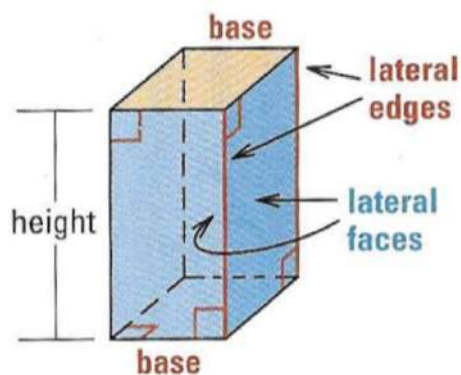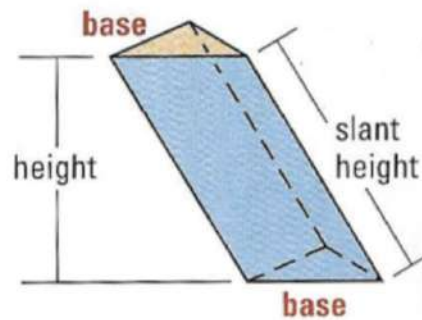Prism - A solid geometric figure whose two end faces are similar, equal, and parallel retilinear figures, and whose sides are parallelograms.

Bases - Congruent parallel polygons

Lateral Faces - Parallelograms that make up the sides

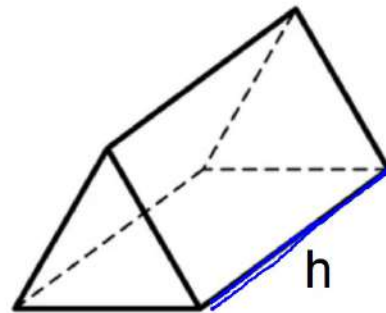Right rectangular prism
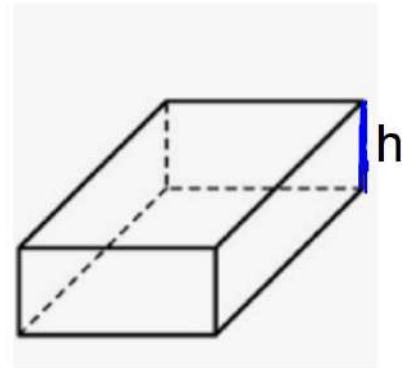
Oblique triangular prism
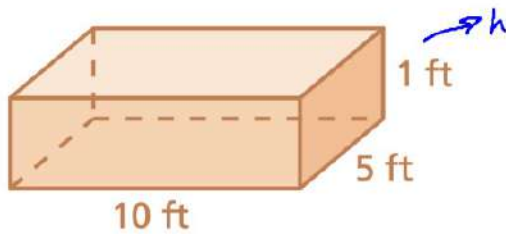
Surface Area of a Right Prism

$S = 2B + Ph$

B = Area of the base

P = Perimeter of the base

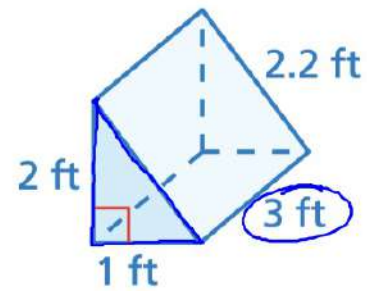h = height of the prism

Find the surface area for each prism.

10 ft · 5 ft · 1 ft (rectangular prism, h labeled)

2 ft · 2.2 ft · 3 ft · 1 ft (triangular prism)

