

Applications of Trigonometry

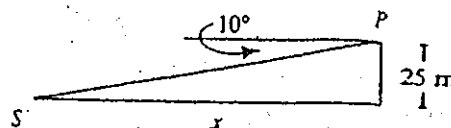
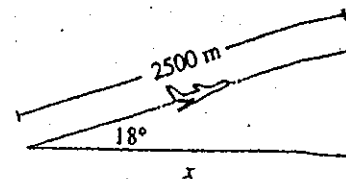
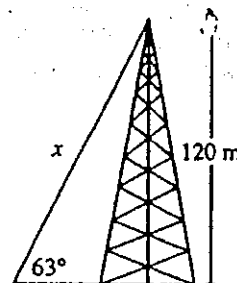
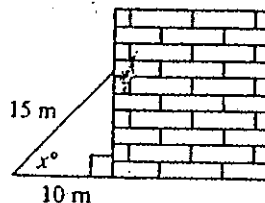
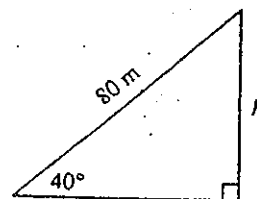
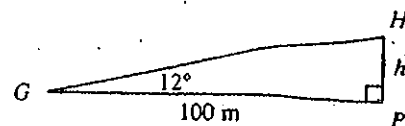
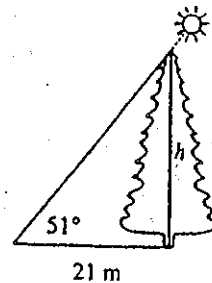
In Exercises 1-5 express lengths correct to the nearest meter and angles correct to the nearest degree.

1. A tree casts a shadow 21 m long. The angle of elevation of the sun is 51° . What is the height of the tree? _____
2. A helicopter (H) is hovering over a landing pad (P) 100 m from where you are standing (G). The helicopter's angle of elevation with the ground is 12° . What is the altitude of the helicopter? _____
3. You are flying a kite and have let out 80 m of string. The kite's angle of elevation with the ground is 40° . If the string is stretched straight, how high is the kite above the ground?

4. A 15 m pole is leaning against a wall. The foot of the pole is 10 m from the wall. Find the angle the pole makes with the ground. _____
5. A guy wire reaches from the top of a 120 m television transmitter tower to the ground. The wire makes a 63° angle with the ground. Find the length of the guy wire.

6. An airplane climbs at an angle of 18° with the ground. Find the ground distance the plane travels as it moves 2500 m through the air. Give your answer to the nearest 100 m.

7. A lighthouse operator at point P 25 m above sea level sights a sailboat at point S . The angle of depression of the sighting is 10° . How far is the boat from the base of the lighthouse? Give your answer to the nearest 10 m.



Angles of Elevation and Depression

Solve each problem. Round measures of segments to the nearest hundredth and measures of angles to the nearest degree.

1. A 20-foot ladder leans against a wall so that the base of the ladder is 8 feet from the base of the building. What angle does the ladder make with the ground?
2. A 50-meter vertical tower is braced with a cable secured at the top of the tower and tied 30 meters from the base. What angles does the cable form with the vertical tower?
3. At a point on the ground 50 feet from the foot of a tree, the angle of elevation to the top of the tree is 53° . Find the height of the tree.
4. From the top of a lighthouse 210 feet high, the angle of depression of a boat is 27° . Find the distance from the boat to the foot of the lighthouse. The lighthouse was built at sea level.
5. Richard is flying a kite. The kite string makes an angle of 57° with the ground. If Richard is standing 100 feet from the point on the ground directly below the kite, find the length of the kite string.
6. An airplane rises vertically 1000 feet over a horizontal distance of 1 mile. What is the angle of elevation of the airplane's path?