QUICK REVIEW 5.5 *(For help, go to Sections 4.2 and 4.7.)*

In Exercises 1–4, solve the equation $a/b = c/d$ for the given variable.

1. a bc/d **2.** b ad/c **3.** c ad/b **4.** d bc/a

In Exercises 5 and 6, evaluate the expression.

5. $\dfrac{7 \sin 48^\circ}{\sin 23^\circ}$ 13.314 **6.** $\dfrac{9 \sin 121^\circ}{\sin 14^\circ}$ 31.888

In Exercises 7–10, solve for the angle x.

7. $\sin x = 0.3$, $0^\circ < x < 90^\circ$ 17.458°

8. $\sin x = 0.3$, $90^\circ < x < 180^\circ$ 162.542°

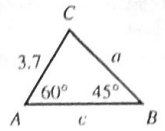
9. $\sin x = -0.7$, $180^\circ < x < 270^\circ$ 224.427°

10. $\sin x = -0.7$, $270^\circ < x < 360^\circ$ 315.573°

SECTION 5.5 EXERCISES

In Exercises 1–4, solve the triangle.

1.



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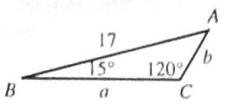

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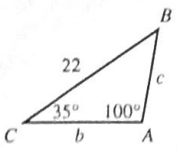

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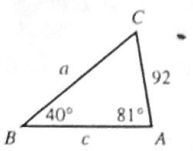


In Exercises 5–8, solve the triangle.

5. $A = 40^\circ$, $B = 30^\circ$, $b = 10$

6. $A = 50^\circ$, $B = 62^\circ$, $a = 4$

7. $A = 33^\circ$, $B = 70^\circ$, $b = 7$

8. $B = 16^\circ$, $C = 103^\circ$, $c = 12$

In Exercises 9–12, solve the triangle.

9. $A = 32^\circ$, $a = 17$, $b = 11$

10. $A = 49^\circ$, $a = 32$, $b = 28$

11. $B = 70^\circ$, $b = 14$, $c = 9$

12. $C = 103^\circ$, $b = 46$, $c = 61$

In Exercises 13–18, state whether the given measurements determine zero, one, or two triangles.

13. $A = 36^\circ$, $a = 2$, $b = 7$ zero

14. $B = 82^\circ$, $b = 17$, $c = 15$ one

15. $C = 36^\circ$, $a = 17$, $c = 16$ two

16. $A = 73^\circ$, $a = 24$, $b = 28$ zero

17. $C = 30^\circ$, $a = 18$, $c = 9$ two

18. $B = 88^\circ$, $b = 14$, $c = 62$ zero

In Exercises 19–22, two triangles can be formed using the given measurements. Solve both triangles.

19. $A = 64^\circ$, $a = 16$, $b = 17$

20. $B = 38^\circ$, $b = 21$, $c = 25$

21. $C = 68^\circ$, $a = 19$, $c = 18$

22. $B = 57^\circ$, $a = 11$, $b = 10$

23. Determine the values of b that will produce the given number of triangles if $a = 10$ and $B = 42^\circ$.

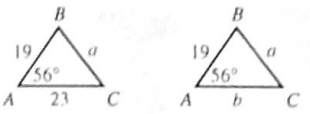
(a) two triangles **(b)** one triangle **(c)** zero triangles

24. Determine the values of c that will produce the given number of triangles if $b = 12$ and $C = 53^\circ$.

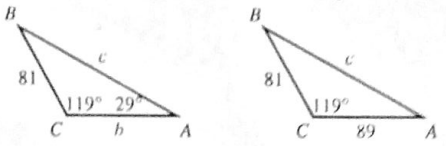
(a) two triangles **(b)** one triangle **(c)** zero triangles

In Exercises 25 and 26, decide whether the triangle can be solved using the Law of Sines. If so, solve it. If not, explain why not.

25.



26.



In Exercises 27–36, respond in one of the following ways:

(a) State, "Cannot be solved with the Law of Sines."

(b) State, "No triangle is formed."

(c) Solve the triangle.

