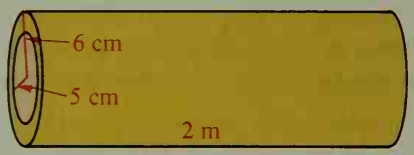
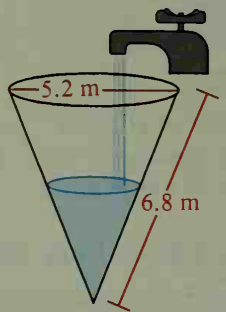
22. A pipe is 2 m long and has inside radius 5 cm and outside radius 6 cm. Find the volume of metal contained in the pipe to the nearest cubic centimeter. Use $\pi \approx 3.14$.



Ex. 22



Ex. 23

23. Water is pouring into a conical (cone-shaped) reservoir at the rate of 1.8 m^3 per minute. Find, to the nearest minute, the number of minutes it will take to fill the reservoir. Use $\pi \approx 3.14$.

24. Two water pipes of the same length have inside diameters of 6 cm and 8 cm. These two pipes are replaced by a single pipe of the same length, which has the same capacity as the smaller pipes combined. What is the inside diameter of the new pipe?

25. The total area of a cylinder is 40π. If $h = 8$, find r.

26. The total area of a cylinder is 90π. If $h = 12$, find r.

27. In rectangle $ABCD$, $AB = 10$ and $AD = 6$.

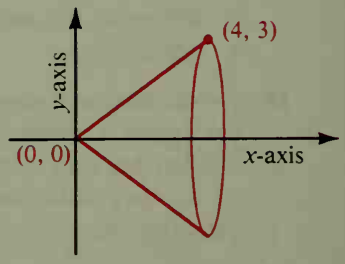
a. The rectangle is rotated in space about $\overline{AB}$. Describe the solid that is formed and find its volume.

b. Answer part (a) if the rectangle is rotated about $\overline{AD}$.

28. a. The segment joining (0, 0) and (4, 3) is rotated about the x-axis, forming the lateral surface of a cone. Find the lateral area and the volume of this cone.

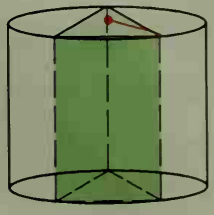
b. Sketch the cone that would be formed if the segment had been rotated about the y-axis. Find the lateral area and the volume of this cone.

c. Are your answers to parts (a) and (b) the same?



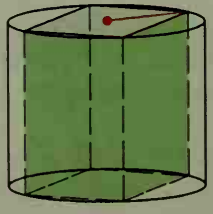
29. Each prism shown below is inscribed in a cylinder with height 10 and radius 6. Find the volume and lateral area of each prism.

a.



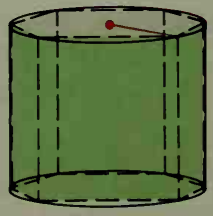
Base is an equilateral triangle.

b.



Base is a square.

c.



Base is a regular hexagon.