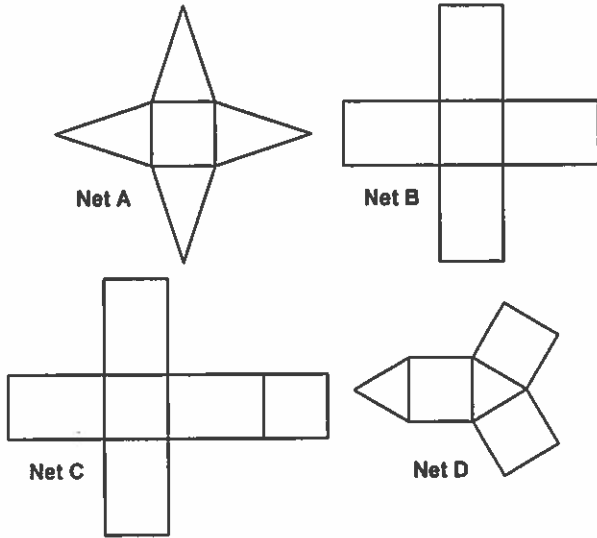


**Review - Unit Test - Surface Area and Volume**

**Multiple Choice**

*Identify the choice that best completes the statement or answers the question.*

\_\_\_\_\_ 1. Which diagram is the net for a square pyramid?



- a. Net A                      b. Net B                      c. Net C                      d. Net D

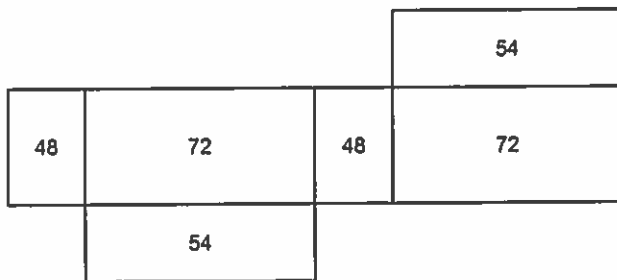
\_\_\_\_\_ 2. What shapes do you need to make a hexagonal pyramid?

- a. 1 hexagon and 6 triangles                      c. 2 hexagons and 6 triangles  
 b. 2 hexagons and 6 rectangles                      d. 1 hexagon and 6 rectangles

\_\_\_\_\_ 3. The area of one face of a cube is 25 cm<sup>2</sup>. What is the surface area of the cube?

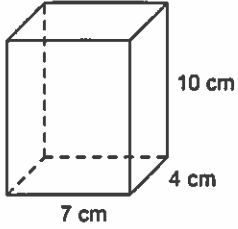
- a. 100 cm<sup>2</sup>                      b. 100150 cm<sup>2</sup>                      c. 30 cm<sup>2</sup>                      d. 125 cm<sup>2</sup>

\_\_\_\_\_ 4. This is the net of a right rectangular prism. The area of each face, in square centimetres, is given. What is the surface area of the prism?



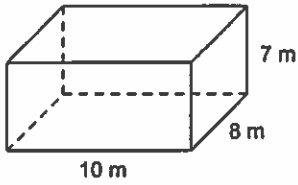
- a. 178 cm<sup>2</sup>                      b. 174 cm<sup>2</sup>                      c. 228 cm<sup>2</sup>                      d. 348178 cm<sup>2</sup>

5. Find the surface area of this right rectangular prism.



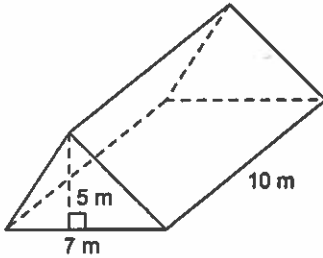
- a.  $138 \text{ cm}^2$       b.  $21 \text{ cm}^2$       c.  $280 \text{ cm}^2$       d.  $276 \text{ cm}^2$

