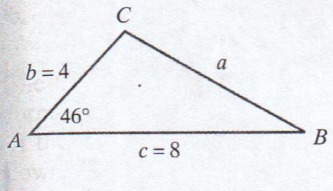
Exercise Set 7.2

Practice Exercises

In Exercises 1–8, solve each triangle. Round lengths of sides to the nearest tenth and angle measures to the nearest degree.

1.



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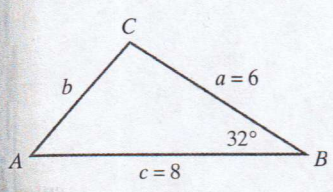

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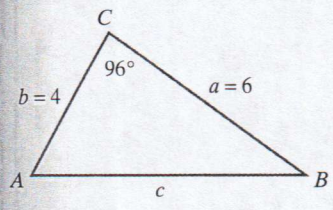

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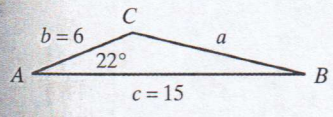

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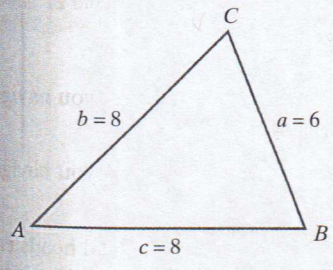

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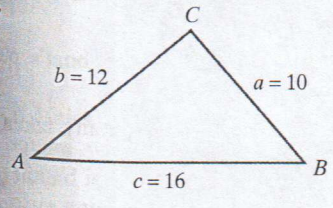

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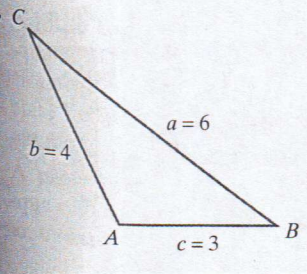

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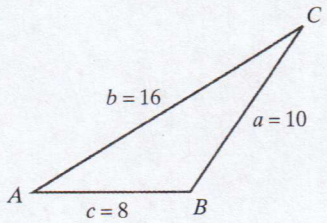


In Exercises 9–24, solve each triangle. Round lengths to the nearest tenth and angle measures to the nearest degree.

9. $a = 5, b = 7, C = 42°$

10. $a = 10, b = 3, C = 15°$

11. $b = 5, c = 3, A = 102°$

12. $b = 4, c = 1, A = 100°$

13. $a = 6, c = 5, B = 50°$

14. $a = 4, c = 7, B = 55°$

15. $a = 5, c = 2, B = 90°$

16. $a = 7, c = 3, B = 90°$

17. $a = 5, b = 7, c = 10$

18. $a = 4, b = 6, c = 9$

19. $a = 3, b = 9, c = 8$

20. $a = 4, b = 7, c = 6$

21. $a = 3, b = 3, c = 3$

22. $a = 5, b = 5, c = 5$

23. $a = 63, b = 22, c = 50$

24. $a = 66, b = 25, c = 45$

In Exercises 25–30, use Heron's formula to find the area of each triangle. Round to the nearest square unit.

25. $a = 4$ feet, $b = 4$ feet, $c = 2$ feet

26. $a = 5$ feet, $b = 5$ feet, $c = 4$ feet

27. $a = 14$ meters, $b = 12$ meters, $c = 4$ meters

28. $a = 16$ meters, $b = 10$ meters, $c = 8$ meters

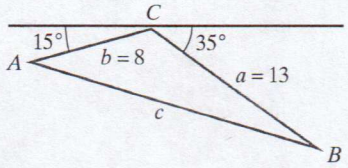
29. $a = 11$ yards, $b = 9$ yards, $c = 7$ yards

30. $a = 13$ yards, $b = 9$ yards, $c = 5$ yards

Practice Plus

In Exercises 31–32, solve each triangle. Round lengths of sides to the nearest tenth and angle measures to the nearest degree.

31.



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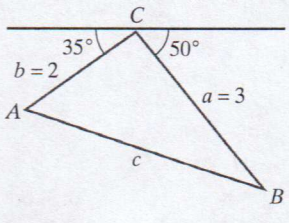
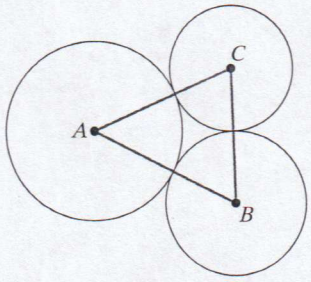


In Exercises 33–34, the three circles are arranged so that they touch each other, as shown in the figure. Use the given radii for the circles with centers A, B, and C, respectively, to solve triangle ABC. Round angle measures to the nearest degree.



