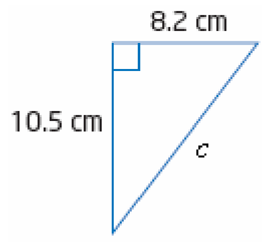
Chapter 8 Review

Chapter 8 Review **Question 1** **Page 470**

a)



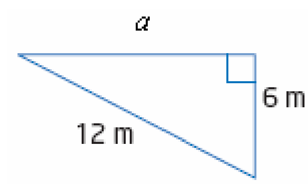
$$c^2 = 8.2^2 + 10.5^2$$
$$c^2 = 67.24 + 110.25$$
$$c^2 = 177.49$$
$$\sqrt{c^2} = \sqrt{177.49}$$
$$c \doteq 13.32$$

$$P = 13.32 + 8.2 + 10.5$$
$$\doteq 32.0$$

$$A = \frac{1}{2}bh$$
$$= \frac{1}{2} \times 8.2 \times 10.5$$
$$\doteq 43.1$$

The perimeter is about 32.0 cm, and the area is about 43.1 cm^2.

b)



$$12^2 = 6^2 + a^2$$
$$144 = 36 + a^2$$
$$144 - 36 = 36 + a^2 - 36$$
$$108 = a^2$$
$$\sqrt{108} = \sqrt{a^2}$$
$$10.39 \doteq a$$

$$P = 10.39 + 12 + 6$$
$$\doteq 28.4$$
$$A = \frac{1}{2} \times 6 \times 10.39$$
$$\doteq 31.2$$

The perimeter is about 28.4 m, and the area is about 31.2 m^2.

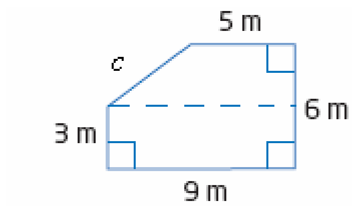
Chapter 8 Review **Question 2** **Page 470**

$$
\begin{aligned}
6^2 &= 2^2 + a^2 \\
36 &= 4 + a^2 \\
36 - 4 &= 4 + a^2 - 4 \\
32 &= a^2 \\
\sqrt{32} &= \sqrt{a^2} \\
5.7 &\doteq a
\end{aligned}
$$

The ladder reaches approximately 5.7 m up the wall.

Chapter 8 Review **Question 3** **Page 470**

a)



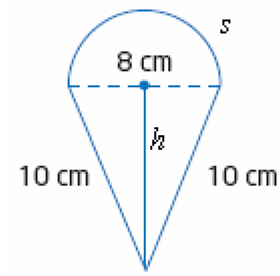
$$
\begin{aligned}
c^2 &= 3^2 + 4^2 \\
c^2 &= 9 + 16 \\
c^2 &= 25 \\
c &= \sqrt{25} \\
c &= 5
\end{aligned}
$$

$$
\begin{aligned}
P &= 5 + 5 + 6 + 9 + 3 \\
&= 28
\end{aligned}
$$

$$
\begin{aligned}
A &= A_{\text{trapezoid}} + A_{\text{rectangle}} \\
&= \frac{1}{2} \times 3 \times (5 + 9) + 3 \times 9 \\
&= 21 + 27 \\
&= 48
\end{aligned}
$$

The perimeter is 28 m, and the area is 48 m^2.

b)



$$
\begin{aligned}
s &= \frac{1}{2}\pi d \\
&= \frac{1}{2}\pi \times 8 \\
&\doteq 12.57
\end{aligned}
$$

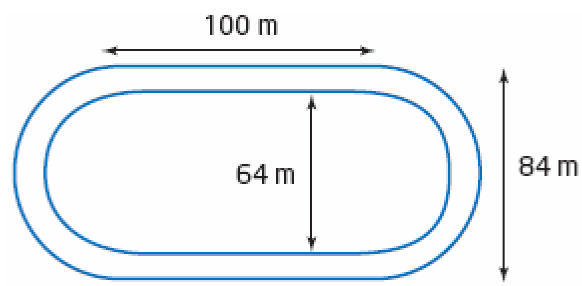
$$
\begin{aligned}
P &= 12.57 + 10 + 10 \\
&\doteq 32.6
\end{aligned}
$$

$$
\begin{aligned}
h^2 + 4^2 &= 10^2 \\
h^2 + 16 &= 100 \\
h^2 &= 100 - 16 \\
h^2 &= 84 \\
h &= \sqrt{84} \\
h &\doteq 9.17
\end{aligned}
$$

$$
\begin{aligned}
A &= A_{\text{triangle}} + A_{\text{semicircle}} \\
&= \frac{1}{2} \times 8 \times 9.17 + \frac{1}{2}\pi \times 4^2 \\
&\doteq 61.8
\end{aligned}
$$

The perimeter is about 32.6 cm, and the area is about 61.8 cm^2.