6. Find the volume of this rectangular prism.



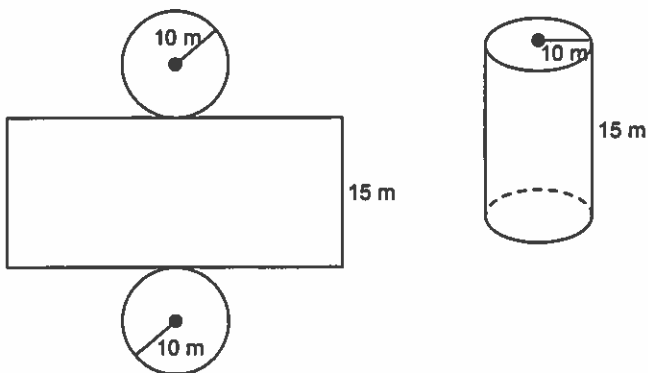
- a.  $412 \text{ m}^3$       b.  $100 \text{ m}^3$       c.  $206 \text{ m}^3$       d.  $560 \text{ m}^3$

7. Find the volume of this triangular prism.



- a.  $350 \text{ m}^3$       b.  $88 \text{ m}^3$       c.  $175 \text{ m}^3$       d.  $105 \text{ m}^3$

8. Use this net to find the surface area of the cylinder. Give the answer to the nearest square metre.

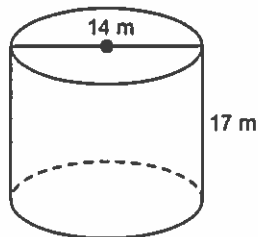


- a.  $785 \text{ m}^2$       b.  $1257 \text{ m}^2$       c.  $1100 \text{ m}^2$       d.  $1571 \text{ m}^2$

Name: \_\_\_\_\_

ID: A

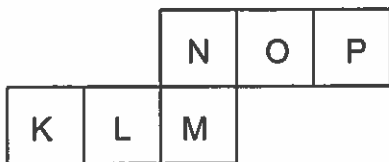
9. Find the volume of this cylinder. Round your answer to the nearest tenth.



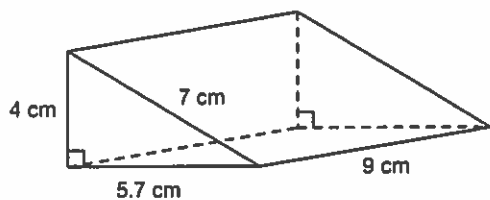
- a.  $747.7 \text{ m}^3$       b.  $373.8 \text{ m}^3$       c.  $2616.9 \text{ m}^3$       d.  $238 \text{ m}^3$

**Short Answer**

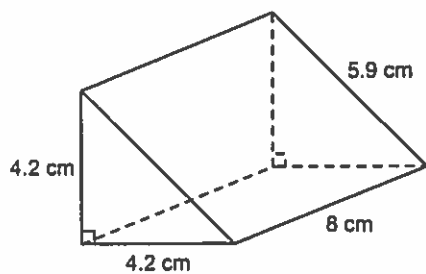
10. Is this diagram a net for a cube? If so, name the opposite faces.



11. Find the surface area of this right triangular prism.



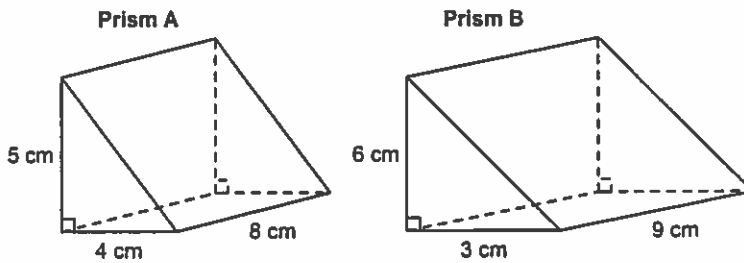
12. Find the surface area of this right rectangular prism.



13. A rectangular sheet of cardboard measures 20 cm by 16 cm. To form the net of an open box, a 4-cm square is cut from each of the 4 corners of the cardboard. What will be the volume of the box made?



