Course 2 Unit 4 Practice

LESSON 13-1
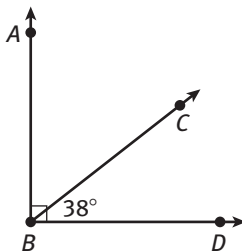
1. **Model with mathematics.** Two angles are supplementary. One measures $(3x)°$ and the other measures $51°$.

   a. Draw a pair of adjacent, supplementary angles and label them using the given information.

   b. Write an equation to show the relationship between the two angles and solve for the value of x.
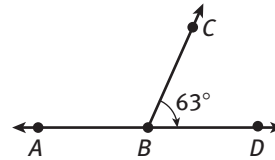
   c. Find the measure of both angles. Show your work.

2. What is the measure of $\angle ABC$?

   A. $38°$

   B. $52°$

   C. $64°$

   D. $148°$

3. What is the measure of $\angle ABC$?
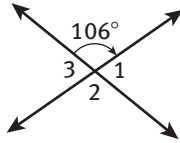
   A. $27°$

   B. $63°$

   C. $117°$

   D. $132°$

4. **Use appropriate tools strategically.** $\angle R$ and $\angle S$ are supplementary. $m\angle R = 25°$ and $m\angle S = (4x + 3)°$. Find the value of x.

5. $\angle ZTS$ and $\angle NRQ$ are supplementary. $m\angle ZTS = (6x - 10)°$ and $m\angle NRQ = (3x + 1)°$. Find the measure of each angle.
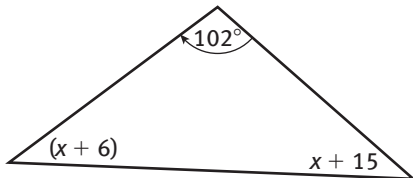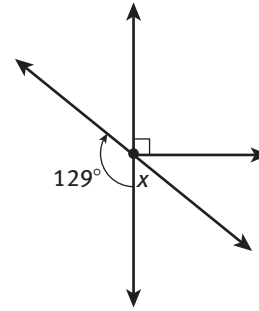
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LESSON 13-2

6. Use the diagram.

a. Find the measure of $\angle 1$.

b. Find the measure of $\angle 2$.

c. Find the measure of $\angle 3$.

**7. Reason quantitatively.** Find the measure of each of the angles in the triangle shown.

8. $\angle A$ and $\angle B$ are vertical angles. $m\angle B = (3x + 4)°$ and $m\angle A = (x + 48)°$. Find the measure of angle A.

A. 22 degrees

B. 66 degrees

C. 70 degrees

D. 72 degrees

9. Find the measure of x in the diagram.

A. 29 degrees

B. 45 degrees

C. 51 degrees

D. 65 degrees

10. Persevere in solving problems. Use the diagram to find the measures of each of the angles in the triangles.
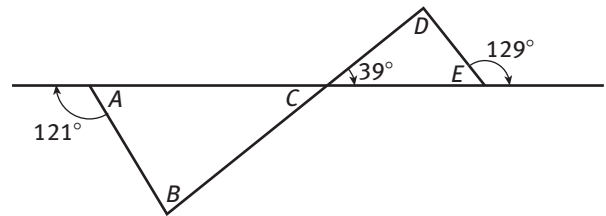
LESSON 14-1

11. Determine whether it is possible to draw a triangle with the given side lengths. Justify your answers.

a. 8 feet, 6 feet, and 3 feet

b. 4 meters, 5 meters, and 7 meters

c. 6 inches, 8 inches, and 16 inches

d. 7 yards, 14 yards, and 7 yards

12. Make use of structure. Two sides of a triangle measure 4 inches and 7 inches. What is one possible length for the third side of the triangle? Explain.

