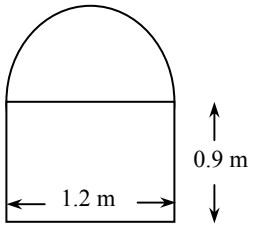
Name: _____ Date: _____

Chapter 7 Test

Unless otherwise specified, round answers to one decimal place, where appropriate.

1. If 1 in. is equivalent to approximately 2.54 cm, what is 1 in.^{2} in square centimetres?

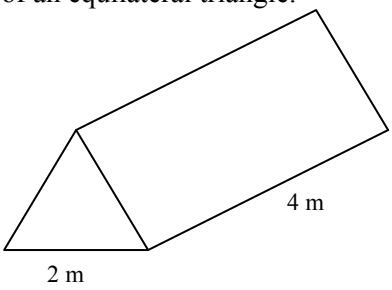
2. A window is in the shape of a rectangle with a semicircular top, as shown.



a) Determine the area of the window.

b) Determine the height, to the nearest centimetre, of the rectangular portion of the window that would make it equal in area to the semicircular part.

3. A tent has a floor in the shape of a rectangle that measures 2 m by 4 m. The standing ends of the tent are in the shape of an equilateral triangle.



a) Determine the height of the tent.

b) If material costs \$1.50/m^2, determine the cost of material for the entire tent, including the floor.

4. A cylindrical pipe is 4 ft long. The inner diameter is 20 in., and walls are 2 in. thick.

a) What are the different surfaces involved in calculating the surface area of the pipe?

b) Determine the surface area of the pipe, to the nearest square foot.

c) If four pipes are joined end to end, calculate the total surface area, to the nearest square foot.

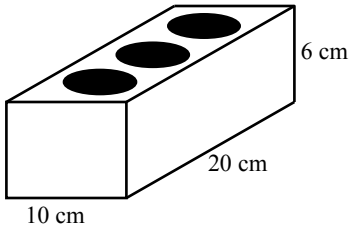
5. An oxygen tank is a cylinder with hemispherical ends. The diameter of the tank is 25 cm, and the length is 80 cm.

a) Draw a labelled diagram.

b) Determine the length of the cylinder.

c) Determine the total volume of the tank.

6. A clay brick is in the shape of a rectangular prism with three holes running as shown in the diagram. The diameter of the holes is 5 cm.



a) Determine the volume of one brick.

b) How many cubic centimetres are in 1 m^3?

c) How many bricks will 1 m^3 of clay make?

d) Determine the surface area of the brick.

7. A soup can is in the shape of a cylinder. The manufacturer is making a larger can with double the volume. Should they double the height of the can, double the radius, or neither of these? Explain.

8. A sphere and a cube have a volume of 1 L.

a) Determine the radius of the sphere, to the nearest tenth of a centimetre.

b) Determine the side length of the cube, to the nearest tenth of a centimetre.

c) Which would you expect to have a smaller surface area? Explain.

d) Calculate to verify your answer to part c).

e) Companies selling goods want to minimize the amount of packaging. Which is more commonly seen in grocery stores, spheres or cubes?

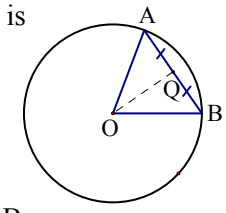
f) Does your answer to part d) agree with your answer to part e)? Suggest some reasons why this is the case.

978-007090899-4

Name: _____ Date: _____

9. One Imperial gallon is equivalent to approximately 4.54 L, and 1 mile is equivalent to approximately 1.61 km. If a car's rate of fuel consumption is 8.2 L/100 km, calculate its consumption in miles per gallon.

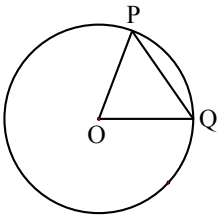
10. In the circle, the radius is 5 cm and the length of chord AB is 6 cm.



a) Determine the distance from the centre, O, to Q, the midpoint of chord AB.

b) Use trigonometry to determine the measure of ∠AOB.

11. In the given diagram, ΔPOQ is equilateral, and the circle's radius is 10 cm.



a) State the measure of ∠POQ.

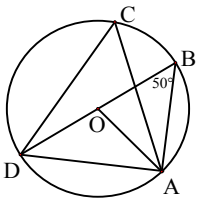
b) What fraction of the circle's area is sector OPQ?

c) Predict the length of arc PQ. Explain.

d) Use a formula to determine the actual length of arc PQ.

12. Explain the difference between a secant and a tangent.

13. For the given circle, determine the measure of the angles.



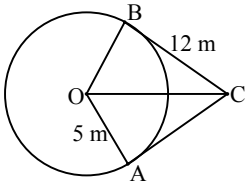
a) ∠DOA

b) ∠DCA

c) ∠DAB

d) ∠BDA

14. In the diagram, segments BC and AC are tangent to the circle.



a) Determine the length of OC.

b) Determine the area of OBCA.

15. Two chords, AB and CD, each have a length of 80 cm. The radius of the circle is 50 cm. The midpoint of chord AB is P. The midpoint of chord CD is Q.

a) Show this information in a diagram.

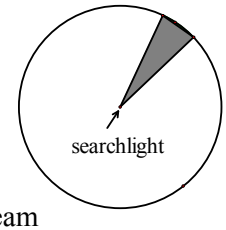
b) If O is the centre of the circle, is the length of OP equal to the length of OQ? Show your work.

16. A race car is travelling around a circular track with radius 500 m. A television camera, located at the centre of the circle, is filming the car as it goes around the track.

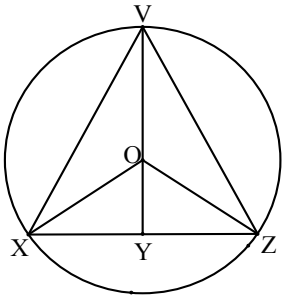
a) Through what angle does the camera rotate as it tracks the car from the 1:00 position to the 5:00 position?

b) If this takes 30 s, how fast is the car going, to the nearest kilometre per hour?

17. A circular athletic complex has a searchlight that rotates from the centre, as shown. The radius of the complex is 75 m, and the searchlight's beam forms an angle of 15°. Determine the area that is illuminated by the light at any given time.



18. In the diagram shown, the length of OY is 6 cm, Y is the midpoint of chord XZ, and the length of XY is 8 cm.



a) Determine the area of ΔXVZ.

b) Determine the measure of ∠XOZ.

c) Determine the area of the segment bounded by chord XZ and arc XZ at the bottom of the circle.

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