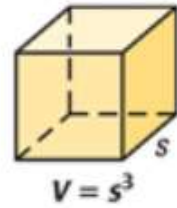


## 11.6 Volume of Prisms and Cylinders

### **POSTULATE 27** Volume of a Cube Postulate

The volume of a cube is the cube of the length of its side.



### **POSTULATE 28** Volume Congruence Postulate

If two polyhedra are congruent, then they have the same volume.

### **POSTULATE 29** Volume Addition Postulate

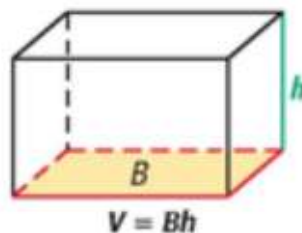
The volume of a solid is the sum of the volumes of all its nonoverlapping parts.

### THEOREM 11.6 Volume of a Prism

The volume  $V$  of a prism is

$$V = Bh,$$

where  $B$  is the area of a base and  $h$  is the height.

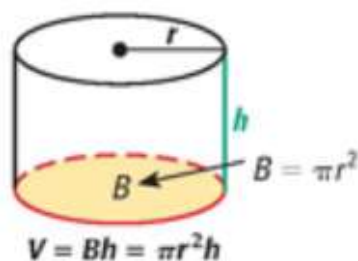


### THEOREM 11.7 Volume of a Cylinder

The volume  $V$  of a cylinder is

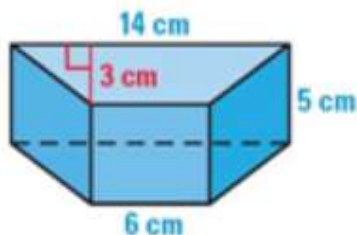
$$V = Bh = \pi r^2 h,$$

where  $B$  is the area of a base,  $h$  is the height, and  $r$  is the radius of a base.

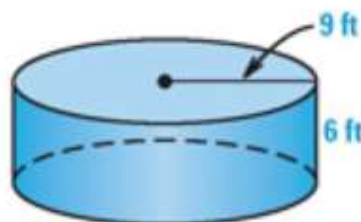


Find the volume of the solid.

- a. Right trapezoidal prism



- b. Right cylinder



### Solution

- a. The area of a base is  $\frac{1}{2}(3)(6 + 14) = 30 \text{ cm}^2$  and  $h = 5 \text{ cm}$ .

$$V = Bh = 30(5) = 150 \text{ cm}^3$$

- b. The area of the base is  $\pi \cdot 9^2$ , or  $81\pi \text{ ft}^2$ . Use  $h = 6 \text{ ft}$  to find the volume.

$$V = Bh = 81\pi(6) = 486\pi \approx 1526.81 \text{ ft}^3$$

### THEOREM 11.8 Cavalieri's Principle

If two solids have the same height and the same cross-sectional area at every level, then they have the same volume.