Name: _____   Date: _____

Chapter 9 Test

Multiple Choice

For questions 1 to 4, select the best answer.

1. Heather wants to build a rectangular pen. She has 24 1-m sections of fencing. What are the dimensions of the pen with the greatest area?
   A 1 m by 11 m   B 2 m by 10 m
   C 3 m by 9 m   D 4 m by 8 m

2. A square-based prism has a surface area of 600 cm^2. What are the dimensions of the prism if it has maximum volume?
   A 15 cm by 2.5 cm by 2.5 cm
   B 8.4 cm by 8.4 cm by 8.4 cm
   C 10 cm by 10 cm by 10 cm
   D 8 cm by 8 cm by 15 cm

3. These square-based prisms all have the same volume. Which prism has the least surface area?
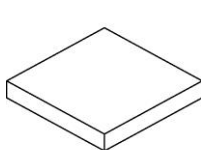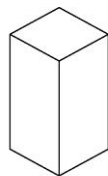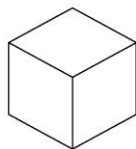

   Prism A   Prism B
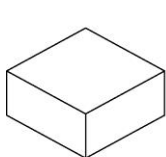
   Prism C   Prism D

   A Prism A   B Prism B
   C Prism C   D Prism D

4. The volume of a cylinder is 700 cm^3. What are the radius and height of the cylinder if it has the least surface area possible?
   A $r = 5$ cm, $h = 8.9$ cm
   B $r = 4.8$ cm, $h = 9.6$ cm
   C $r = 4.8$ cm, $h = 4.8$ cm
   D $r = 5.2$ cm, $h = 8.2$ cm

Short Response

Show all steps to your solution. When necessary, round your answer to one decimal place.

5. Wendy has 20 m of fencing. She plans to enclose an area in her yard. The fourth side of the area has a hedge, so she only needs to fence three sides. What is the greatest area Wendy can enclose?

6. Suppose you plan to build a box with a volume of 120 cm^3.
   a) What are the dimensions of the box?
   b) What is the least amount of material required to build the box?

7. Amy is building a cylindrical storage tank to hold 800 cm^3 of road salt. Find the radius and height of the tank that requires the least amount of material.

Extend

Provide complete solutions.

8. Engla wishes to make a container with a volume of 500 cm^3 using the least amount of material. Should the box be a square-based prism or a cylinder? Why?

BLM.CT.1 Chapter 9 Test

1. D
2. C
3. D
4. B
5. 50 m^2
6. a) 4.9 cm by 4.9 cm by 4.9 cm
   b) 144.1 cm^2
7. $r = 5$ cm; $h = 10.1$ cm
8. The dimensions of the square-based prism with a volume of 500 cm^3 are 7.9 cm by 7.9 cm by 7.9 cm. The surface area of this prism is 374.5 cm^2. A cylinder with volume 500 cm cubed has a radius of 4.3 cm, a height of 8.6 cm, and a surface area of 348.5 cm^2. Engla should make a cylinder.