Chapter 8 Review **Question 4** **Page 470**



a) $d = 100 + 100 + \pi \times 64$
$\doteq 401.1$

Tyler runs about 401.1 m.

b) $d = 100 + 100 + \pi \times 84$
$\doteq 463.9$

Dylan runs about 463.9 m.

c) Dylan runs 463.9 – 401.1, or 62.8 m farther than Tyler.

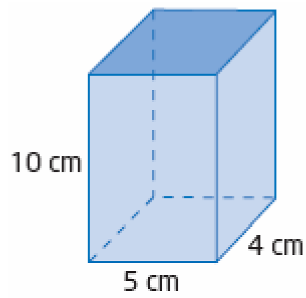
Chapter 8 Review **Question 5** **Page 470**

a) $SA = 2A_{\text{bottom}} + 2A_{\text{sides}} + 2A_{\text{front}}$

$= 2(5 \times 4) + 2(10 \times 4) + 2(10 \times 5)$

$= 40 + 80 + 100$

$= 220$



The surface area is 220 cm^2.

b)

$s^2 = 115^2 + 147^2$

$s^2 = 13\,225 + 21\,609$

$s^2 = 34\,834$

$s = \sqrt{34\,834}$

$s \doteq 186.6$

$SA = A_{\text{base}} + 4A_{\text{triangle}}$

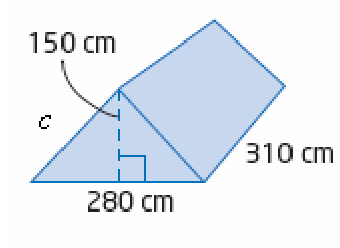
$= 230 \times 230 + 4\left(\frac{1}{2} \times 230 \times 186.6\right)$

$= 52\,900 + 85\,836$

$= 138\,736$

The surface area is about 138 736 m^2.

Chapter 8 Review **Question 6** **Page 471**



a) $V = A_{\text{base}} \times h$

$$= \left(\frac{1}{2} \times 280 \times 150\right) \times 310$$

$$= 6\,510\,000$$

The volume of the tent is 6 510 000 cm^3.

b)

$$c^2 = 140^2 + 150^2$$

$$c^2 = 19\,600 + 22\,500$$

$$c^2 = 42\,100$$

$$c = \sqrt{42\,100}$$

$$c \doteq 205.2$$

$$SA = A_{\text{bottom}} + 2A_{\text{sides}} + 2A_{\text{front}}$$

$$= 280 \times 310 + 2 \times 205.2 \times 310 + 2\left(\frac{1}{2} \times 280 \times 150\right)$$

$$= 86\,800 + 127\,224 + 42\,000$$

$$= 256\,024$$

The amount of nylon required to make the tent is 256 024 cm^2.

c) Answers will vary. A sample answer is shown.

Assume that the side walls of the tent are flat.

d) Answers will vary. A sample answer is shown.

The answer is fairly reasonable. When erecting a tent, you want the side walls to be as flat and stretched as possible.

Chapter 8 Review **Question 7** **Page 471**

500 mL = 500 cm^3

$$V = \pi r^2 h$$

$$500 = \pi \times 4^2 \times h$$

$$500 = 16\pi h$$

$$\frac{500}{16\pi} = \frac{16\pi h}{16\pi}$$

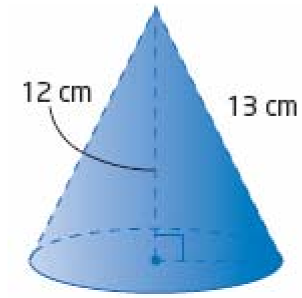
$$\frac{500}{16\pi} = h$$

$$9.9 \doteq h$$

The height of the can is 9.9 cm.