$S = 2B + Ph$

$B = (10)(5)$
$\quad = 50$

$P = 2(10) + 2(5)$
$\quad = 30$

$S = 2(50) + (30)(1)$
$\quad = 100 + 30$
$\quad = 130 \ ft^2$

$S = 2B + Ph$

$B = \frac{1}{2}bh$
$\quad = \frac{1}{2}(1)(2)$
$\quad = 1$

$P = 1 + 2 + 2.2$
$\quad = 5.2$

$S = 2(1) + (5.2)(3)$
$\quad 2 + 15.6$
$\quad 17.6 \ ft^2$

Find the surface area for each prism

3 cm
9 cm
6 cm
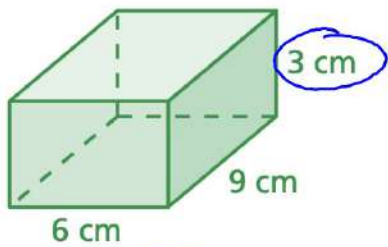
$S = 2B + Ph$

$B = (6)(9)$

$\quad = 54$

$P = 2(6) + 2(9)$

$\quad = 30$

$S = 2(54) + (30)(3)$

$\quad = 108 + 90$

$\quad = 198 \, cm^2$

5 m
5 m
4 m
7 m
6 m
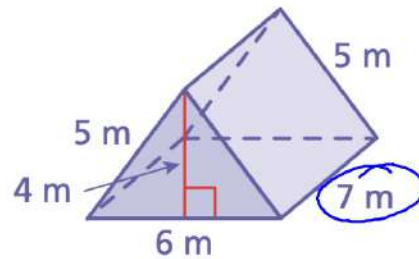
$S = 2B + Ph$

$B = \frac{1}{2}bh$

$\quad = \frac{1}{2}(6)(4)$

$\quad = 12$

$P = 6 + 5 + 5$

$\quad = 16$

$S = 2(12) + 16(7)$

$\quad 24 + 112$

$\quad 136 \, m^2$

Find the surface area for each prism

5 yd
4 yd
2 yd

5.7 mm
3 mm
4 mm
4 mm

Find the surface area for each prism

b_2
12 in.   4 in. L

3 in.

5 in.   5 in.

6 in.
b_1

2 m   2.5 m

4 m   4 m
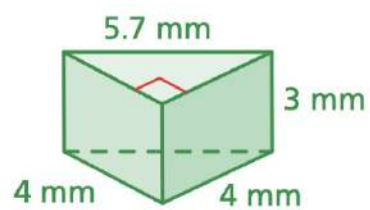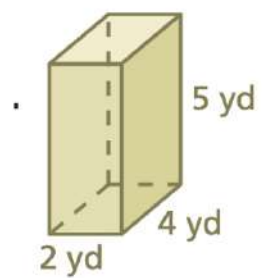
4 m
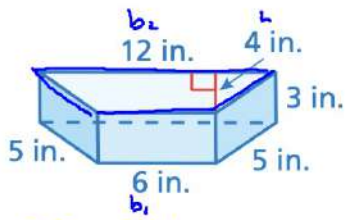
$S = 2B + Ph$

$B = \frac{1}{2}(b_1 + b_2)h$

$\quad = \frac{1}{2}(6+12)4$

$\quad = 36$

$P = 6 + 12 + 5 + 5$

$\quad = 28$

$S = 2(36) + 28(3)$

$\quad 156 \ in.^2$
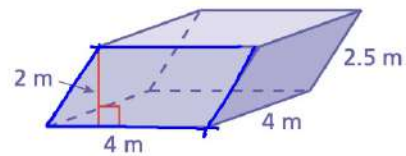
$S = 2B + Ph$

$B = (4)(2)$

$\quad = 8$

$P = 2(4 + 2.5)$

$\quad = 13$

$S = 2(8) + (13)(4)$

$\quad = 68 \ m^2$

$25\frac{1}{12}$ ft

5 ft

25 in.