13. Model with mathematics. Draw a triangle with side lengths that are 7 centimeters, 9 centimeters, and 11 centimeters.

14. Which of the following cannot be the side lengths of a triangle?

A. 5 inches, 5 inches, 5 inches

B. 4 inches, 4 inches, 3 inches

C. 16 centimeters, 17 centimeters, 18 centimeters

D. 4 centimeters, 12 centimeters, 25 centimeters

15. Which of the following could be the length of the third side of a triangle with side lengths of 3 feet and 12 feet?

A. 15 feet

B. 13 feet

C. 20 feet

D. 9 feet

LESSON 14-2

16. Construct viable arguments. Determine whether the given conditions determine a unique triangle or more than one triangle. Justify your answers.

a. Two angles of a triangle measure 42° and 77°. The side between the angles is 4 feet long.

b. Two angles of a triangle each measure 56°. The side opposite one of the 56° angles is 3 meters long.

c. The angles of a triangle measure 50°, 60°, and 70°.

d. The sides of a triangle are 10 inches, 24 inches, and 26 inches long.

17. Which condition results in more than one triangle?

  A. The angles of a triangle measure 26°, 72° and 82°.

  B. Two angles of a triangle measure 85° and 68°. The side between the angles is 3 meters long.

  C. Two sides that form a right angle of a triangle are 6 inches and 8 inches long.

  D. Two angles of a triangle each measure 63°. The side opposite one of the 63° angles is 32 inches long.

18. Which condition results in more than one triangle?

  A. Two angles of a triangle each measure 65°. The side opposite one of the 65° angles is 24 inches long.

  B. Two angles of a triangle measure 82° and 62°. The side between the angles is 5 meters long.

  C. Two sides that form a right angle of a triangle are 10 inches and 12 inches long.

  D. Two sides of a triangle are 4 meters and 7 meters long. One of the non-included angles measures 52°.

19. Reason abstractly. When a triangle is formed by three given sides, is the triangle a unique triangle, or can more than one triangle be formed using those same three sides? Explain.
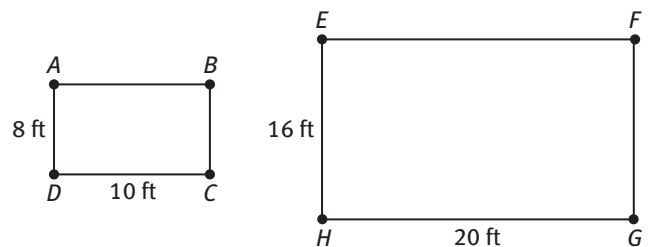
20. Is it possible to draw a unique triangle with two sides that are each 15 centimeters long and an included angle that measures 42°? Explain.

LESSON 15-1

21. $\triangle ABC \sim \triangle DEF$, $m\angle A = 28°$ and $m\angle E = 102°$. What is the measure of angle C?

  A. 130°

  B. 102°

  C. 50°

  D. 28°

22. Construct viable arguments. Rectangle *ABCD* is 8 feet by 10 feet. Rectangle *EFGH* is 16 feet by 20 feet.

  a. Name the corresponding angles.

  b. Name the corresponding sides.

  c. Write the ratios of the corresponding widths and lengths of the rectangles.

  d. Are the corresponding sides in proportion? Explain.

  e. Is rectangle *ABCD* similar to rectangle *EFGH*? Explain.

23. Model with mathematics. Sketch two similar figures. Explain why they are similar.

24. Are the ratios of the corresponding sides of the right triangle shown equal? Explain.
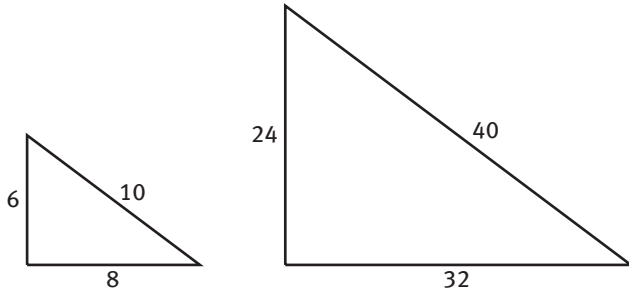
25. Rectangle J is 8 feet wide and 12 feet long. Rectangle K is 9 feet wide and 15 feet long. Rectangle L is 13.5 feet wide and 22.5 feet long. Which statement is true?