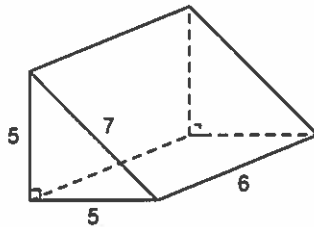
14. a) Find the volume of each right triangular prism.  
b) Which prism has the greater volume?



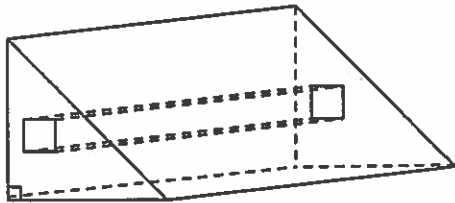
15. An open storage tank is cylindrical with height 13 m and diameter 22 m. The outside curved surface area will be given 3 coats of paint. Calculate, to the nearest square metre, the total area to be painted.
16. Juice concentrate is poured into cylindrical cans with diameter 6 cm and height 11.6 cm. A space of 1.5 cm is left at the top of each can to allow for expansion when the concentrate freezes. What volume of concentrate, to the nearest millilitre, is poured into each can? Use  $\pi = 3.14$ .

**Problem**

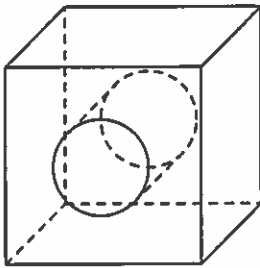
17. Sketch and label a net of this right triangular prism.



18. A right rectangular prism has these faces:  
2 faces of area  $55 \text{ cm}^2$   
2 faces of area  $66 \text{ cm}^2$   
2 faces of area  $30 \text{ cm}^2$   
Find the dimensions of the prism.
19. Gift boxes are made in the shape of right rectangular prisms of dimensions 6 cm by 5 cm by 4 cm.  
a) What is the volume of each gift box?  
b) How many gift boxes can be packed in a larger box that measures 18 cm by 15 cm by 16 cm?  
Explain your strategy.
20. This wooden object has the shape of a triangular prism with a square hole drilled across it. Each square hole has side length 4 cm. The length of the triangular prism is 16 cm. The base of the triangular prism is an isosceles triangle with each leg 7 cm. What is the volume of the wooden object? Show your work.



21. An object that has the shape of a cube with a cylindrical hole drilled through it is to be painted. The cube has an edge length of 28 cm and the hole has diameter 16 cm. What area of the object, to the nearest square centimetre, will be covered with paint?  
Explain your work.



22. Which object has the greater volume? Explain your work.
- A cylinder with radius 6 cm and height 5 cm
  - A cube of edge length 8 cm

