Section 6.2 Surface Area of Pyramids, Cylinders, Spheres, and Cones, Build Your Skills, p365–367
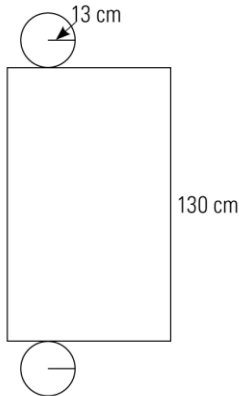Student Resource p242–243

**Build Your Skills**

1. a) Draw the rectangle to have a width of approximately 3 times the diameter of the circle.



b) $SA = 2\pi r^2 + 2\pi rh$
$SA = 2\pi(13)^2 + 2\pi(13)(130)$
$SA \approx 11\ 680\ \text{cm}^2$
Sasha will need to cover 11 680 cm$^2$ of space to paint the column.

2. To help students visualize the inside of the tunnel, you can show them an air duct tube, which is easily found at a local hardware store.
Have students think about the benefits of using a corrugated surface versus a smooth surface.
a) Surface area of tunnel:
$SA = 2\pi r\ell$
$SA = \pi d\ell$
$SA = \pi(6)(20)$
$SA \approx 377\ \text{m}^2$
Area of one steel sheet:
$A = \ell \times w$
$A = 1.30 \times 2.00$
$A = 2.60\ \text{m}^2$
Number of steel sheets required:
$\frac{\quad\quad}{\quad\quad} = 145$ sheets
The number of steel sheets used to line the tunnel is about 145.
Note: This method can only be used to estimate. An estimator would have to consider the length and width of the steel sheets and how they would fit onto the surface area of the tunnel.
b) No, it would not be a good idea. Although the steel sheets cover the inside of the tunnel, the actual surface area of the corrugated steel is much greater because of the wavy surface. You would need much more paint to cover the corrugations than to cover a flat surface.

3. Begin by calculating the area of hide needed. Each piece of hide must have a diameter 14

cm larger than the drum diameter, in order to reach 7 cm down the sides of the drum.

$d = 60 + 14$

$d = 49$ cm

The wood needed to build the drum is a rectangle. The width of the rectangle is equal to the height of the drum, 35 cm. The length of the rectangle is equal to the circumference of a circle with a diameter of 60 cm.

$A = \ell w$

$A = (\pi d)w$

$A = (\pi \times 60) \times 35$

$A \approx 6597.3$ cm$^2$

To build the drum, 8601.7 cm$^2$ of hide and 6597.3 cm$^2$ of wood are needed.

If students are interested in learning more about Eastern Eagle, or hearing their music, they can visit this website. www.myspace.com/easterneagle

4. Students may need to see examples of grain stockpile covers to better visualize their shape and solve this question. Although the covers are not usually a perfect cone, have students use a cone to estimate the cover's surface area.

Surface area of the lateral face of a cone:

$\pi rs$ (where $s$ is the slant height)

Use the Pythagorean theorem to calculate the slant height:
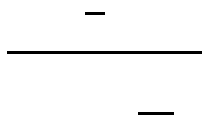
Surface area of the lateral face of a cone:

$SA = \pi rs$

$SA = \pi (48)(53)$

$SA \approx 7992$ m$^2$

7992 m$^2$ of material is needed.

5. a)

The slant height is 3.5 m.

b)

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The lateral surface area is 35 m².

**Extend Your Thinking**

6. a) Surface area of a cube = $6 \times \ell^2$
Use algebraic manipulation; divide both sides by 6 and take the square root to find $\ell$.
$1350 = 6 \times \ell^2$

$\ell = \dfrac{\overline{\phantom{xx}}}{\phantom{xx}}$

$\ell = 15$ cm
The side length of the cube measures 15 cm.
b) Use the surface area, 1350, to solve.
$SA = 4\pi r^2$
$1350 = 4\pi r^2$
$\dfrac{\overline{\phantom{xxxx}}}{\phantom{xxxx}} = r^2$
$107.43 \approx r^2$
$107.43 = r$
$10.36 \approx r$
$d = 2r$
$d = 2(10.36)$
$d \approx 20.7$
The diameter is 20.7 cm.