33. 5.0, 4.0, 3.5

34. 7.5, 4.3, 3.0

In Exercises 35–36, the three given points are the vertices of a triangle. Solve each triangle, rounding lengths of sides to the nearest tenth and angle measures to the nearest degree.

35. $A(0, 0), B(-3, 4), C(3, -1)$

36. $A(0, 0), B(4, -3), C(1, -5)$

Application Exercises

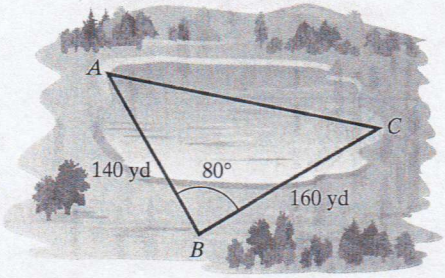
37. Use **Figure 7.13** on page 676 to find the pace angle, to the nearest degree, for the carnivore. Does the angle indicate that this dinosaur was an efficient walker? Describe your answer.

38. Use **Figure 7.13** on page 676 to find the pace angle, to the nearest degree, for the herbivore. Does the angle indicate that this dinosaur was an efficient walker? Describe your answer.

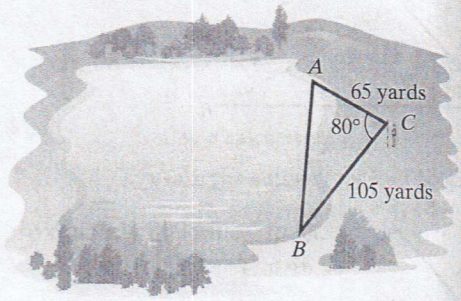
39. Two ships leave a harbor at the same time. One ship travels on a bearing of S12°W at 14 miles per hour. The other ship travels on a bearing of N75°E at 10 miles per hour. How far apart will the ships be after three hours? Round to the nearest tenth of a mile.

40. A plane leaves airport A and travels 580 miles to airport B on a bearing of N34°E. The plane later leaves airport B and travels to airport C 400 miles away on a bearing of S74°E. Find the distance from airport A to airport C to the nearest tenth of a mile.

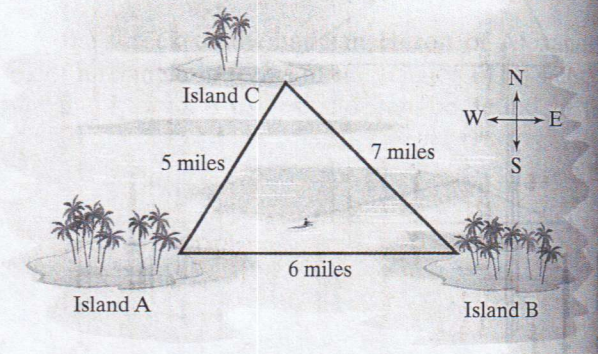
41. Find the distance across the lake from A to C, to the nearest yard, using the measurements shown in the figure.



42. To find the distance across a protected cove at a lake, a surveyor makes the measurements shown in the figure. Use these measurements to find the distance from A to B to the nearest yard.



The diagram shows three islands in Florida Bay. You rent a boat and plan to visit each of these remote islands. Use the diagram to solve Exercises 43–44.



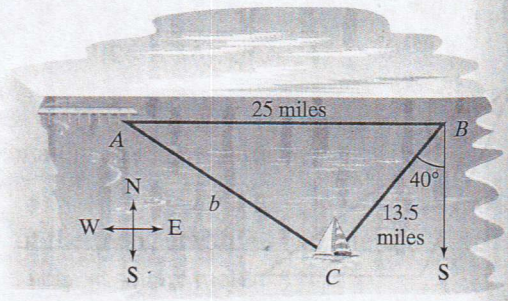
43. If you are on island A, on what bearing should you navigate to go to island C?

44. If you are on island B, on what bearing should you navigate to go to island C?

45. You are on a fishing boat that leaves its pier and heads east. After traveling for 25 miles, there is a report warning of rough seas directly south. The captain turns the boat and follows a bearing of S40°W for 13.5 miles.

a. At this time, how far are you from the boat's pier? Round to the nearest tenth of a mile.

b. What bearing could the boat have originally taken to arrive at this spot?

