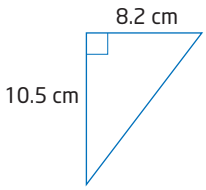
Chapter 8 Review

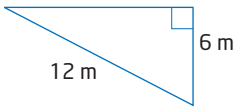
8.1 Apply the Pythagorean Theorem, pages 418–425

1. Determine the perimeter and area of each right triangle. Round answers to the nearest tenth of a unit or square unit.

a)



b)

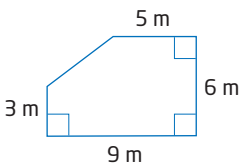


2. A 6-m extension ladder leans against a vertical wall with its base 2 m from the wall. How high up the wall does the top of the ladder reach? Round to the nearest tenth of a metre.

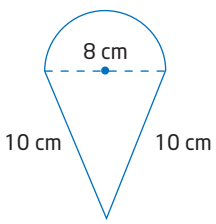
8.2 Perimeter and Area of Composite Figures, pages 426–435

3. Calculate the perimeter and area of each figure. Round answers to the nearest tenth of a unit or square unit, if necessary.

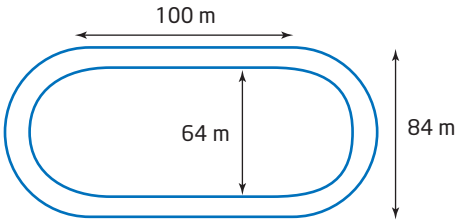
a)



b)



4. The diagram shows a running track at a high school. The track consists of two parallel line segments, with a semicircle at each end. The track is 10 m wide.



a) Tyler runs on the inner edge of the track. How far does he run in one lap, to the nearest tenth of a metre?

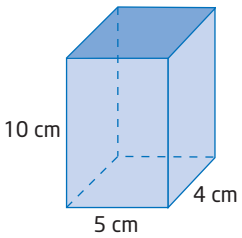
b) Dylan runs on the outer edge. How far does he run in one lap, to the nearest tenth of a metre?

c) Find the difference between the distances run by Tyler and Dylan.

8.3 Surface Area and Volume of Prisms and Pyramids, pages 436–443

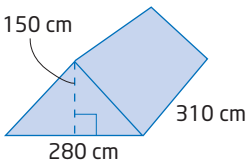
5. Calculate the surface area of each object. Round answers to the nearest square unit, if necessary.

a)



b) the Great Pyramid of Cheops, with a height of about 147 m and a base width of about 230 m

6. a) Calculate the volume of the tent.



b) How much nylon is required to make this tent?

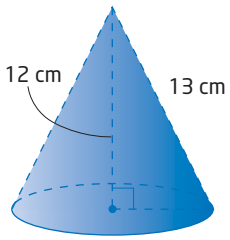
c) Describe any assumptions you made in part b).

d) How reasonable is your answer in part b)?

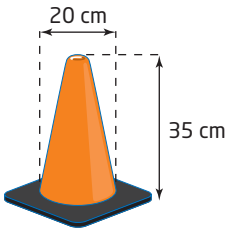
7. A cylindrical can holds 500 mL and has a radius of 4 cm. Calculate the height of the can, to the nearest tenth of a centimetre.

8.4 Surface Area of a Cone, pages 444–450

8. Calculate the surface area of a cone with a slant height of 13 cm and a height of 12 cm. Round to the nearest square centimetre.

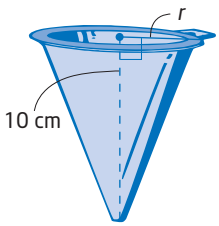


9. The cone portion of a traffic pylon has a diameter of 20 cm and a vertical height of 35 cm. Calculate the surface area of the cone portion of the pylon, to the nearest square centimetre. Assume that the bottom of the cone is complete.



8.5 Volume of a Cone, pages 451–456

10. A conical funnel holds 100 mL. If the height of the funnel is 10 cm, determine its radius, to the nearest tenth of a centimetre.



11. Calculate the volume of a cone that just fits inside a cylinder with a base radius of 8 cm and a height of 10 cm. Round to the nearest cubic centimetre. How does the volume of the cone compare to the volume of the cylinder?

8.6 Surface Area of a Sphere, pages 457–461

12. A volleyball has a diameter of 21.8 cm. Calculate the amount of leather required to cover the volleyball, to the nearest tenth of a square centimetre.

13. The diameter of Earth is about 12 800 km.

a) Calculate the area of the Northern Hemisphere, to the nearest square kilometre.

b) What assumptions have you made?

c) Canada's area is 9 970 610 km^2. Estimate the fraction of the Northern Hemisphere that Canada covers.

8.7 Volume of a Sphere, pages 462–469

14. Calculate the volume of a soccer ball with a diameter of 22.3 cm, to the nearest tenth of a cubic centimetre.

15. The soccer ball in question 14 is packaged so that it just fits inside a cube-shaped box.

a) Estimate the amount of empty space inside the box.

b) Calculate the amount of empty space.

c) How close was your estimate?

