

In Exercises 1–10, write a mathematical expression for the quantity described verbally:

5. **Area of a Rectangle** The area of a rectangle whose length is 12 more than its width x .
6. **Area of a Triangle** The area of a triangle whose altitude is 2 more than its base length x .
7. **Salary Increase** A salary after a 4.5% increase, if the original salary is x dollars.
9. **Sale Price** Sale price of an item marked x dollars, if 40% is discounted from the marked price.

In Exercises 15–20, write the specified quantity as a function of the specified variable. It will help in each case to draw a picture.

15. The height of a right circular cylinder equals its diameter. Write the volume of the cylinder as a function of its radius.

18. A square is inscribed in a circle. Write the area of the square as a function of the radius of the circle.

33.

Maximum Value Problem A square of side x inches is cut out of each corner of a 10 in. by 18 in. piece of cardboard and the sides are folded up to form an open-topped box.

- (a) Write the volume V of the box as a function of x .
- (b) Find the domain of your function, taking into account the restrictions that the model imposes in x .
- (c) Use your graphing calculator to determine the dimensions of the cut-out squares that will produce the box of maximum volume.

37. Finding the Model and Solving Water is stored in a conical tank with a faucet at the bottom. The tank has depth 24 inches and radius 9 in., and it is filled to the brim. If the faucet is opened to allow the water to flow at a rate of 5 cubic inches per second, what will the depth of the water be after 2 minutes?

39.

Unit Conversion A tire of a moving bicycle has radius 16 in. If the tire is making 2 rotations per second, find the bicycle's speed in miles per hour.