25 ft
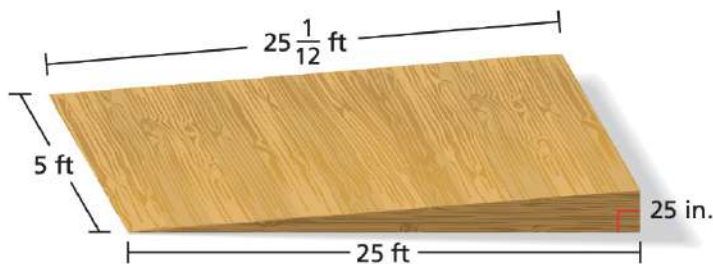
21. **RAMP** A quart of stain covers 100 square feet. How many quarts should you buy to stain the wheelchair ramp? (Assume you do not have to stain the bottom of the ramp.)

$$S = 2B + top + Back$$

$$B = \tfrac{1}{2}bh$$
$$= \tfrac{1}{2}(25)(2.08)$$
$$= 26$$

top
$$A = (5)(25\tfrac{1}{12})$$
$$= 125.42$$

Back
$$A = (5)(2.08)$$
$$= 10.4$$

$$2(26) + 125.42 + 10.4$$
$$187.82 \ ft^2$$
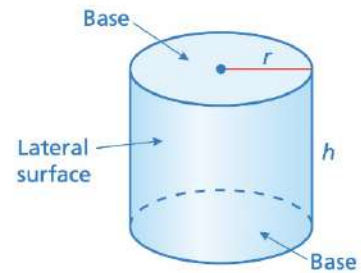
2 quarts are needed

Surface area of a Cylinder -

$$S = 2B + Ph$$

Since the base is always a circle

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

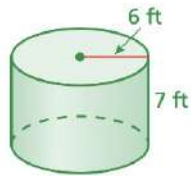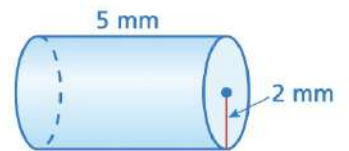# Find the surface area for each cylinder.

5 mm

2 mm

6 ft

7 ft

5 mm

2 mm
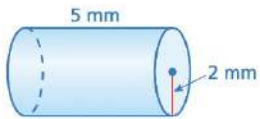
$S = 2\pi r^2 + 2\pi rh$

$2\pi(2)^2 + 2\pi(2)(5)$

$8\pi + 20\pi$

$28\pi \text{ mm}^2$

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

$= 2\pi(6)^2 + 2\pi(6)(7)$

$72\pi + 84\pi$

$156\pi \text{ ft}^2$

The volume of a prism is the product of the area of the base and the height of the prism.
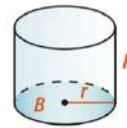
$V = Bh$
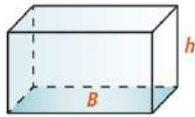
The volume of a cylinder is the product of the area of the base and the height of the cylinder.

$V = Bh$

$V = \pi r^2 h$

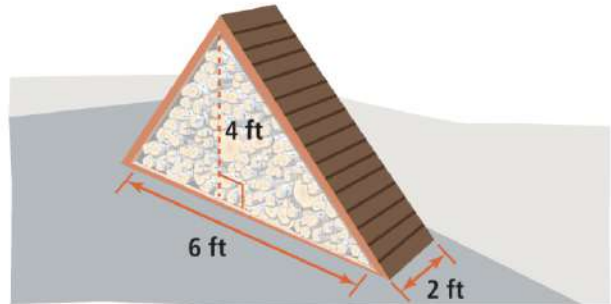**A. Lonzell needs to store 20 ft^3 of firewood. Could he use the storage rack shown?**

SOLUTION

$V = BH$

$B = \frac{1}{2}bh$

$\quad = \frac{1}{2}(6)(4)$

$\quad = 12$

$V = (12)(2)$

$\quad = 24 \text{ ft}^3$

Yes, he could use the Storage Rack

B. Keisha is deciding between the two canisters shown. Which canister holds more? What is the volume of the larger canister?