27. $A = 61^\circ$, $a = 8$, $b = 21$ no triangle is formed

28. $B = 47^\circ$, $a = 8$, $b = 21$ $A \approx 16.2^\circ$; $C \approx 116.8^\circ$; $c \approx 25.6$

29. $A = 136°$, $a = 15$, $b = 28$ no triangle is formed

30. $C = 115°$, $b = 12$, $c = 7$ no triangle is formed

31. $B = 42°$, $c = 18$, $C = 39°$ $A = 99°$; $a \approx 28.3$; $b \approx 19.1$

32. $A = 19°$, $b = 22$, $B = 47°$ $C = 114°$; $a \approx 9.8$; $c \approx 27.5$

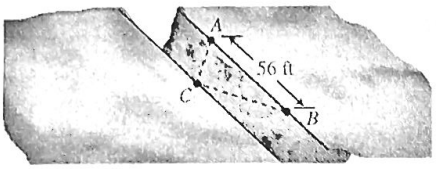
33. $C = 75°$, $b = 49$, $c = 48$

34. $A = 54°$, $a = 13$, $b = 15$

35. $B = 31°$, $a = 8$, $c = 11$

36. $C = 65°$, $a = 19$, $b = 22$

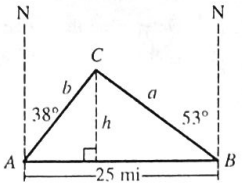
37. Surveying a Canyon Two markers A and B on the same side of a canyon rim are 56 ft apart. A third marker C, located across the rim, is positioned so that $\angle BAC = 72°$ and $\angle ABC = 53°$.



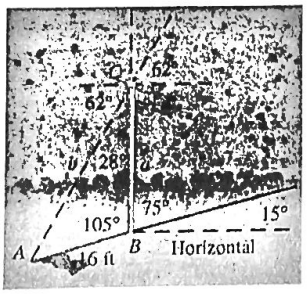
(a) Find the distance between C and A. 54.6 ft

(b) Find the distance between the two canyon rims. (Assume they are parallel.) 51.9 ft

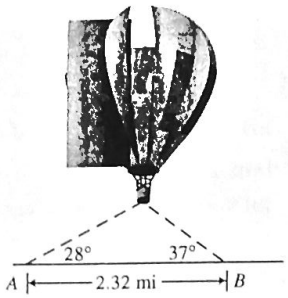
38. Weather Forecasting Two meteorologists are 25 mi apart located on an east-west road. The meteorologist at point A sights a tornado 38° east of north. The meteorologist at point B sights the same tornado at 53° west of north. Find the distance from each meteorologist to the tornado. Also find the distance between the tornado and the road.



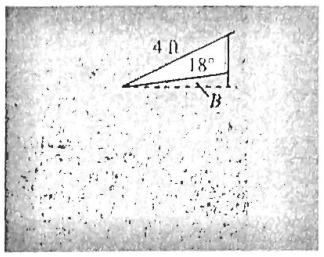
39. Engineering Design A vertical flagpole stands beside a road that slopes at an angle of 15° with the horizontal. When the angle of elevation of the Sun is 62°, the flagpole casts a 16-ft shadow downhill along the road. Find the height of the flagpole. ≈ 24.9 ft



40. Altitude Observers 2.32 mi apart see a hot-air balloon directly between them but at the angles of elevation shown in the figure. Find the altitude of the balloon. ≈ 0.7 mi



41. Reducing Air Resistance A 4-ft airfoil attached to the cab of a truck reduces wind resistance. If the angle between the airfoil and the cab top is 18° and angle B is 10°, find the length of a vertical brace positioned as shown in the figure. 1.9 ft

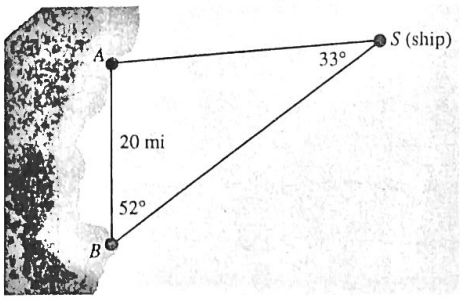


42. Group Activity Ferris Wheel Design A Ferris wheel has 16 evenly spaced cars. The distance between adjacent chairs is 15.5 ft. Find the radius of the wheel (to the nearest 0.1 ft). 39.7 ft

43. Finding Height Two observers are 600 ft apart on opposite sides of a flagpole. The angles of elevation from the observers to the top of the pole are 19° and 21°. Find the height of the flagpole. ≈ 108.9 ft

44. Finding Height Two observers are 400 ft apart on opposite sides of a tree. The angles of elevation from the observers to the top of the tree are 15° and 20°. Find the height of the tree. ≈ 61.7 ft

45. Finding Distance Two lighthouses A and B are known to be exactly 20 mi apart on a north-south line. A ship's captain at S measures $\angle ASB$ to be 33°. A radio operator at B measures $\angle ABS$ to be 52°. Find the distance from the ship to each lighthouse. 36.6 mi to A; 28.9 mi to B



46. Using Measurement Data A geometry class is divided into ten teams, each of which is given a yardstick and a protractor to find the distance from a point A on the edge of a pond to a tree at a point C on the opposite shore. After they mark points A and B with stakes, each team uses a protractor to measure angles A and B and a yardstick to measure distance AB. Their measurements are given in the table on the next page.