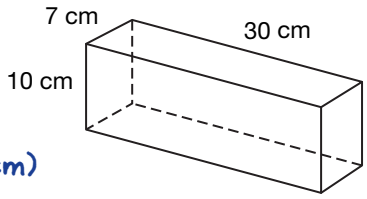
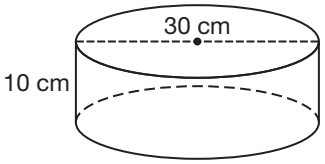
# Chapter Review

**1.** Which block of cheese has more surface area to wrap: the rectangular prism or the cylinder?




$SA_{\text{rectangular prism}} = 2(10\text{ cm})(30\text{ cm}) + 2(10\text{ cm})(7\text{ cm}) + 2(7\text{ cm})(30\text{ cm})$

$= 600\text{ cm}^2 + 140\text{ cm}^2 + 420\text{ cm}^2$, or $1160\text{ cm}^2$




Area of 2 bases $= 2\pi(15\text{ cm})^2$, or $1413.716...\text{ cm}^2$

Circumference $= \pi(30\text{ cm})$, or $94.247...\text{ cm}$

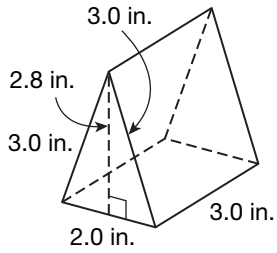
Lateral area $= (94.247...\text{ cm})(10\text{ cm})$, or $942.477...\text{ cm}^2$

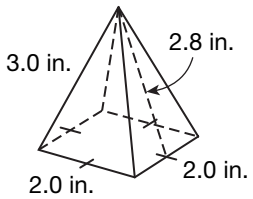
$SA_{\text{cylinder}} = 1413.716... + 942.477...\text{ cm}^2$

$= 2356.194...\text{ cm}^2$

The cylinder has more surface area to wrap.

**2.** Which wooden block has more surface area to paint?




$SA = 2(\text{base area}) + \text{lateral area}$

$= 2\left(\frac{1}{2}\right)(2.0\text{ in.})(2.8\text{ in.}) + (8.0\text{ in.})(3.0\text{ in.})$

$= 29.6\text{ sq in.}$

$SA = \text{base area} + \text{lateral area}$

$= 4.0\text{ sq in.} + \left(\frac{1}{2}\right)(8.0\text{ in.})(2.8\text{ in.})$

$= 15.2\text{ sq in.}$

The triangular prism has more surface area to paint.

**3.** A box-shaped chest freezer has a surface area of 5.1 $m^2$. The freezer is 1.2 m long and 0.7 m wide. How tall is it?

e.g., $SA = 2(\text{base area}) + \text{lateral area}$

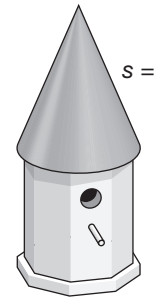
$5.1\text{ m}^2 = 2(1.2\text{ m})(0.7\text{ m}) + (\text{base perimeter})(\text{height})$

$5.1\text{ m}^2 = 1.68\text{ m}^2 + (3.8\text{ m})(\text{height})$

$3.42\text{ m}^2 = (3.8\text{ m})(\text{height})$

$0.9\text{ m} = \text{height}$ The freezer is 0.9 m tall.

**4.** Melissa is making this bird feeder with a metal roof for her craft store. She is leaving the cone open at the bottom. She needs to calculate the area of metal needed for the roof.



base diameter = 20 cm

Melissa made an error when she calculated the area of metal. Describe the error. Correct the solution.

*SA*(roof) is the lateral area of cone

$SA = \pi rs$

$= \pi(20 \text{ cm})(30 \text{ cm})$

$= 1884.955... \text{ cm}^2$

I will need about 1880 $\text{cm}^2$ of metal for the roof.

e.g., Melissa used the diameter instead of the radius in her calculations.

Correct solution:

$\pi(10 \text{ cm})(30 \text{ cm}) = 942.477... \text{ cm}^2$

She will need about 942 $\text{cm}^2$ of metal.

**5.** The Aboriginal Pavilion at the 2010 Winter Olympics in Vancouver included a giant sphere with a radius of 32.5 ft. About how many square feet of material were used to cover the surface of the sphere?

e.g., $SA_{\text{sphere}} = 4\pi r^2$

$= 4\pi(32.5 \text{ ft})^2$, or 13 273.228... sq ft

About 13 273 sq ft, or about 13 300 sq ft of material were used.

**6.** Choose an object you can see from your desk that looks like a prism, cylinder, sphere, pyramid, or cone. Estimate the surface area of the object. Show your steps.

e.g., Softball: I know my hand covers about 100 $\text{cm}^2$. It takes three of my hand areas to cover the softball. So the surface area is about 300 $\text{cm}^2$.

**7.** The Flashline Mars Arctic Research Station (FMARS) on Devon Island in Nunavut is a research station where scientists explore what it might be like to live and work on Mars.


height = 9 m
diameter = 8 m

Suppose the station had a flat roof and no openings. What would be the surface area of the station, to the nearest square metre? Include the floor.

e.g., $SA = 2\pi r^2 + (\pi d)(\text{height})$

$= 2\pi(4 \text{ m})^2 + \pi(8 \text{ m})(9 \text{ m})$

$= 326.725... \text{ m}^2$

The surface area would be 327 $\text{m}^2$, to the nearest square metre.