Homework
Textbook pages 359 & 360:
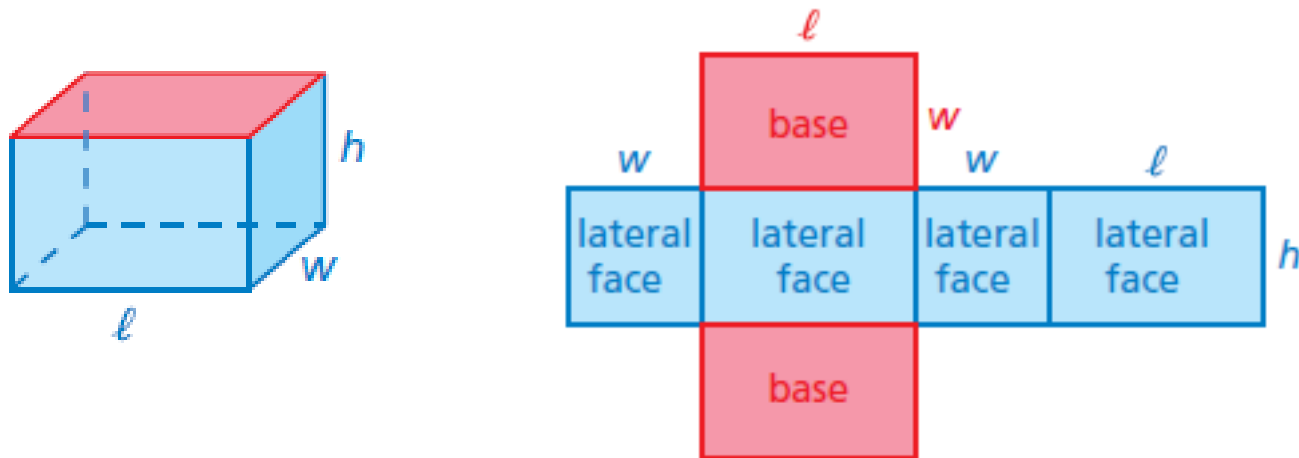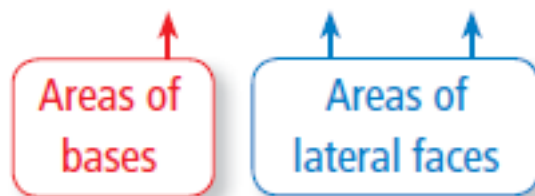## 1-3, 7-15 odd, 16, 17, 19

Surface Area of Prisms
9.1

Surface Area of a Rectangular Prism

Words The surface area S of a rectangular prism is the sum of the areas of the bases and the lateral faces.
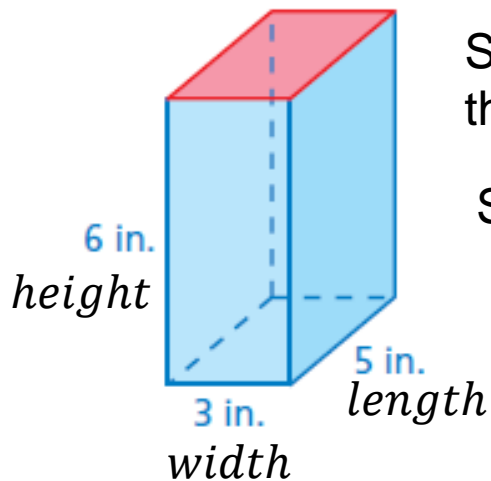

Algebra $S = 2\ell w + 2\ell h + 2wh$

Areas of bases → $2\ell w$

Areas of lateral faces → $2\ell h + 2wh$

EXAMPLE 1 **Finding the Surface Area of a Rectangular Prism**

Find the surface area of the prism.

Step 1: Label the $length\ (l), width\ (w), and\ height\ (h)$ of the the prism.
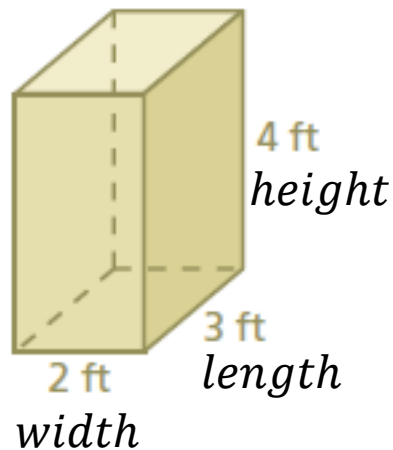
Step 2: Substitute values into formula.