A. Rectangle $J \sim$ Rectangle K

B. Rectangle $K \sim$ Rectangle L

C. Rectangle $J \sim$ Rectangle L

D. All of the triangles are similar

LESSON 15-2

26. $\triangle ABC \sim \triangle DEF$. Find the measures of the missing sides.
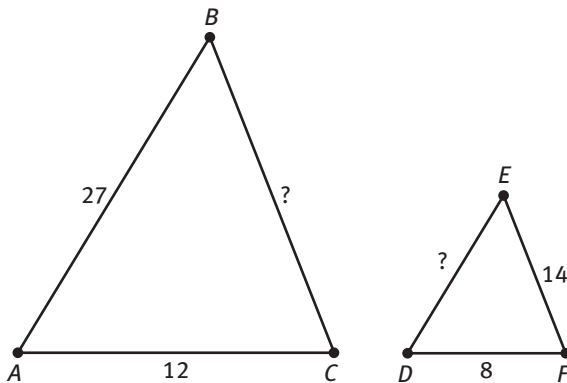

27. A rectangular room is 48 feet wide and 72 feet long. On a blueprint, the room is 26 inches wide. How long is the room on a blueprint?

A. 24 inches

B. 36 inches

C. 39 inches

D. 42 inches

28. Model with mathematics. A flagpole casts a shadow 9 feet long. At the same time, a small tree 4 feet tall casts a shadow 3 feet long.

a. Draw and label a picture to model the situation.

b. Write and solve a proportion to determine the height of the flagpole.

29. A lighthouse casts a 72-foot-long shadow at the same time a nearby building that is 12 feet tall casts an 18-foot-long shadow. What is the height of the lighthouse?

A. 36 feet

B. 48 feet

C. 52 feet

D. 108 feet

30. Make sense of problems. Nicholas is 5 feet 2 inches tall. On a sunny day he casts a shadow that is 3 feet long. At the same time, a nearby pole casts a shadow 15 feet 6 inches long. How tall is the pole?

LESSON 16-1

31. What is the circumference of a circle with a radius of 5 feet?

A. 15.7 ft

B. 31.4 ft

C. 78.5 ft

D. 157 ft

32. A port hole on a freight ship has a radius of 18 inches. What is the length of the insulating strip that encircles the window?

33. What is the circumference of the circle shown?

20 mm
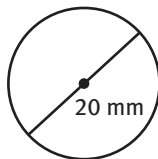
**A.** 62.8 mm

B. 125.6 mm

C. 188.4 mm

D. 314 mm

34. Make sense of problems. The diameter of a bicycle tire is 22 inches. About how many revolutions does the wheel make during a ride of 600 feet? Use 3.14 for π. Explain your answer.

35. Make use of structure. A circle has a circumference of 56.52 cm. What is the diameter of the circle to the nearest centimeter? What is the radius to the nearest centimeter?

