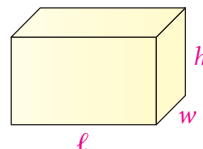


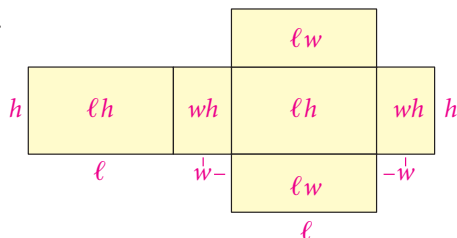
You can develop formulas for the surface area of prisms and cylinders using what you know about the areas of geometric shapes. Making a net of a figure can help. A net is a two-dimensional figure that you could fold to make a three-dimensional figure.

## 1 EXAMPLE

The figure at the right is a rectangular prism. Write a formula for the surface area of a rectangular prism.



Draw a net.



Add the areas of the six rectangles that form the net. The sum of the areas of all six faces of the net will give you the surface area  $SA$  of the prism.

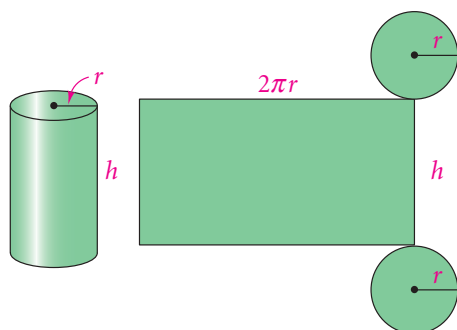
$$\begin{aligned} SA &= lw + lw + lh + lh + hw + hw \\ &= 2lw + 2lh + 2hw \quad \text{Combine like terms.} \\ &= 2(lw + lh + hw) \quad \text{Use the Distributive Property.} \end{aligned}$$

The formula for the surface area is  $SA = 2(lw + lh + hw)$ .

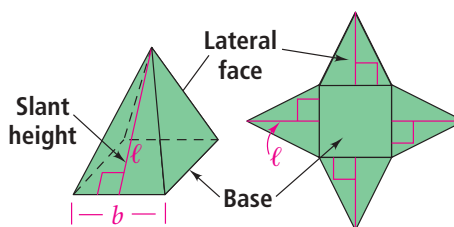
## EXERCISES

Use the net for each figure. Write a formula for the surface area of each figure.

1. cylinder



2. square pyramid



Use the formula in Example 1 and the formulas you wrote in Exercises 1 and 2 to find the surface area of each figure.

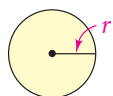
3. rectangular prism with  $l = 8$  in.,  $w = 5$  in., and  $h = 10$  in.
4. cylinder with  $r = 3$  ft and  $h = 10$  ft
5. cylinder with  $r = 8$  cm and  $h = 100$  cm

6. square pyramid with  $b = 12$  mm and  $\ell = 10$  mm
7. square pyramid with  $b = 100$  m and  $\ell = 90$  m
8. Write a formula for the surface area of a cube with edges of length  $s$ .

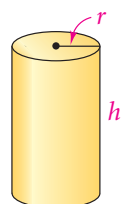
In general, the formula for the volumes of rectangular prisms and cylinders is area of base  $\times$  height. You make the formula more specific by including the formula for the area of the base in the formula for the volume.

## 2 EXAMPLE

Write a formula for the volume of a cylinder.

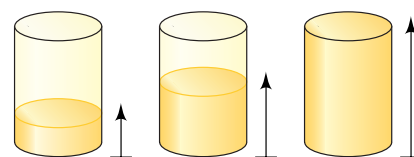


The base is a circle.  
The area of a circle is  $\pi r^2$ .



The height of a cylinder takes into account “filling” the cylinder. So the volume of a cylinder is the area of the base times the height.

●  $V = \pi r^2 h$



## EXERCISES

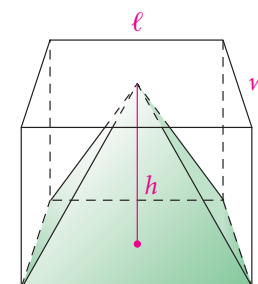
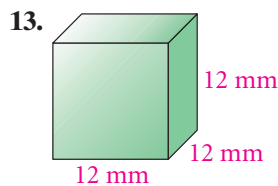
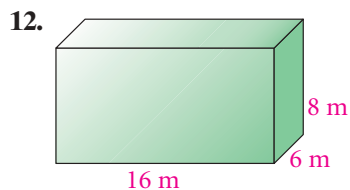
9. A rectangular prism is shown at the right. Write a formula for the volume of a rectangular prism.



Find the volume of each figure.

10. rectangular prism with  $\ell = 8$  in.,  $w = 5$  in., and  $h = 10$  in.

11. cylinder with  $r = 3$  ft and  $h = 10$  ft



14. a. The volume of a pyramid is  $\frac{1}{3}$  the volume of a rectangular prism with the same base and height. Write a formula for the volume of a pyramid.  
b. Use your formula to find the volume of a rectangular pyramid with base length 7 cm, width 12 cm, and height 10 cm.