6 in.
height

5 in.
length

3 in.
width

$$S = 2\,\ell w + 2\ell h + 2wh$$

$$= 2(5)(3) + 2(5)(6) + 2(3)(6)$$

$$= 30 + 60 + 36$$

$$= 126$$

The surface area is 126 square inches.

● On Your Own

Find the surface area of the prism. $S = 2\ell w + 2\ell h + 2wh$

1.

4 ft
height

3 ft
length

2 ft
width

2.

5 m
height

8 m
length

8 m
width

$S = 2(3)(2) + 2(3)(4) + 2(2)(4)$

$= 12 + 24 + 16$

$= 52\ ft^2$
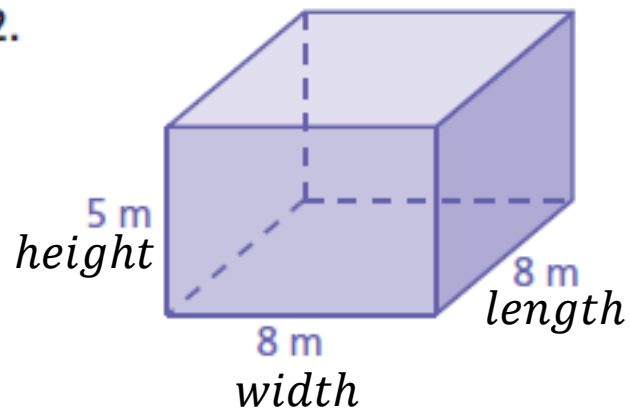
$S = 2(8)(8) + 2(8)(5) + 2(8)(5)$

$= 128 + 80 + 80$

$= 288\ m^2$

![Key Idea](key icon) **Key Idea**
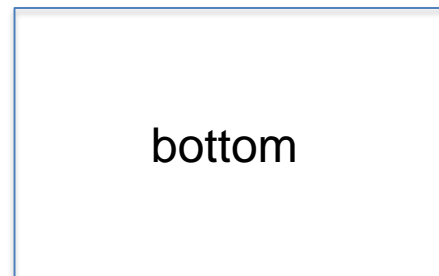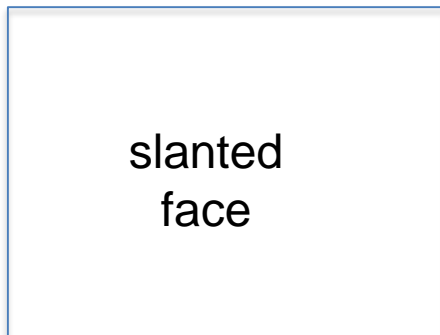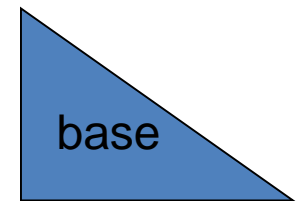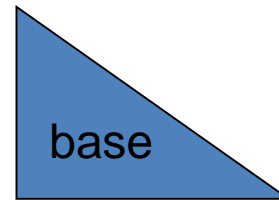
Surface Area of a Prism

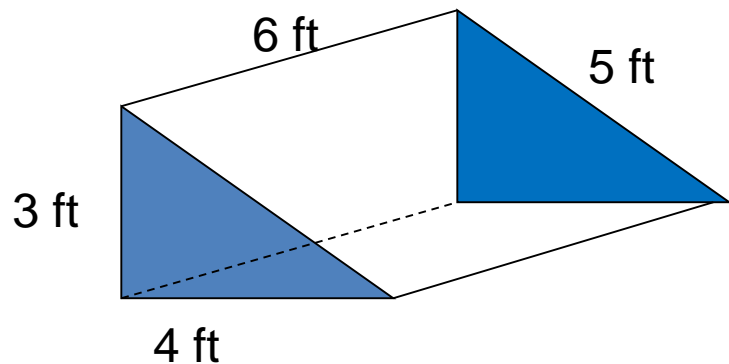The surface area S of any prism is the sum of the areas of the bases and the lateral faces.
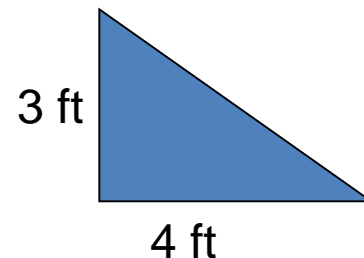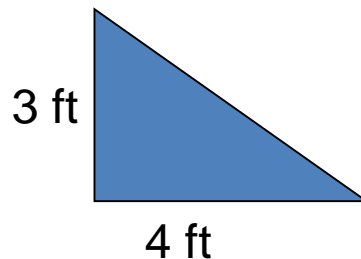
S = areas of bases + areas of lateral faces
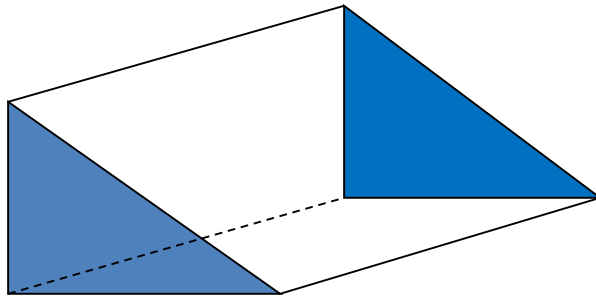
A triangular prism has 5 faces.