## Review - Unit Test - Surface Area and Volume Answer Section

### MULTIPLE CHOICE

1. ANS: A                      PTS: 1                      DIF: Easy                      REF: 4.1 Exploring Nets  
LOC: 8.SS2                      TOP: Shape and Space (Measurement)                      KEY: Conceptual Understanding
2. ANS: A                      PTS: 1                      DIF: Moderate                      REF: 4.1 Exploring Nets  
LOC: 8.SS2                      TOP: Shape and Space (Measurement)                      KEY: Conceptual Understanding
3. ANS: B                      PTS: 1                      DIF: Easy  
REF: 4.3 Surface Area of a Right Rectangular Prism                      LOC: 8.SS3  
TOP: Shape and Space (Measurement)                      KEY: Conceptual Understanding
4. ANS: D                      PTS: 1                      DIF: Easy                      LOC: 8.SS3  
REF: 4.3 Surface Area of a Right Rectangular Prism                      LOC: 8.SS3  
TOP: Shape and Space (Measurement)                      KEY: Conceptual Understanding
5. ANS: D                      PTS: 1                      DIF: Moderate                      LOC: 8.SS3  
REF: 4.3 Surface Area of a Right Rectangular Prism                      LOC: 8.SS3  
TOP: Shape and Space (Measurement)                      KEY: Conceptual Understanding
6. ANS: D                      PTS: 1                      DIF: Easy                      LOC: 8.SS4  
REF: 4.5 Volume of a Right Rectangular Prism                      LOC: 8.SS4  
TOP: Shape and Space (Measurement)                      KEY: Conceptual Understanding
7. ANS: C                      PTS: 1                      DIF: Easy                      LOC: 8.SS4  
REF: 4.6 Volume of a Right Triangular Prism                      LOC: 8.SS4  
TOP: Shape and Space (Measurement)                      KEY: Conceptual Understanding
8. ANS: D                      PTS: 1                      DIF: Easy                      LOC: 8.SS3  
REF: 4.7 Surface Area of a Right Cylinder                      LOC: 8.SS3  
TOP: Shape and Space (Measurement)                      KEY: Conceptual Understanding
9. ANS: C                      PTS: 1                      DIF: Moderate                      REF: 4.8 Volume of a Right Cylinder  
LOC: 8.SS4                      TOP: Shape and Space (Measurement)                      KEY: Conceptual Understanding

### SHORT ANSWER

10. ANS:  
Yes; Faces K and M, L and O, and N and P will be opposite faces.  
  
PTS: 1                      DIF: Moderate                      REF: 4.1 Exploring Nets  
LOC: 8.SS2                      TOP: Shape and Space (Measurement)                      KEY: Problem-solving Skills
11. ANS:  
The surface area of the prism is 173.1 cm<sup>2</sup>.  
  
PTS: 1                      DIF: Moderate                      REF: 4.4 Surface Area of a Right Triangular Prism  
LOC: 8.SS3                      TOP: Shape and Space (Measurement)                      KEY: Conceptual Understanding
12. ANS:  
The surface area of the prism is 246.4 cm<sup>2</sup>.  
  
PTS: 1                      DIF: Moderate                      REF: 4.4 Surface Area of a Right Triangular Prism  
LOC: 8.SS3                      TOP: Shape and Space (Measurement)                      KEY: Conceptual Understanding

13. ANS:

The volume of the box will be  $384 \text{ cm}^3$ .

PTS: 1                    DIF: Difficult            REF: 4.5 Volume of a Right Rectangular Prism  
 LOC: 8.SS4            TOP: Shape and Space (Measurement)  
 KEY: Procedural Knowledge | Problem-solving Skills

14. ANS:

- a) The volume of Prism A is  $80 \text{ cm}^3$ .  
     The volume of Prism B is  $81 \text{ cm}^3$ .
- b) Prism B has the greater volume.

PTS: 1                    DIF: Moderate            REF: 4.6 Volume of a Right Triangular Prism  
 LOC: 8.SS4            TOP: Shape and Space (Measurement)    KEY: Conceptual Understanding

15. ANS:

The total area to be painted is about  $2695 \text{ m}^2$ .

PTS: 1                    DIF: Moderate            REF: 4.7 Surface Area of a Right Cylinder  
 LOC: 8.SS3            TOP: Shape and Space (Measurement)  
 KEY: Conceptual Understanding | Problem-solving Skills

16. ANS:

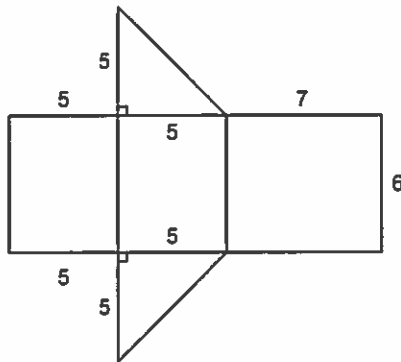
The volume of concentrate in each can is about 285 mL.