LESSON 16-2

36. What is the area of a circle with a radius of 8 feet?

A. 25.12 ft²
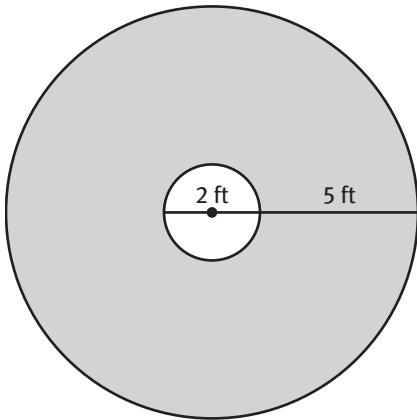
B. 50.24 ft²

C. 200.96 ft²

D. 401.92 ft²

37. What is the area of the circle shown?

14 cm
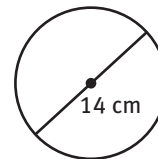
A. 43.96 cm²

B. 87.92 cm²

C. 238.64 cm²

D. 615.44 cm²

38. The circumference of a circle is 75.36 cm. What is the area of the circle?
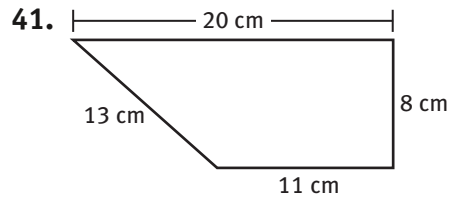
39. Persevere in solving problems. There is a brick patio around a fire pit. Use 3.14 for π.

2 ft   5 ft

a. What is the area of the fire pit?

b. What is the area of the brick patio?

LESSON 17-1

40. Reason quantitatively. A 16-inch pizza costs $14.00. The pizza is cut into eight equal slices. How many square inches are in each slice? Show your work.

41.

20 cm

13 cm   8 cm

11 cm

a. Draw a line segment on the diagram to divide the figure into a rectangle and a triangle.

b. Find the total area of the composite figure. Show your work. Label your answer with the appropriate unit of measure.

c. Find the perimeter of the composite figure. Show your work. Label your answer with the appropriate unit of measure.

42. If the total base length of the triangle shown is 12 feet, what is the area of just the triangle to the right of the dashed vertical line?

8 ft

3 ft

A. 12 ft^2

B. 24 ft^2

C. 36 ft^2

D. 72 ft^2

43. Make sense of problems. A 5-inch wide by 7-inch long photo is placed on a solid mat that forms a frame around it. The mat is 12 inches wide. The mat and the photo are similar rectangles. What is the area of the mat?

44. What is the perimeter of the composite figure?

18 cm

3 cm

22 cm

8 cm

6 cm

15 cm
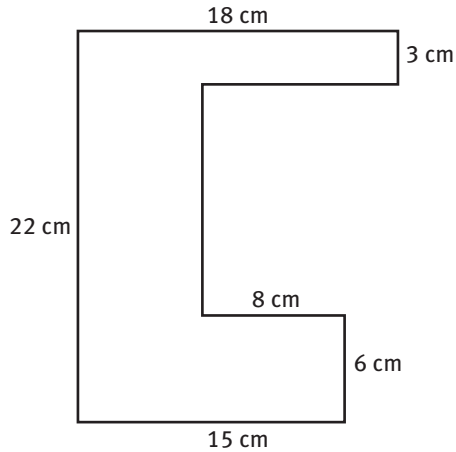
A. 72 cm

B. 83 cm

C. 84 cm

D. 96 cm

45. Reason quantitatively. A kite is formed by connecting the bases of two triangular frames. The height of the top frame is 12 inches. The height of the lower section is 18 inches. The bases of the frames are 14 inches long. What is the least amount of material needed to make three kites?
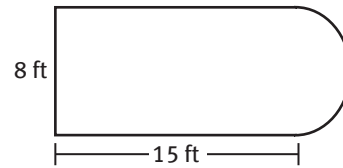
LESSON 17-2

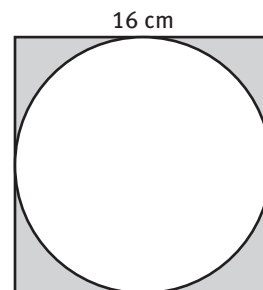**46.** What is the area of the shaded region?

20 cm

8 cm

14 cm

5 cm
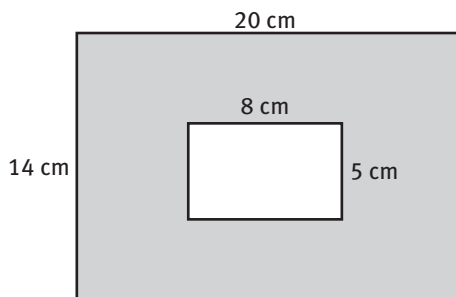
A. 40 cm²

B. 240 cm²

C. 280 cm²

D. 320 cm²

47.