- Two triangular bases
- Three rectangular sides

base

base

slanted face

bottom

back

EXAMPLE 2 **Finding the Surface Area of a Triangular Prism**

Find the surface area of the prism.

$Triangle: \quad A = \dfrac{1}{2}bh$

6 ft

5 ft

3 ft

3 ft

3 ft

4 ft

4 ft

4 ft

$Rectangle: \quad A = lw$

$A = \dfrac{1}{2}(4)(3) = 6 \times 2 = 12\ ft^2$

6 ft

6 ft

6 ft

slanted face

5 ft   4 ft

bottom

3 ft

back
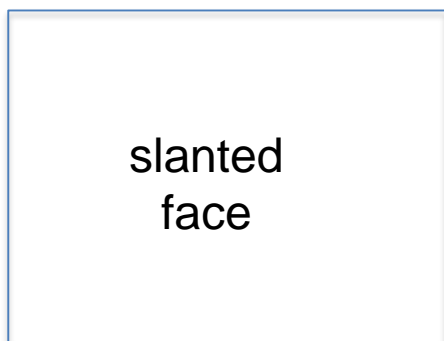
$A = (6)(5) = 30\ ft^2$

$A = (6)(4) = 24\ ft^2$
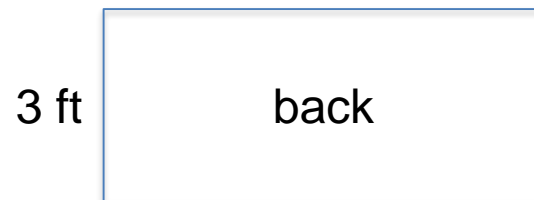
$A = (6)(3) = 18\ ft^2$

EXAMPLE **2** **Finding the Surface Area of a Triangular Prism**
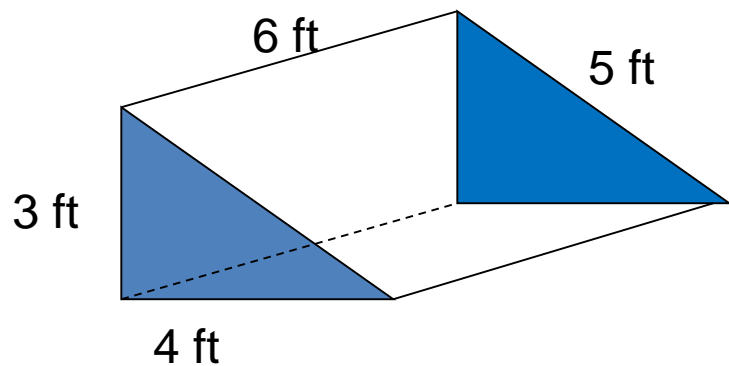
Find the surface area of the prism.