Chapter 8 Review **Question 8** **Page 471**

$$
\begin{aligned}
13^2 &= 12^2 + r^2 \\
169 &= 144 + r^2 \\
25 &= r^2 \\
\sqrt{25} &= r \\
5 &= r
\end{aligned}
$$

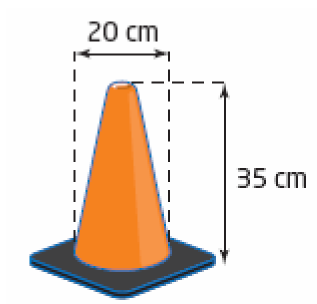


$$
\begin{aligned}
SA &= \pi rs + \pi r^2 \\
&= \pi \times 5 \times 13 + \pi \times 5^2 \\
&\doteq 283
\end{aligned}
$$

The surface area is approximately 283 cm^2.

Chapter 8 Review **Question 9** **Page 471**

$$
\begin{aligned}
s^2 &= 10^2 + 35^2 \\
s^2 &= 100 + 1225 \\
s^2 &= 1325 \\
s &= \sqrt{1325} \\
s &\doteq 36.4
\end{aligned}
$$

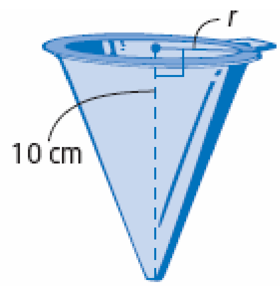


$$
\begin{aligned}
SA &= \pi rs + \pi r^2 \\
&= \pi \times 10 \times 36.4 + \pi \times 10^2 \\
&\doteq 1458
\end{aligned}
$$

The surface area is about 1458 cm^2.

Chapter 8 Review **Question 10** **Page 471**

100 mL = 100 cm^3



$$
\begin{aligned}
V &= \frac{1}{3}\pi r^2 h \\
100 &= \frac{1}{3}\pi r^2 (10) \\
100 &= \frac{10\pi}{3} r^2 \\
\frac{3}{10\pi} \times 100 &= \frac{3}{10\pi} \times \frac{10}{3}\pi r^2 \\
\frac{300}{10\pi} &= r^2 \\
\sqrt{\frac{300}{10\pi}} &= r \\
3.1 &\doteq r
\end{aligned}
$$

The radius is approximately 3.1 cm.

Chapter 8 Review **Question 11** **Page 471**

$$
\begin{aligned}
V &= \frac{1}{3}\pi r^2 h \\
&= \frac{1}{3}\pi \times 8^2 \times 10 \\
&\doteq 670
\end{aligned}
$$

The volume of the cone is approximately 670 cm^3. The volume of the cone is $\frac{1}{3}$ of the volume of the cylinder.

Chapter 8 Review **Question 12** **Page 471**

$$
\begin{aligned}
SA &= 4\pi r^2 \\
&= 4\pi \times 10.9^2 \\
&\doteq 1493.0
\end{aligned}
$$

The amount of leather required to cover the volleyball is approximately 1493.0 cm^2.

Chapter 8 Review **Question 13** **Page 471**

a) $$\begin{aligned} SA &= \frac{1}{2}\left(4\pi r^2\right) \\ &= \frac{1}{2}\times 4\pi \times 6400^2 \\ &\doteq 257\ 359\ 270 \end{aligned}$$

The area of the Northern Hemisphere is approximately 257 359 270 km^2.

b) Answers will vary. A sample answer is shown.

Assume that the Earth is a sphere.

c) The fraction of the Northern Hemisphere that Canada covers is $\frac{9\ 970\ 610}{257\ 359\ 270}$, or about 0.04. This is about $\frac{1}{25}$ of the Northern Hemisphere.

Chapter 8 Review **Question 14** **Page 471**

$$\begin{aligned} V &= \frac{4}{3}\pi r^3 \\ &= \frac{4}{3}\pi \times 11.15^3 \\ &\doteq 5806.5 \end{aligned}$$

The volume of the soccer ball is approximately 5806.5 cm^3.

Chapter 8 Review **Question 15 Page 471**

a) Answers will vary. A possible estimate is 5200 cm^3.

b)
$$
\begin{aligned}
V_{\text{emptyspace}} &= V_{\text{box}} - V_{\text{ball}} \\
&= 22.3^3 - 5806.5 \\
&= 5283.07
\end{aligned}
$$

c) Answers will vary. The estimate in part a) was close to the correct answer.

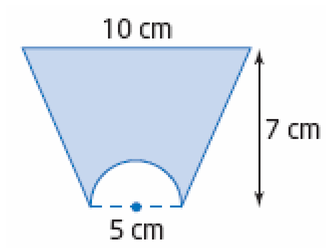
Chapter 8 Chapter Test

Chapter 8 Chapter Test Question 1 Page 472

$$
\begin{aligned}
V &= \frac{4}{3}\pi r^3 \\
&= \frac{4}{3}\pi \times 3^3 \\
&\doteq 113
\end{aligned}
$$

The volume of the sphere is approximately 113 cm^3. Answer C.