This canister is an *oblique cylinder*. An **oblique cylinder** is a cylinder such that the segment joining the centers of the bases is not perpendicular to the planes of the bases.
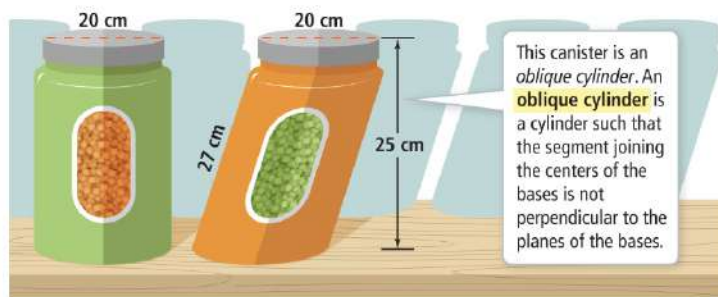
$V = \pi r^2 H$

$\pi (10)^2 (25)$

$2500 \pi \ cm^2$

$V = \pi r^2 H$

$= \pi (10)^2 (25)$

$= 2500 \pi \ cm^2$

Marta is repurposing a sandbox as a garden and is buying the soil from her school's fundraiser. Estimate the number of bags she should buy.

48
4 ft
48
4 ft
10 in.
10 in.
Soil
18 in.
Soil
5 in.
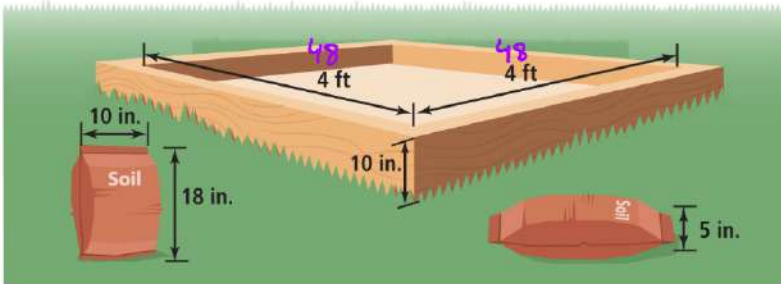
$$V_{Garden} = B\,H$$
$$= (48)(48)(10)$$
$$= 23{,}040 \text{ in}^3$$

$$V_{Bag} = B\,H$$
$$= (10)(18)(5)$$
$$= 900 \text{ in}^3$$

$$\frac{23{,}040}{900} = 25.6 \text{ bags}$$

$$\approx 26 \text{ bags}$$

3. Kathryn is using cans of juice to fill a cylindrical pitcher that is 11 in. tall and has a radius of 4 in. Each can of juice is 6 in. tall with a radius of 2 in. How many cans of juice will Kathryn need?

$$V_{pitcher} = \pi r^2 H$$
$$= \pi (4)^2 (11)$$
$$= 176\pi \text{ in}^3$$

$$V_{can} = \pi r^2 H$$
$$= \pi (2)^2 (6)$$
$$= 24\pi \text{ in}^3$$

$$\frac{176\pi}{24\pi} = 7.3$$
$$\approx 7 \text{ cans}$$

Benito has 15 neon tetras in his aquarium. Each neon tetra requires at least 2 gallons of water. What is the maximum number of neon tetras that Benito should have in his aquarium? (Hint: 1 gal = 231 in.^{3})

32 in.

16 in.
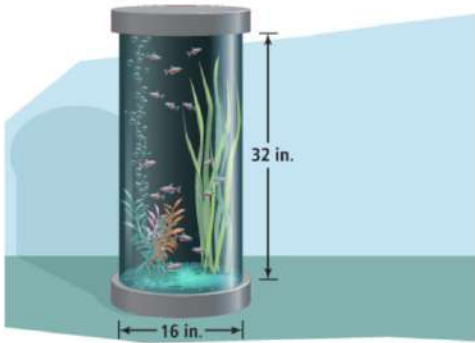
$V = \pi r^2 H$

$\pi (8)^2 (32)$

$= 2048\pi \ in^3$

$\approx \dfrac{6433.98 \ in^3}{231} = \dfrac{28 \ gal}{2} = 14 \ neon \ tetras$

4. Benito has 15 neon tetras in his aquarium. Each neon tetra requires at least 2 gallons of water. He is considering the aquarium shown. What is the maximum number of neon tetras that this aquarium can hold?

Enter your answer.

16 in.

12 in.

24 in.

$$V = (24)(12)(16) = \frac{4608}{231} = \frac{20}{2}$$

$$= 10$$