6 ft

5 ft

3 ft

4 ft

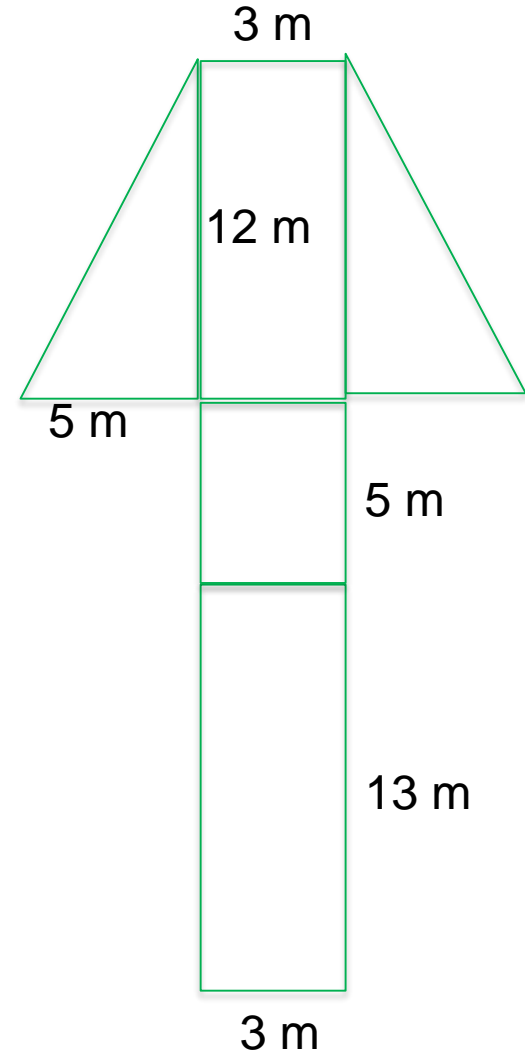$S = 12 + 30 + 24 + 18 = 84\ ft^2$

Find the surface area of the prism.

3.

$$A = \frac{1}{2}(12)(5) = 30 \times 2 = 60 \ ft^2$$

$$A = (12)(3) = 36 \ ft^2$$
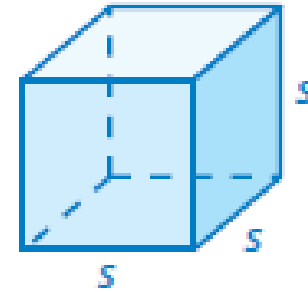
$$A = (5)(3) = 15 \ ft^2$$

$$A = (13)(3) = 39 \ ft^2$$

$$S = 60 + 36 + 15 + 39 = 150 \ ft^2$$

When all the edges of a rectangular prism have the same length s, the rectangular prism is a cube. The formula for the surface area of a cube is $S = 6s^2$

EXAMPLE **3** **Finding the Surface Area of a Cube**

Find the surface area of the cube.

12 m

12 m

12 m
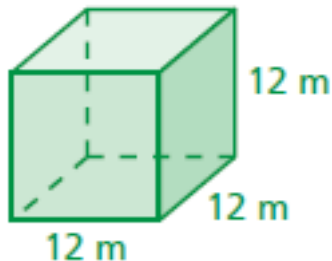
$S = 6s^2$ Write formula for surface area of a cube.

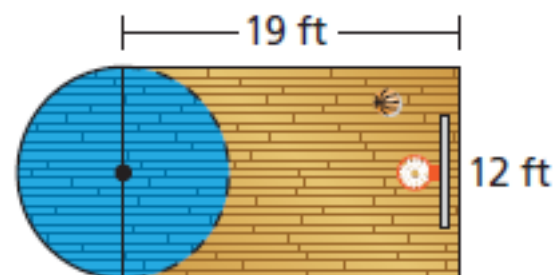$= 6(12)^2$ Substitute 12 for s.

$= 864$ Simplify.

The surface area of the cube is 864 square meters.

EXAMPLE 2 Finding an Area

Find the area of the portion of the basketball court shown.

The figure is made up of a rectangle and a semicircle. Find the area of each figure.

19 ft

12 ft

Area of Rectangle

$A = \ell w$

EXAMPLE 2 **Finding an Area**

Find the area of the portion of the basketball court shown.

The figure is made up of a rectangle and a semicircle. Find the area of each figure.

19 ft

12 ft

Area of Rectangle

$$A = \ell w$$

$$= 19(12)$$

EXAMPLE **2** **Finding an Area**

Find the area of the portion of the basketball court shown.

The figure is made up of a rectangle and a semicircle. Find the area of each figure.

Area of Rectangle

$$A = \ell w$$

$$= 19(12)$$

$$= 228$$

EXAMPLE **2** **Finding an Area**

Find the area of the portion of the basketball court shown.