Chapter 8 Practice Test

Multiple Choice

For questions 1 to 5, select the best answer.

1. A sphere has a radius of 3 cm. What is its volume, to the nearest cubic centimetre?

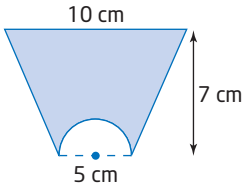
A 339 cm^3

B 38 cm^3

C 113 cm^3

D 85 cm^3

2. What is the area of the figure, to the nearest square centimetre?



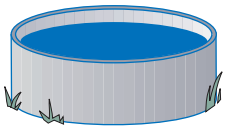
A 43 cm^2

B 54 cm^2

C 62 cm^2

D 73 cm^2

3. A circular swimming pool has a diameter of 7.5 m. It is filled to a depth of 1.4 m. What is the volume of water in the pool, to the nearest litre?



A 61 850 L

B 247 400 L

C 23 561 L

D 47 124 L

4. A conical pile of road salt is 15 m high and has a base diameter of 30 m. How much plastic sheeting is required to cover the pile, to the nearest square metre?

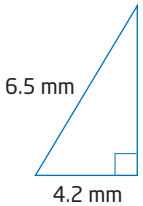
A 414 m^2

B 990 m^2

C 707 m^2

D 999 m^2

5. What is the length of the unknown side of the triangle, to the nearest tenth of a millimetre?



A 2.3 mm

B 5.0 mm

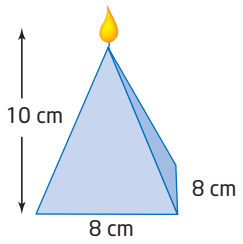
C 6.1 mm

D 7.7 mm

Short Response

Show all steps to your solutions.

6. A candle is in the shape of a square-based pyramid.



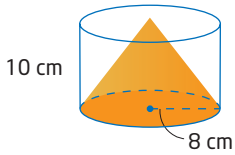
a) How much wax is needed to create the candle, to the nearest cubic centimetre?

b) How much plastic wrap, to the nearest tenth of a square centimetre, would you need to completely cover the candle? What assumptions did you make?

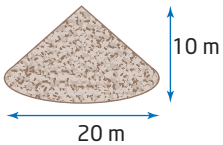
7. A rectangular cardboard carton is designed to hold six rolls of paper towel that are 28 cm high and 10 cm in diameter. Describe how you would calculate the amount of cardboard required to make this carton.

8. Compare the effects of doubling the radius on the volume of a cylinder and a sphere. Justify your answer with numerical examples.

9. Calculate the surface area of the cone that just fits inside a cylinder with a base radius of 8 cm and a height of 10 cm. Round to the nearest square centimetre.



10. Determine the volume of a conical pile of grain that is 10 m high with a base diameter of 20 m. Round to the nearest cubic metre.



Extended Response

Provide complete solutions.

11. Three tennis balls that measure 8.4 cm in diameter are stacked in a cylindrical can.

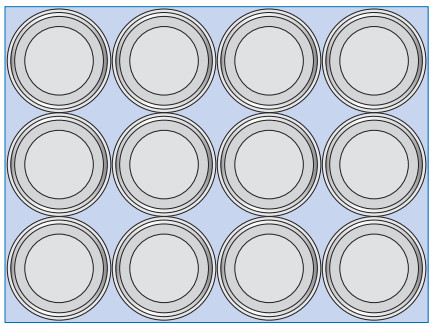
a) Determine the minimum volume of the can, to the nearest tenth of a cubic centimetre.

b) Calculate the amount of aluminum required to make the can, including the top and bottom. Round to the nearest square centimetre.

c) The can comes with a plastic lid to be used once the can is opened. Find the amount of plastic required for the lid. Round to the nearest square centimetre.

d) Describe any assumptions you have made.

12. A rectangular carton holds 12 cylindrical cans that each contain three tennis balls, like the ones described in question 11.



a) How much empty space is in each can of tennis balls, to the nearest tenth of a cubic centimetre?

b) Draw a diagram to show the dimensions of the carton.

c) How much empty space is in the carton and cans once the 12 cans are placed in the carton?

d) What is the minimum amount of cardboard necessary to make this carton?

Chapter Problem Wrap-Up

You are to design a fountain for the garden of one of Emily's customers.

- The fountain will have a cylindrical base with a cone on top.
- The cylindrical base will have a diameter of 1 m.
- The fountain is to be made of concrete.
- The entire fountain is to be coated with protective paint.

a) Make a sketch of your design, showing all dimensions.

b) How much concrete is needed to make the fountain?

c) What is the surface area that needs to be painted?

d) Concrete costs \$100/m^3. Each litre of protective paint costs \$17.50 and covers 5 m^2. Find the total cost of the materials needed to make the fountain.