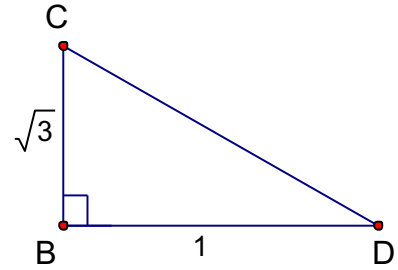


1. Find the indicated trigonometric ratios. Write your answers in simplest radical form.

$\sin C =$ $\csc C =$

$\cos C =$ $\sec C =$

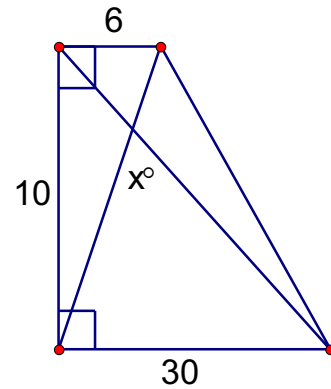
$\tan C =$ $\cot C =$



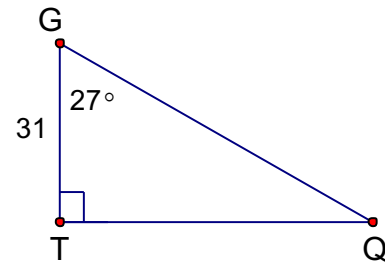
2. In $\triangle XYZ$, $m\angle Z = 90^\circ$ and $\sin(X) = \frac{60}{61}$. If $YZ = 120$, then what is XZ ?

3. The diagonals of a rhombus have lengths 14 and 20. Find the measure of the angles of the rhombus and the length of the sides to the nearest tenth.

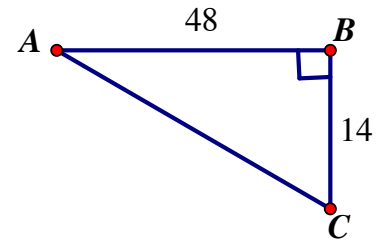
4. Find the value of x . Round your answer to the nearest tenth.



5A. Solve the right triangle. Round your answers to the nearest tenth.

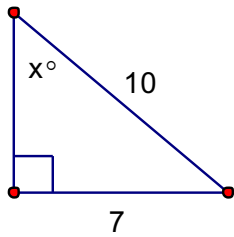


5B. Solve the right triangle. Round your answers to the nearest tenth.

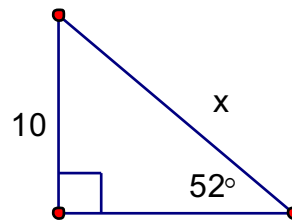


Questions 6-17: Find the value of the variable to the nearest tenth.

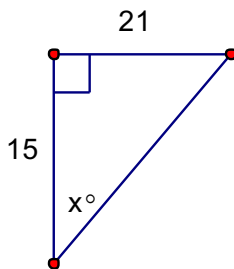
6.



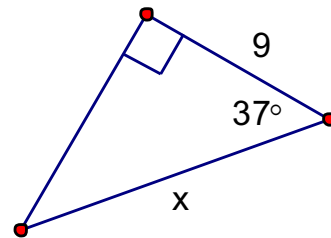
7.



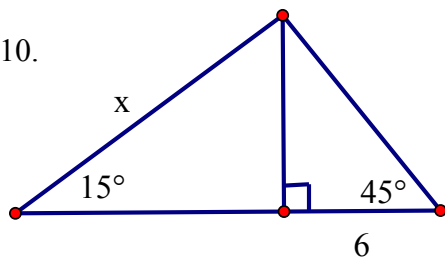
8.



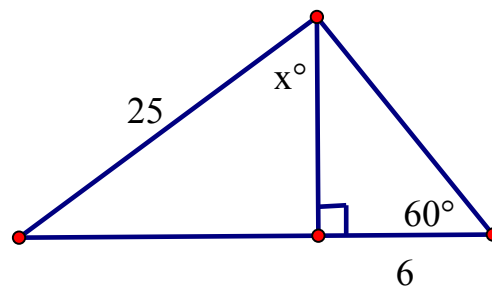
9.



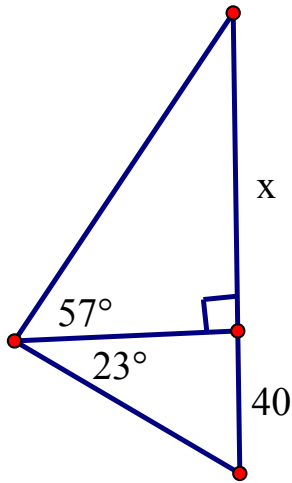
10.



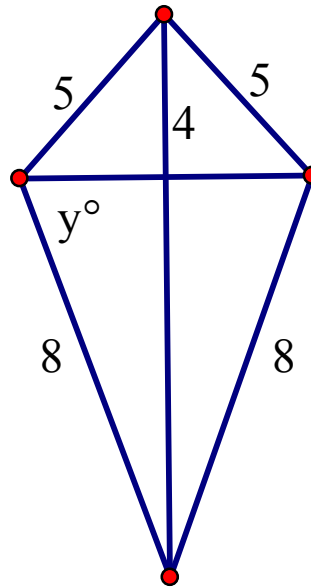
11.



