A tree 10 meters high casts a 17.3 meter shadow. Find the angle of elevation of the sun.

3) A plane is flying at an altitude of 12,000 m. From the pilot, the angle of depression to the airport tower is 32°. How far is the tower from a point directly beneath the plane?

4) A car is traveling up a slight grade with an angle of elevation of 2°. After traveling 1 mile, what is the vertical change in feet? (1 mile = 5,280 ft)
5) From the top of a fence, a person sites a lion on the ground at an angle of depression of 24°. If the man and the fence is 4.2 meters high, how far is the man from the lion?

6) A 300 m cable is attached to the top of an antenna. The angle of elevation to the top of the antenna is 15°. How high is the antenna?

7) The angle of elevation from a boat to the top of a 90 meter hotel is 10°. How far is the boat from the base of the hotel?

8) A great white shark swims 22 feet below sea level. If the shark is 67.7 feet from the sailboat, what is the angle of depression of the boat to the shark?
9) If a 50 foot cable supporting a circus tent is staked into the ground at an angle of elevation of 37°, how far from the tent must the stake be placed?

10) A bird is flying at a height of 40 feet and spots an 8-ft ledge on which to perch. If the top of the ledge is at a 22° angle of depression from the bird, how far must the bird fly before it can land? (Careful!)

11) A person is standing 30 meters from a traffic light. If the angle of elevation from the person’s feet to the top of the traffic light is 25°, find the height of the traffic light.

12) A 12 meter ladder is inclined against a brick wall at an angle of 15°. If the top of the ladder reaches the top of the wall, how tall is the wall?
Lesson 13.7

Solve each problem. Round your answer to the nearest whole number. Draw a diagram if you need to.

1. Brian looks up at a house on top of a hill. The angle of elevation is 55°. The height of the hill is 350 feet. What is the distance between Brian and the house?

2. Esther and her friends fly a star balloon in a parade. The balloon is flown at a 75° angle of elevation. It uses a rope that is 20 feet long. The rope is held 3 feet above the ground. How high off the ground is the star balloon?

3. A plane is flying 5 miles above the ground. The horizontal distance from the airplane to the start of the runway is 19 miles. What is the angle of depression the airplane must use for its descent?

4. The height of a lighthouse is 50 feet. From the top of the lighthouse, the angle of depression of a boat is 40°. How far is the boat from the lighthouse?