Chapter 8 Chapter Test Question 2 Page 472



$$
\begin{aligned}
A &= A_{\text{trapezoid}} - A_{\text{semicircle}} \\
&= \frac{1}{2} \times 7 \times (10 + 5) - \frac{1}{2}\pi \times 2.5^2 \\
&\doteq 43
\end{aligned}
$$

The area of the figure is approximately 43 cm^2. Answer A.

Chapter 8 Chapter Test Question 3 Page 472

$$
\begin{aligned}
V &= \pi r^2 h \\
&= \pi \times 3.75^2 \times 1.4 \\
&\doteq 61.850
\end{aligned}
$$

The volume of the water is approximately 61.850 m^3,
or 61 850 L. Answer A.

Chapter 8 Chapter Test Question 4 Page 472

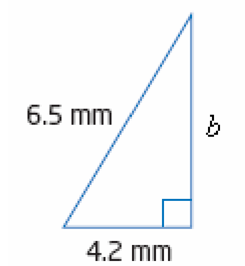
$$
\begin{aligned}
s^2 &= 15^2 + 15^2 \\
s^2 &= 225 + 225 \\
s^2 &= 450 \\
s &= \sqrt{450} \\
s &\doteq 21.2
\end{aligned}
$$

$$
\begin{aligned}
\textit{Lateral Area} &= \pi r s \\
&= \pi \times 15 \times 21.2 \\
&\doteq 999
\end{aligned}
$$

The amount of plastic sheeting required is approximately 999 m^2. Answer D.

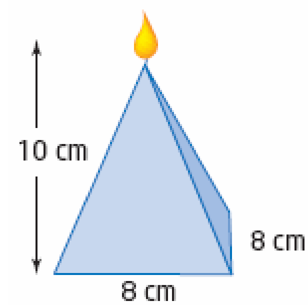
Chapter 8 Chapter Test Question 5 Page 472

$$6.5^2 = 4.2^2 + b^2$$
$$42.25 = 17.64 + b^2$$
$$24.61 = b^2$$
$$\sqrt{24.61} = b$$
$$5.0 \doteq b$$



The length of the unknown side is approximately 5.0 mm. Answer B.

Chapter 8 Chapter Test Question 6 Page 472



a) $V = \frac{1}{3}A_{\text{base}} \times h$

$$= \frac{1}{3} \times 8^2 \times 10$$
$$\doteq 213$$

The amount of wax required is approximately 213 cm^3.

b)

$$s^2 = 4^2 + 10^2$$
$$s^2 = 16 + 100$$
$$s^2 = 116$$
$$s = \sqrt{116}$$
$$s \doteq 10.77$$
$$SA = A_{\text{base}} + 4A_{\text{triangle}}$$
$$= 8 \times 8 + 4\left(\frac{1}{2} \times 8 \times 10.77\right)$$
$$= 64 + 172.32$$
$$\doteq 236.3$$

The area of plastic wrap needed is about 236.3 cm^2, assuming no overlap.

Chapter 8 Chapter Test Question 7 Page 472

Answers will vary. A sample answer is shown.

Assume that the paper towels are stacked in three columns with two rolls in each column. Then, the dimensions of the carton would be 10 cm by 30 cm by 56 cm.

$$\begin{aligned} SA &= 2A_{\text{bottom}} + 2A_{\text{sides}} + 2A_{\text{front}} \\ &= 2(10 \times 30) + 2(56 \times 30) + 2(10 \times 56) \\ &= 600 + 3360 + 1120 \\ &= 5080 \end{aligned}$$

The area of cardboard needed is 5080 cm^2.

Chapter 8 Chapter Test Question 8 Page 472

Doubling the radius of a sphere will increase the volume eight times. Doubling the radius of a cylinder will quadruple the volume.