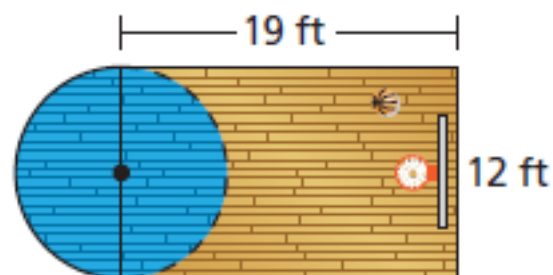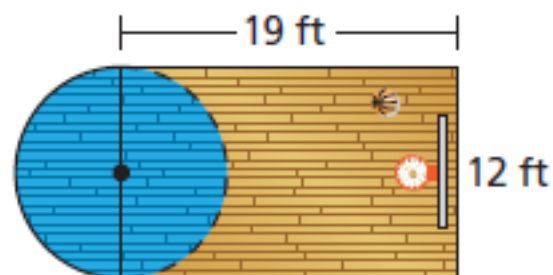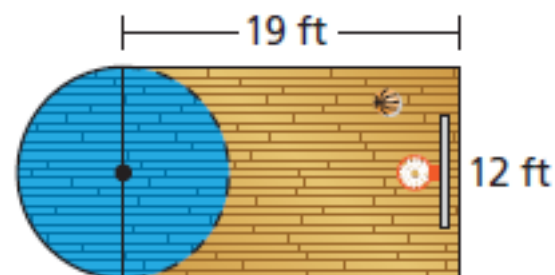The figure is made up of a rectangle and a semicircle. Find the area of each figure.
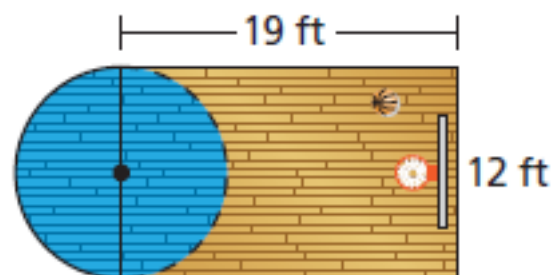
Area of Rectangle

$$A = \ell w$$

$$= 19(12)$$

$$= 228$$

Area of Semicircle

$$A = \frac{\pi r^2}{2}$$

EXAMPLE 2 **Finding an Area**

Find the area of the portion of the basketball court shown.

19 ft

12 ft

The figure is made up of a rectangle and a semicircle. Find the area of each figure.

Area of Rectangle

$$A = \ell w$$

$$= 19(12)$$

$$= 228$$

Area of Semicircle

$$A = \frac{\pi r^2}{2}$$

$$\approx \frac{3.14 \cdot 6^2}{2}$$

The semicircle has a radius of $\frac{12}{2} = 6$ feet.

EXAMPLE **2** **Finding an Area**

Find the area of the portion of the basketball court shown.

The figure is made up of a rectangle and a semicircle. Find the area of each figure.

Area of Rectangle

$$A = \ell w$$

$$= 19(12)$$

$$= 228$$

Area of Semicircle

$$A = \frac{\pi r^2}{2}$$

$$\approx \frac{3.14 \cdot 6^2}{2}$$

$$= 56.52$$

The semicircle has a radius of $\frac{12}{2} = 6$ feet.

EXAMPLE 2 **Finding an Area**

Find the area of the portion of the basketball court shown.

The figure is made up of a rectangle and a semicircle. Find the area of each figure.

19 ft

12 ft

Area of Rectangle

$$A = \ell w$$

$$= 19(12)$$

$$= 228$$

Area of Semicircle

$$A = \frac{\pi r^2}{2}$$

$$\approx \frac{3.14 \cdot 6^2}{2}$$

$$= 56.52$$

> The semicircle has a radius of $\frac{12}{2} = 6$ feet.

So, the area is about $228 + 56.52 = 284.52$ square feet.

Find the area of the figure.

The figure is made up of a triangle, a rectangle, and a parallelogram.
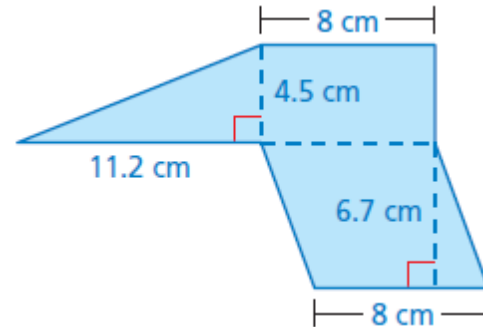Find the area of each figure.

Area of Triangle

$$A = \frac{1}{2}(11.2)(4.5)$$

$$= 25.2$$

Area of Rectangle

$$A = 8(4.5)$$

$$= 36$$

Area of Parallelogram

$$A = 8(6.7)$$

$$= 53.6$$

So, the area is 25.2 + 36 + 53.6 = 114.8 square centimeters.