8 ft

15 ft

a. What is the diameter of the semicircle?

b. Find the total area of the figure. Use 3.14 for π. Show your work.

c. Find the distance around the figure. Show your work.

48. What is the area of the shaded region?

16 cm

A. 25.16 cm²

B. 27.52 cm²

C. 50.24 cm²

D. 55.04 cm²

49. Make sense of problems. A circular pizza has a diameter of 12 inches. A pizza in the center of the pan has a radius of 4 inches. How much of the pan is *not* covered by the pizza? Use 3.14 for π.

50. Reason quantitatively. A banner is being made for the opening of an ice-cream parlor. On the banner is an ice-cream cone a triangular height of 10 feet and the base of the semicircle is 6 feet. What is the total area of the ice-cream cone? Use 3.14 for π. Show your work.
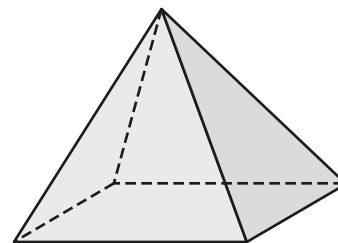
LESSON 18-1

51. Model with mathematics.
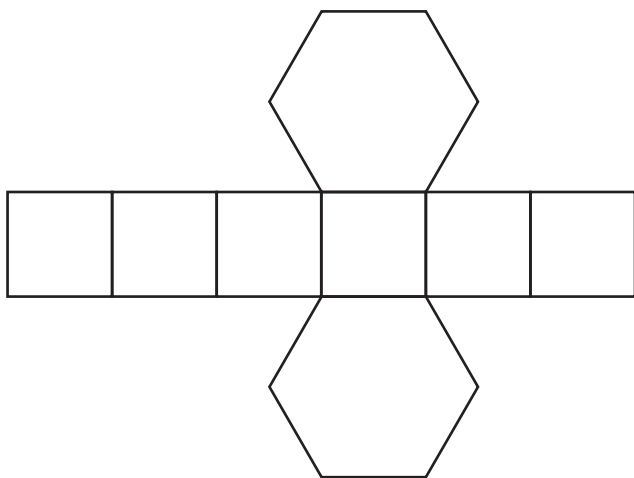
a. What is the name of the solid formed by this net?

b. What are the horizontal and vertical cross sections of the solid?

52. What is the horizontal cross section of the figure shown?
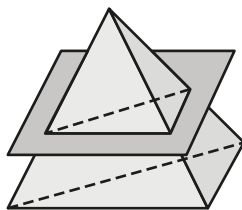
53. How many sides does a pentagonal pyramid have?
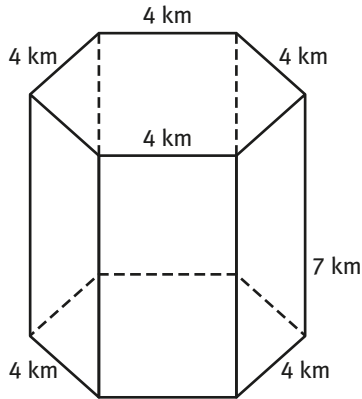
    A. 4

    B. 5

    C. 6

    D. 7

54. In a right rectangular pyramid, what cross section is not possible?

    A. rectangle

    B. square

    C. triangle

    D. trapezoid

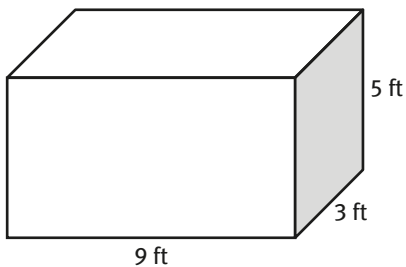**55. Reason abstractly.** Is it possible to have a circular cross section of a triangular prism? Explain.

