Section 2.6: Mathematical Models - Building Functions

Learning Objectives:

1. Build and Analyze Functions (p.112)

Tips:

1. Read [and re-read if necessary] the problem.
2. Assign variables to unknown quantities.
3. Draw a diagram [if appropriate] and label with known quantities and variables.
4. Find a function or equation that relates the variable and known quantities

Examples:

1. A rectangle is inscribed in a circle of radius 3. Let $P = (x, y)$ be a point in quadrant I that is a vertex of the rectangle and is on the circle. Express the area A of the rectangle as a function of x and the perimeter P of the rectangle as a function of x.

2. Let $P = (x, y)$ be a point on the graph of $y = x^3$. Express the distance d from P to the point (2, 0) as function of x. What is d if $x = -1$?

3. A right triangle has one vertex on the graph of $y = 16 - x^2$, $x > 0$, at (x, y), another at the origin, and the third on the positive x-axis at $(x, 0)$. Express the area A of the triangle as a function of x.

4. An open box with a square base is to be made from a square piece of cardboard 16 inches on a side by cutting out a square from each corner and turning up the sides. Express the volume V of the box as a function of the length x of the side of the square cut from each corner. Find the volume if a 2-inch square is cut out.