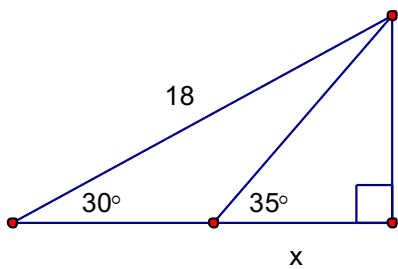
12.



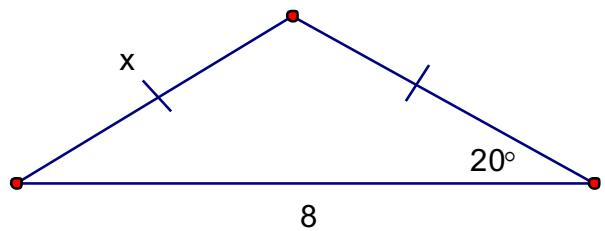
13.



14.



15.



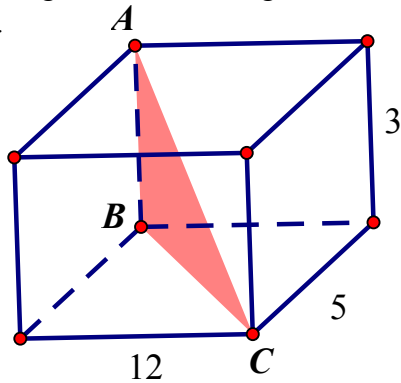
Questions 18-21: Accurately draw a picture representing the problem and answer the question.

16. A building casts a shadow 40 feet long when the sun's angle of elevation is 58° . Find the height of the building to the nearest foot.
17. A forest ranger watches for fires from a look-out tower built on a high hill. The site of the tower is 740 m above most of the surrounding land, and the tower itself is 24 m tall. If the ranger sights a fire at an angle of 7° (hint: its an angle of depression), how far, to the nearest meter, is the fire from the top of the tower?

18. When the sun's angle of elevation is 42° , a tree casts a shadow 17 m long. How tall is the tree to the nearest meter?
19. The angle of depression from the top of a tower to a point A is 23° . The distance from A to the base, B , of the tower is 80 m. How tall is the tower to the nearest meter?
20. In $\triangle ABC$ where angle C is a right angle, the $\sin A = \frac{3}{4}$. Find the five other trigonometric ratios for angle A .
21. An isosceles triangle has lengths 13, 13, 10. Find the lengths of the 3 altitudes to the nearest integer
22. The angle of elevation to the top of Egyptian pyramid Cheops is 36.4° , measured from a point 350 feet from the base of the pyramid. The angle of elevation of a face of the pyramid is 51.9° (this is where the edge of the pyramid meets the ground). Find the height of Cheops.

23. The sonar of a navy cruiser detects a submarine that is 2500 feet from the cruiser. The angle formed between the water level and submarine is 31.5° (from the cruiser to submarine). How deep is the submarine?
24. You're standing at a peak of a mountain that is 14,000 feet above sea level. The angle of depression from this peak to a smaller peak is 4° . On your map these two peaks are represented by points that are 1 inch apart. If each inch on the map represents 1.2 miles, and there are 5,280 feet in a mile, then how many feet above sea level is the second peak?
25. According to legend, Galileo used the leaning tower of Pisa to conduct his experiments on gravity. When he dropped objects from the top of the 55-meter tower (length not height) they landed 4.8 meters from the tower's base. To the nearest degree what is the angle that the tower leans from the vertical?
26. The sides of a rectangle are 15 and 30. What is the measure of the obtuse angle formed by the diagonals? Round to the nearest tenth.

27. A rectangular box has length 12, width 5, and height 3. Find the $m\angle ACB$ to the nearest tenth.



28. You are standing 97 feet from the base of a skyscraper, where you can see at the top of the skyscraper is an antenna. The angle of elevation between where you are standing and the bottom of the antenna is 43° and the angle of elevation to the top is 60° . Find the height of the antenna alone (not including the skyscraper height). Round to the nearest foot.
29. From a point A on a line from the base of a radio tower, the angle of elevation to the top of the tower is 54° . From a point 75 feet away and on the same line, the angle to the top is 37° . Find the approximate height of the radio tower. Round to the nearest tenth.

Answers:

1. $\sin C = \frac{1}{2}$ $\csc C = 2$
 $\cos C = \frac{\sqrt{3}}{2}$ $\sec C = \frac{2\sqrt{3}}{3}$
 $\tan C = \frac{\sqrt{3}}{3}$ $\cot C = \sqrt{3}$
2. $XZ = 22$
3. 110, 70, 110, 70 ; side = 12.2
4. 102.6
- 5A. $m\angle Q = 63$; $TQ = 15.8$; $GQ = 34.8$
- 5B. $AC = 50$, $m\angle A = 16.3^\circ$, $m\angle C = 73.7^\circ$
6. 44.4
7. 12.7
8. 54.5
9. 11.3
10. 23.2
11. 65.4
12. 145.1
13. 68.0
14. 12.9
15. 4.3
16. 64 ft
17. 6269 m
18. 15m
19. 34m
20. $\sin A = \frac{3}{4}$ $\csc A = \frac{4}{3}$
 $\cos A = \frac{\sqrt{7}}{4}$ $\sec A = \frac{4\sqrt{7}}{7}$
 $\tan A = \frac{3\sqrt{7}}{7}$ $\cot A = \frac{\sqrt{7}}{3}$
21. 12, 9, 9
22. 611.6 ft
23. 1,306.2 feet
24. 13,556.9 feet
25. 5°
26. 126.9° or 126.8°
27. 13°
28. 78 ft.
29. 124.9 ft.