LESSON 18-2

56. Model with mathematics.
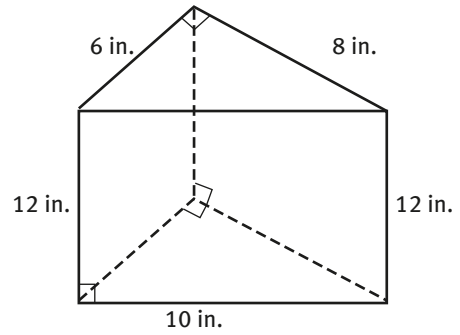

a. Find the area of each lateral face. Show your work.

b. Find the lateral area of the solid. Show the work.

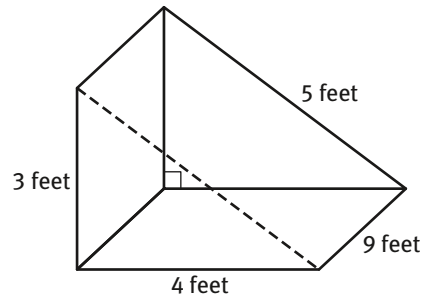c. Determine the perimeter of the base.

57. Model with mathematics.

a. Find the lateral area of the prism.

b. Find the surface area of the prism.

58. What is the surface area of the prism?

A. 318 in.²

B. 336 in.²

C. 376 in.²

D. 390 in.²

59. What is the surface area of the prism?

A. 93 ft²

B. 114 ft²

C. 120 ft²

D. 132 ft²

60. Attend to precision. Which two surfaces must you add to the lateral area when finding the surface area of a rectangular prism?

LESSON 18-3

61. Model with mathematics. What is the surface area of the pyramid?

9 ft

5.5 ft

5.5 ft
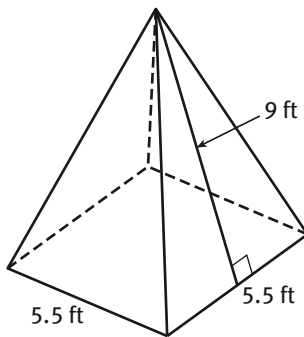
A. 99 ft^2

B. 129.25 ft^2

C. 154 ft^2

D. 228.25 ft^2

62. Persevere in solving problems. The base of a triangular pyramid has sides that are 6 cm long and a height of 10.3 cm. The slant height of the pyramid is 10.3 cm.

a. Find the lateral area of the pyramid. Show your work.

b. Find the surface area of the pyramid. Show your work.

63. A square pyramid has a base length of 825 feet. The slant height of this large pyramid is 596 feet. What is the lateral area of the pyramid?

A. 245,850 ft^2

B. 491,700 ft^2

C. 983,400 ft^2

D. 1,664,025 ft^2

64. Make use of structure. A holiday decoration is constructed from two square pyramids that are joined together at their bases. The edge of each square base is 4.5 inches. The slant height of the triangular faces is 7 inches. What is the surface area of the decoration?

65. A square pyramid has a slant height of 7 feet. The perimeter of the base is 42 feet. Find the surface area of the pyramid.
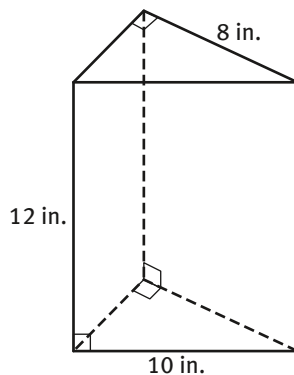
LESSON 19-1

