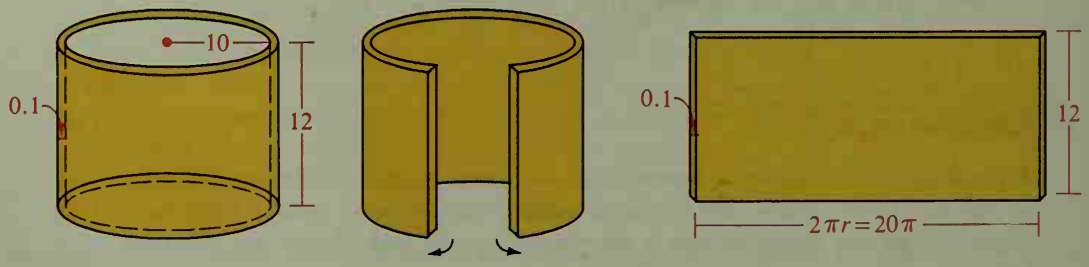
Self-Test 1

For Exercises 1–5 find the lateral area, total area, and volume of each solid.

1. A rectangular solid with length 10, width 8, and height 4.5
2. A regular square pyramid with base edge 24 and slant height 13
3. A cylinder with radius 10 in. and height 7 in.
4. A right hexagonal prism with height 5 cm and base edge 6 cm
5. A cone with height 12 and radius 9
6. The total area of a cube is 2400 m^2. Find the volume.
7. A solid metal cylinder with radius 2 and height 2 is recast as a solid cone with radius 2. Find the height of the cone.
8. A prism with height 2 m and a pyramid with height 5 m have congruent triangular bases. Find the ratio of their volumes.

♦ Calculator Key-In

1. A cylinder has radius 10 and height 12. Suppose that the lateral surface of the cylinder is covered with a thin coat of paint having thickness 0.1. The volume of the paint can be calculated approximately or exactly.
   a. Use the diagrams below to explain the following formula.
   Approximate volume = (lateral area of cylinder) · (thickness of paint)
   $$V \approx (2\pi rh) \cdot (t)$$



   b. Why is this formula only an approximation of the volume?
2. Use a calculator and the formula to find the approximate volume of paint for each thickness: 0.1, 0.01, 0.001.
3. The exact volume of paint can be found by subtracting the volume of the inner cylinder (the given cylinder) from the volume of the outer cylinder (the given cylinder plus paint). Use a calculator to evaluate the exact volume of paint for each thickness: 0.1, 0.01, 0.001.
4. Compare the values for the approximate volume and exact volume for each thickness in Exercises 2 and 3. What can you conclude?