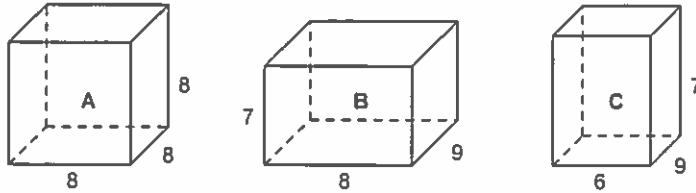


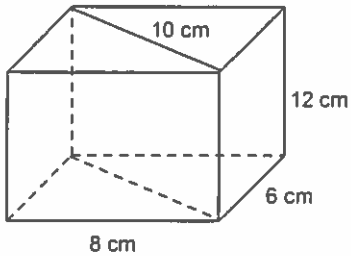
Surface Area of Prisms

Problem

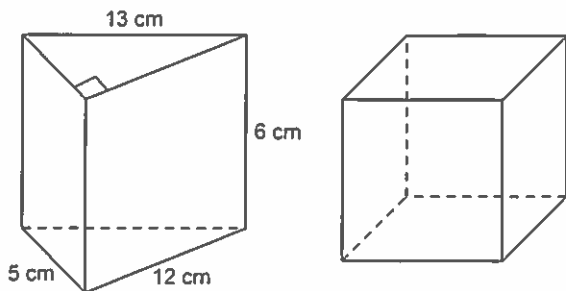
1. The diagrams shows the dimensions, in centimetres, of three right rectangular prisms. Which prism has the greatest surface area? Show your work.



2. A right rectangular prism has these faces:
 2 faces of area 55 cm^2
 2 faces of area 66 cm^2
 2 faces of area 30 cm^2
 Find the dimensions of the prism.
3. This rectangular prism is divided into 2 equal halves by a line drawn along the diagonal. Each half is in the shape of a right triangular prism and will be painted in a different colour. Find the surface area covered by each colour paint. Explain your answer.



4. The right triangular prism and the cube have the same surface area.
 a) Find the surface area of the prism.
 b) Find the length of an edge of the cube to 1 decimal place.
 Explain your work.



Name: _____

ID: A

5. A cylindrical storage container has radius 4 m and height 8 m.
- What is the surface area of this container? Round your answer to the nearest square unit.
Show your work.
 - If either the radius or the height of the container is doubled, which will give a greater area increase compared to the original container? Explain.
6. A coffee can has diameter 9.6 cm and height 15 cm.
The label around the can has 1 cm extra length to allow for gluing.
What is the area of the label, to the nearest square centimetre?
Show your work.

Surface Area of Prisms

Answer Section

PROBLEM

1. ANS:

$$\text{Prism A: surface area} = (6 \times 8 \times 8) \text{ cm}^2 = 384 \text{ cm}^2$$

$$\text{Prism B: surface area} = 2(8 \times 9 + 8 \times 7 + 9 \times 7) \text{ cm}^2 = 382 \text{ cm}^2$$

$$\text{Prism C: surface area} = 2(6 \times 9 + 6 \times 7 + 9 \times 7) \text{ cm}^2 = 318 \text{ cm}^2$$

Prism A has the greatest surface area.

PTS: 1

DIF: Difficult

REF: 4.3 Surface Area of a Right Rectangular Prism

LOC: 8.SS3

TOP: Shape and Space (Measurement)

KEY: Communication

2. 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

3. ANS:

Explanations may vary. Sample:

The common face of the 2 triangular prisms will not be painted.

For each prism,

$$\begin{aligned} \text{Area of 2 triangular faces} &= 2 \times \frac{1}{2} \times 8 \text{ cm} \times 6 \text{ cm} \\ &= 48 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of 2 rectangular faces} &= (8 \text{ cm} \times 12 \text{ cm}) + (6 \text{ cm} \times 12 \text{ cm}) \\ &= 96 \text{ cm}^2 + 72 \text{ cm}^2 \\ &= 168 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Area covered by 1 colour paint} &= 48 \text{ cm}^2 + 168 \text{ cm}^2 \\ &= 216 \text{ cm}^2 \end{aligned}$$

PTS: 1

DIF: Difficult

REF: 4.4 Surface Area of a Right Triangular Prism

LOC: 8.SS3

TOP: Shape and Space (Measurement)

KEY: Communication | Problem-solving Skills

4. ANS:

Explanations may vary. Sample:

a) The surface area of the prism is the sum of the areas of its faces.

$$\text{Area of 3 rectangular faces is: } 6 \times 5 + 6 \times 12 + 6 \times 13 = 180$$

$$\text{Area of 2 triangular faces is: } 2 \times \frac{1}{2} \times 5 \times 12 = 60$$

$$\text{Surface area} = \text{area of 3 rectangular faces} + \text{area 2 triangular faces} = 180 + 60 = 240$$

The surface area of the prism is 240 cm^2 .b) Area of 1 face of the cube is: $240 \text{ cm}^2 \div 6 = 40 \text{ cm}^2$

$$\text{The length of an edge of the cube is: } \sqrt{40} \text{ cm} \approx 6.3 \text{ cm}$$

PTS: 1

DIF: Difficult

REF: 4.4 Surface Area of a Right Triangular Prism

LOC: 8.SS3

TOP: Shape and Space (Measurement)

KEY: Communication | Problem-solving Skills

5. ANS:

a) Use the formula for finding the surface area of a cylinder.

Surface area = area of 2 circular bases + area of curved surface

$$SA = 2\pi r^2 + 2\pi rh$$

Substitute: $r = 4$ and $h = 8$

$$SA = 2\pi \times 4^2 + 2\pi \times 4 \times 8$$

$$\approx 302$$

The surface area of the container is about 302 m^2 .

b) Explanations may vary. Sample:

Find the surface area of each new container.

When radius is doubled, $r = 8$.

$$SA = 2\pi \times 8^2 + 2\pi \times 8 \times 8$$

$$\approx 808$$

The surface area of the new container will be about 804 m^2 .When height is doubled, $h = 16$.

$$SA = 2\pi \times 4^2 + 2\pi \times 4 \times 16$$

$$\approx 503$$

The surface area of the new container will be about 503 m^2 .

Doubling the radius will give the greater increase in surface area.

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

6. ANS:

Answers may vary. Sample:

$$\text{Circumference of circular base is: } \pi \times 9.6 \approx 30.16$$

$$\text{Length of label is: } 30.16 + 1 = 31.16$$

$$\text{Area of label is: } 31.16 \times 15 \approx 467$$

The area of the label is about 467 cm^2 .

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