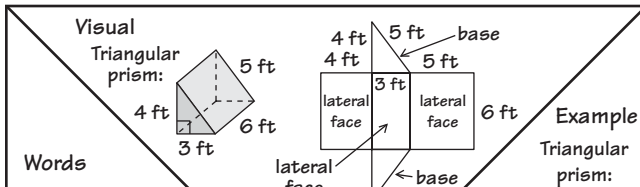


Chapter 9 Surface Area and Volume

Information Frame

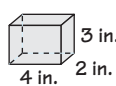
1–5. Sample answers are given.

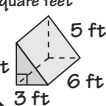
1.

Visual


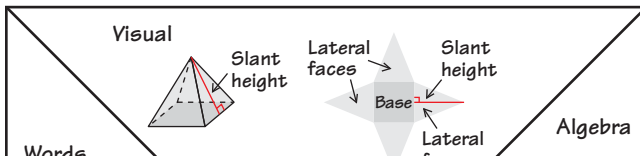
Words
 The surface area S of a prism is the sum of the areas of the bases and lateral faces.

Surface areas of prisms

Example
 Rectangular prism:

 $S = 2lw + 2lh + 2wh$
 $= 2(4)(2) + 2(4)(3) + 2(2)(3)$
 $= 16 + 24 + 12$
 $= 52$ square inches

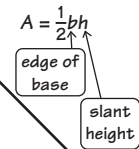
Example
 Triangular prism:

 $S = 2(\frac{1}{2} \cdot 3 \cdot 4) + 3 \cdot 6$
 $+ 5 \cdot 6 + 4 \cdot 6$
 $= 12 + 18 + 30 + 24$
 $= 84$ square feet

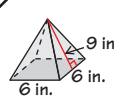
2.

Visual


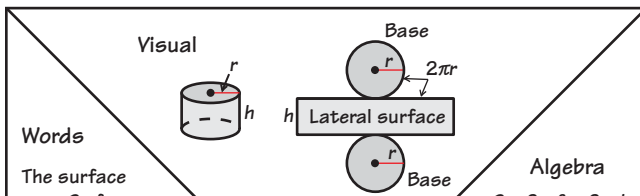
Words
 The surface area S of a pyramid is the sum of the areas of the base and lateral faces, which are triangles.

Surface areas of pyramids

Algebra
 $S = \text{area of base} + \text{areas of lateral faces}$
 area of a lateral face (triangle):
 $A = \frac{1}{2}bh$


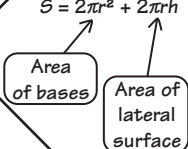
Example

 $S = 6^2 + 4(\frac{1}{2} \cdot 6 \cdot 9)$
 $= 36 + 4 \cdot 27$
 $= 36 + 108$
 $= 144$ square inches

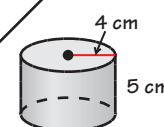
3.

Visual


Words
 The surface area S of a cylinder is the sum of the areas of the bases and the lateral surface.

Surface areas of cylinders

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


Example

 $S = 2\pi r^2 + 2\pi rh$
 $= 2\pi(4)^2 + 2\pi(4)(5)$
 $= 32\pi + 40\pi$
 $= 72\pi$
 ≈ 226.08 square centimeters

Chapter 9 (continued)

4.

Visual

Words

The volume V of a rectangular prism is the product of the area of the base and the height of the prism.

Volumes of prisms

Algebra

$V = Bh$

Area of base Height of prism

Example

5 in.
4 in.
3 in.

$$\begin{aligned}
 V &= Bh \\
 &= 3(4) \cdot 5 \\
 &= 12 \cdot 5 \\
 &= 60 \text{ cubic inches}
 \end{aligned}$$

5.

Visual

Words

The volume V of a pyramid is one-third the product of the area of the base and the height of the pyramid.

Volumes of pyramids

Algebra

$V = \frac{1}{3}Bh$

Area of base Height of pyramid

Example

9 m
4 m 5 m

$$\begin{aligned}
 V &= \frac{1}{3}Bh \\
 &= \frac{1}{3} \cdot (4)(5) \cdot 9 \\
 &= \frac{1}{3} \cdot 20 \cdot 9 \\
 &= 60 \text{ cubic meters}
 \end{aligned}$$