66. Model with mathematics. What is the volume of the prism?

8 ft

3 ft

9 ft
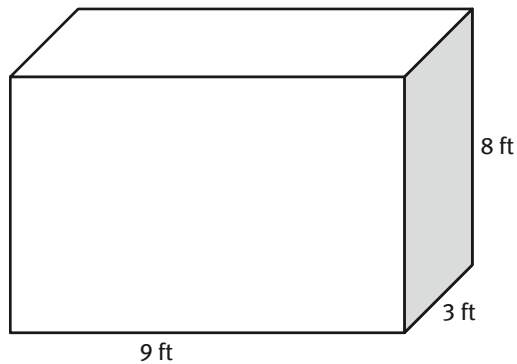
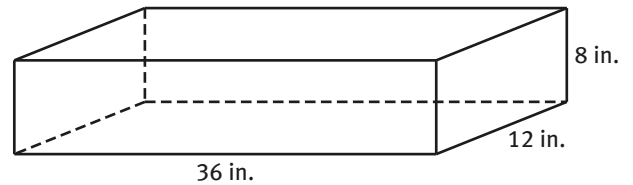**67.** A cube has a face area of 64 square centimeters. What is the volume of the cube?

A. 16 cm³

B. 24 cm³

C. 384 cm³

D. 512 cm³

68. What is the volume of the triangular prism?

8 in.

12 in.

10 in.

A. 688 in.³

**B.** 768 in.³

C. 960 in.³

D. 1040 in.³

69. How many cubes with side length of 4 inches will fit into the rectangular prism? Explain.

8 in.

12 in.

36 in.

70. Make sense of problems. Byron is considering buying two different fish tanks. The first one is 2 feet long, 15 inches wide and 26 inches deep. The second one is 2 feet long, 18 inches wide and 28 inches deep. How much more water is needed to fill the second one than the first?

LESSON 19-2

71. Model with mathematics.

16 cm

20.5 cm

12 cm

20.5 cm
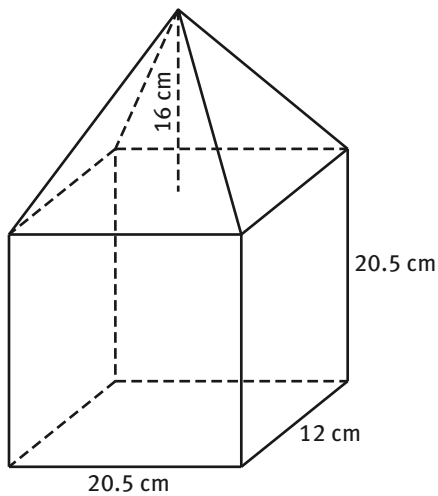
a. Find the volume of the rectangular prism.

b. Find the volume of the rectangular pyramid.

c. Find the total volume of the complex solid.

72. A square pyramid is 21 inches tall and has a volume of 1372 in.³ How long is each side of the base of the pyramid?

    A. 14 inches

    B. 19.6 inches

    C. 21 inches

    D. 65.3 inches

73. Reason abstractly. A square pyramid with the base length of 16 inches is 24 inches tall. The top part of the pyramid is cut off to form a small pyramid with base length of 8 inches and height of 12 inches. How many cubic inches greater was the volume of the larger pyramid than that of the new smaller pyramid?

74. What is the volume of the figure?

8 mm

14 mm

14 mm
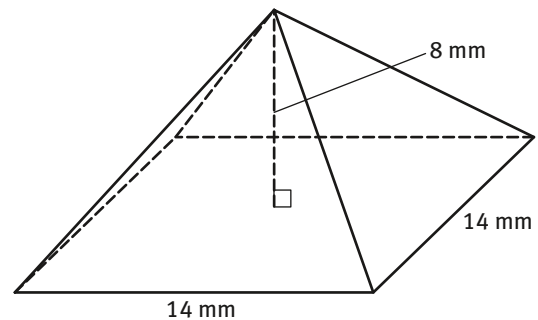
    A. $37\dfrac{1}{3}$ mm³

    B. 112 mm³

    C. $522\dfrac{2}{3}$ mm³

    D. 896 mm³

75. Two square pyramids are joined at their bases. Each base is 28 cm long. The distance between the vertices of the combined pyramids is 21 cm. What is the volume of the solid formed?