

**USE A SEPARATE SHEET OF PAPER FOR THESE PROBLEMS.**

**Be sure to draw a picture and write an equation for each problem. Round to the nearest 10<sup>th</sup>.**

1. Standing across the street 50 feet from a building, the angle of elevation to the top of the building is  $40^\circ$ . An antenna sits on the front edge of the roof of the building. The angle of elevation to the top of the antenna is  $52^\circ$ .
  - (a) How tall is the building?
  - (b) How tall is the antenna itself, not including the height of the building?
2. A tower 250 meters high casts a shadow 176 meters long. Find the angle of elevation of the sun.
3. The angle of depression from the top of a building 25 feet tall to a fire hydrant on the street directly in front of the building is  $39.7^\circ$ . Find the distance from the building to the fire hydrant.
4. Susie's house is 12 miles east and 7 miles south of the high school. What bearing should Susie take if she walks from her house directly to the school?
5. A helicopter hovers 800 feet directly above a small island that is off the California coast. From the helicopter, the pilot takes a sighting to a point on the mainland at the water's edge. If the angle of depression to the point on the shoreline is  $35^\circ$ , how far off the coast is the island?
6. A lamp post is 10 feet tall and casts a shadow. The distance from the top of the lamp post to the tip of the shadow is 20 feet. What is the angle of elevation?
7. Given an isosceles triangle with legs of length 18.8 cm and base angles of  $62^\circ$ .  
Find: (a) the length of the base of the isosceles triangle and (b) the measure of the vertex angle.
8. Determine the angle of elevation from a point on the ground 40 feet from the base of a vertical tower if the tower has a height of 84 feet.
9. A ship leaves the port of Miami with a speed of 17 knots and travels due east of Miami for 2 hours. After 2 hours, the captain heads due north at the same speed for  $1\frac{1}{2}$  hours. What bearing should the ship follow if the captain then wants to sail directly back to Miami?

10. One leg of a right triangle measures 20 cm and the hypotenuse measures 25 cm. Find the measure of the smallest angle of the right triangle.
11. A clock tower casts a shadow 63 feet long when the angle of elevation to the sun is  $12^{\circ}42'$ . Find the height of the clock tower.
12. The vertex angle of an isosceles triangle is  $74^{\circ}$  and the triangle's legs are each 17 inches long. Find the length of the altitude to the base of the triangle.
13. A homeowner needs to construct a ramp to his front door to make it wheelchair accessible. How long will the ramp be if the door is 4 feet above ground level and the angle of elevation is  $20.4^{\circ}$ ?
14. The legs of an isosceles triangle measure 220 cm and the base measures 275 cm. Find the measure of the vertex angle of the triangle.
15. A man on the top of a cliff 1237 feet above sea level sees two ships due west of the foot of the cliff. The angles of depression to the two ships are  $56.2^{\circ}$  and  $32.8^{\circ}$ . Find the distance between the ships.
16. An equilateral triangle has an altitude of 8.73 in. Find the perimeter of the triangle.
17. A jeep leaves a campsite on an off road trip traveling 48 mph with a bearing of  $E29.3^{\circ}S$ . Determine the distance the jeep has traveled east and the distance he has traveled south after 45 minutes.
18. Find the area of an isosceles triangle if one base angle measures  $32.4^{\circ}$  and one leg measures 14.1 cm.

ANSWERS: 1. (a) 42.0 feet (b) 22.0 feet 2.  $54.9^{\circ}$  3. 30.1 feet 4.  $W 30.3^{\circ} N$  or  $N 59.7^{\circ} W$   
 5. 1142.5 feet 6.  $30^{\circ}$  7.(a) 17.7 cm (b)  $56^{\circ}$  8.  $64.5^{\circ}$  9.  $S 53.1^{\circ} W$  or  $W 36.9^{\circ} S$   
 10.  $36.9^{\circ}$  11, 14.2 feet 12. 13.6 in 13. 11.5 ft 14.  $77.4^{\circ}$  15. 1091.3 feet  
 16. 30.3 inches 17. 17.6 miles south; 31.4 miles east 18.  $90.4 \text{ cm}^2$