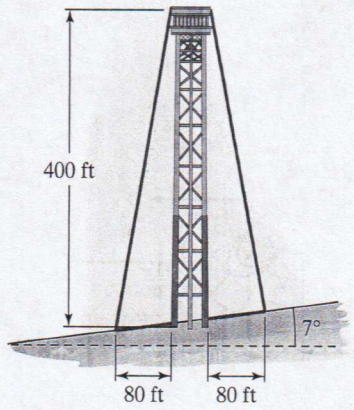


46. You are on a fishing boat that leaves its pier and heads east. After traveling for 30 miles, there is a report warning of rough seas directly south. The captain turns the boat and follows a bearing of S45°W for 12 miles.

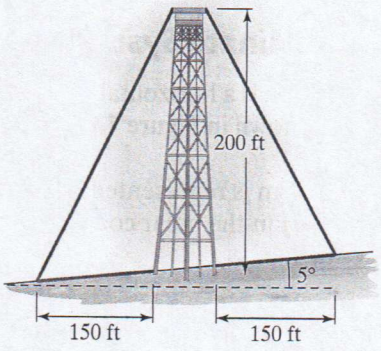
a. At this time, how far are you from the boat's pier? Round to the nearest tenth of a mile.

b. What bearing could the boat have originally taken to arrive at this spot?

47. The figure shows a 400-foot tower on the side of a hill that forms a 7° angle with the horizontal. Find the length of each of the two guy wires that are anchored 80 feet uphill and downhill from the tower's base and extend to the top of the tower. Round to the nearest tenth of a foot.



48. The figure shows a 200-foot tower on the side of a hill that forms a 5° angle with the horizontal. Find the length of each of the two guy wires that are anchored 150 feet uphill and downhill from the tower's base and extend to the top of the tower. Round to the nearest tenth of a foot.



49. A Major League baseball diamond has four bases forming a square whose sides measure 90 feet each. The pitcher's mound is 60.5 feet from home plate on a line joining home plate and second base. Find the distance from the pitcher's mound to first base. Round to the nearest tenth of a foot.

50. A Little League baseball diamond has four bases forming a square whose sides measure 60 feet each. The pitcher's mound is 46 feet from home plate on a line joining home plate and second base. Find the distance from the pitcher's mound to third base. Round to the nearest tenth of a foot.

51. A piece of commercial real estate is priced at \$3.50 per square foot. Find the cost, to the nearest dollar, of a triangular lot measuring 240 feet by 300 feet by 420 feet.

52. A piece of commercial real estate is priced at \$4.50 per square foot. Find the cost, to the nearest dollar, of a triangular lot measuring 320 feet by 510 feet by 410 feet.

Writing in Mathematics

53. Without using symbols, state the Law of Cosines in your own words.

54. Why can't the Law of Sines be used in the first step to solve an SAS triangle?

55. Describe a strategy for solving an SAS triangle.

56. Describe a strategy for solving an SSS triangle.

57. Under what conditions would you use Heron's formula to find the area of a triangle?

58. Describe an applied problem that can be solved using the Law of Cosines, but not the Law of Sines.

59. The pitcher on a Little League team is studying angles in geometry and has a question. "Coach, suppose I'm on the pitcher's mound facing home plate. I catch a fly ball hit in my direction. If I turn to face first base and throw the ball, through how many degrees should I turn for a direct throw?" Use the information given in Exercise 50 and write an answer to the pitcher's question. Without getting too technical, describe to the pitcher how you obtained this angle.

Critical Thinking Exercises

Make Sense? *In Exercises 60–63, determine whether each statement makes sense or does not make sense, and explain your reasoning.*

60. The Law of Cosines is similar to the Law of Sines, with all the sines replaced with cosines.

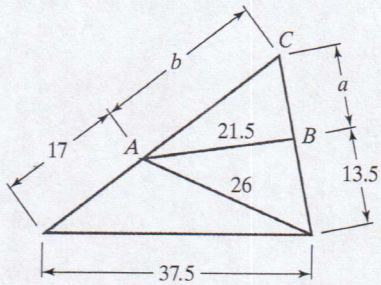
61. If I know the measures of all three angles of an oblique triangle, neither the Law of Sines nor the Law of Cosines can be used to find the length of a side.

62. I noticed that for a right triangle, the Law of Cosines reduces to the Pythagorean Theorem.

63. Solving an SSS triangle, I do not have to be concerned about the ambiguous case when using the Law of Sines.

64. The lengths of the diagonals of a parallelogram are 20 inches and 30 inches. The diagonals intersect at an angle of 35°. Find the lengths of the parallelogram's sides. (*Hint:* Diagonals of a parallelogram bisect one another.)

65. Use the figure to solve triangle ABC. Round lengths of sides to the nearest tenth and angle measures to the nearest degree.



66. The minute hand and the hour hand of a clock have lengths m inches and h inches, respectively. Determine the distance between the tips of the hands at 10:00 in terms of m and h.