PTS: 1                    DIF: Moderate            REF: 4.8 Volume of a Right Cylinder  
 LOC: 8.SS4            TOP: Shape and Space (Measurement)  
 KEY: Conceptual Understanding | Problem-solving Skills

**PROBLEM**

17. ANS:

Diagrams may vary. Sample:



PTS: 1                    DIF: Moderate            REF: 4.1 Exploring Nets  
 LOC: 8.SS2            TOP: Shape and Space (Measurement)  
 KEY: Conceptual Understanding | Communication

18. ANS:

The rectangular prism measures 11 cm by 5 cm by 6 cm.

PTS: 1

DIF: Difficult

REF: 4.3 Surface Area of a Right Rectangular Prism

LOC: 8.SS3

TOP: Shape and Space (Measurement)

KEY: Problem-solving Skills

19. ANS:

Explanations may vary. Sample:

$$\begin{aligned} \text{a) } V &= Ah \\ &= 4 \times 5 \times 6 \\ &= 120 \end{aligned}$$

The volume of each gift box is 120 cm<sup>3</sup>.

b) First ensure that 4 is a factor of 16, 5 is a factor of 15, and 6 is a factor of 18.  
Then divide the volume of the larger box by the volume of each gift box.

$$\frac{18 \times 15 \times 16}{6 \times 5 \times 4} = 36$$

The larger box can fit 36 gift boxes.

PTS: 1

DIF: Difficult

REF: 4.5 Volume of a Right Rectangular Prism

LOC: 8.SS4

TOP: Shape and Space (Measurement)

KEY: Communication | Problem-solving Skills

20. ANS:

$$\begin{aligned} \text{Volume of triangular prism: } V_1 &= \frac{1}{2} bhl \\ &= \frac{1}{2} \times 7 \times 7 \times 16 \\ &= 392 \end{aligned}$$

$$\begin{aligned} \text{Volume of square hole: } V_2 &= 4 \times 4 \times 16 \\ &= 256 \end{aligned}$$

$$\begin{aligned} V_1 - V_2 &= 392 - 256 \\ &= 136 \end{aligned}$$

The volume of the wooden object is 136 cm<sup>3</sup>.

PTS: 1

DIF: Difficult

REF: 4.6 Volume of a Right Triangular Prism

LOC: 8.SS4

TOP: Shape and Space (Measurement)

KEY: Communication | Problem-solving Skills



21. ANS:

Explanations may vary. Sample:

$$\begin{aligned}\text{Surface area of cube} &= 6s^2 = 6 \times 28^2 \\ &= 4704\end{aligned}$$

$$\text{Area of 2 ends of circular hole} = 2 \times \pi r^2$$

$$\begin{aligned}&= 2 \times \pi \times \left(\frac{16}{2}\right)^2 \\ &\approx 402.12\end{aligned}$$

$$\begin{aligned}\text{Curved surface area of cylindrical hole} &= \pi d \times h \\ &= \pi \times 16 \times 28 \\ &\approx 1407.43\end{aligned}$$

Total area to be covered with paint

$$\begin{aligned}&= \text{area of cube} - \text{area of the 2 circular holes} + \text{curved surface area of cylindrical hole} \\ &= 4704 - 402.12 + 1407.43 \\ &\approx 5709\end{aligned}$$

The surface area that will be covered with paint is about 5709 cm<sup>2</sup>.

PTS: 1                    DIF: Difficult                    REF: 4.7 Surface Area of a Right Cylinder

LOC: 8.SS3                    TOP: Shape and Space (Measurement)

KEY: Communication | Problem-solving Skills

22. ANS:

$$\begin{aligned}\text{Volume of a cylinder} &= \text{base area} \times \text{height} \\ &= \pi \times 6^2 \times 5 \\ &\approx 565\end{aligned}$$

$$\begin{aligned}\text{Volume of a cube} &= 8^3 \\ &= 512\end{aligned}$$

The cylinder has the greater volume.

PTS: 1                    DIF: Difficult                    REF: 4.8 Volume of a Right Cylinder

LOC: 8.SS4                    TOP: Shape and Space (Measurement)

KEY: Communication | Problem-solving Skills