Sphere:

$$\begin{aligned} V &= \frac{4}{3}\pi r^3 \\ &= \frac{4}{3}\pi \times 1^3 \\ &= \frac{4}{3}\pi \end{aligned}$$

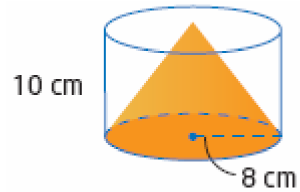
$$\begin{aligned} V &= \frac{4}{3}\pi r^3 \\ &= \frac{4}{3}\pi \times 2^3 \\ &= 8 \times \frac{4}{3}\pi \end{aligned}$$

Cylinder:

$$\begin{aligned} V &= \pi r^2 h \\ &= \pi \times 1^2 \times 1 \\ &= \pi \end{aligned}$$

$$\begin{aligned} V &= \pi r^2 h \\ &= \pi \times 2^2 \times 1 \\ &= 4\pi \end{aligned}$$

Chapter 8 Chapter Test Question 9 Page 472

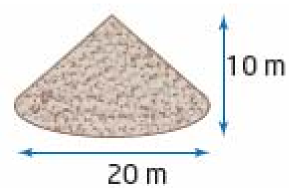


$$
\begin{aligned}
s^2 &= 8^2 + 10^2 \\
s^2 &= 64 + 100 \\
s^2 &= 164 \\
s &= \sqrt{164} \\
s &\doteq 12.8
\end{aligned}
$$

$$
\begin{aligned}
SA &= \pi rs + \pi r^2 \\
&= \pi \times 8 \times 12.8 + \pi \times 8^2 \\
&\doteq 523
\end{aligned}
$$

The surface area of the cone is about 523 cm^2.

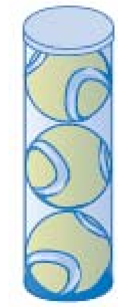
Chapter 8 Chapter Test Question 10 Page 472



$$
\begin{aligned}
V &= \frac{1}{3}\pi r^2 h \\
&= \frac{1}{3}\pi \times 10^2 \times 10 \\
&\doteq 1047
\end{aligned}
$$

The volume of the pile is approximately 1047 m^3.

Chapter 8 Chapter Test　　Question 11　Page 473



a) $V = \pi r^2 h$

$= \pi \times 4.2^2 \times 25.2$

$\doteq 1396.5$

The volume of the can is approximately 1396.5 cm^3.

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

$= 2\pi \times 4.2^2 + 2\pi \times 4.2 \times 25.2$

$\doteq 776$

The amount of aluminum required to make the can is approximately 776 cm^2.

c) $A = \pi r^2$

$= \pi \times 4.2^2$

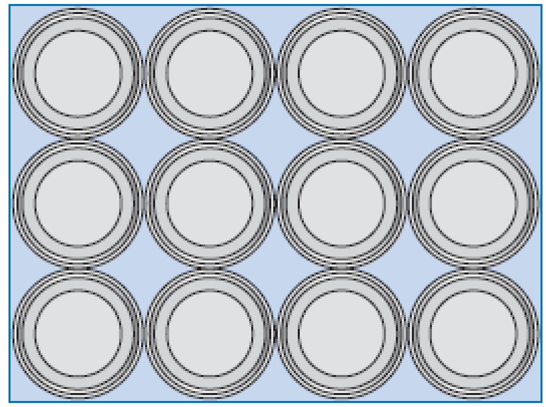
$\doteq 55$

The amount of plastic required for the lid is approximately 55 cm^2.

d) Answers will vary. A sample answer is shown.

Assume that the circular lid covers the top of the cylindrical can with no side parts.

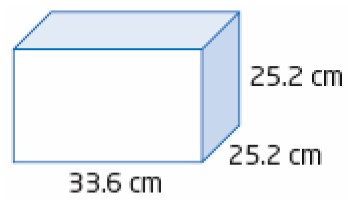
Chapter 8 Chapter Test Question 12 Page 473



a) $$\begin{aligned} V_{\text{emptyspace}} &= V_{\text{can}} - V_{\text{balls}} \\ &= 1396.5 - 3\left(\frac{4}{3}\pi \times 4.2^3\right) \\ &\doteq 465.5 \end{aligned}$$

The empty space in each can is approximately 465.5 cm^3.

b)



c) $$\begin{aligned} V_{\text{emptyspace}} &= V_{\text{box}} - V_{\text{cans}} + V_{\text{empty space in cans}} \\ &= 25.2 \times 25.2 \times 33.6 - 12(1396.5) + 12(465.5) \\ &\doteq 10\,165.3 \end{aligned}$$

The total empty space is about 10 165.3 cm^3.

d) $$\begin{aligned} SA &= 4(33.6 \times 25.2) + 2(25.2 \times 25.2) \\ &\doteq 4657 \end{aligned}$$

The area of cardboard needed to make the box is about 4657 cm^2.