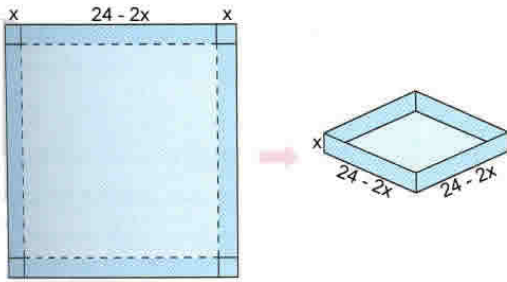


2.6 Mathematical Models: Building Functions

EXAMPLE: A manufacturer buys a new machine costing \$120,000. It is estimated that the machine has a useful lifetime of 10 years, and a salvage value of \$4000 at that time. Find a linear function for the value, V , of the machine after t years.

EXAMPLE: A company is planning to manufacture a certain product. The fixed costs will be \$500,000 and it will cost \$400 to produce each product. Each will be sold for \$600. What is the profit equation and how many units must be sold for in order to break even?

EXAMPLE: An open box of maximum volume is to be made from a square piece of material, 24 inches on a side, by cutting equal squares from the corners and turning up the sides (see figure). Write an equation for the volume, V , of the box as a function of x . Then find the volume when a 3-inch square is cut out.



EXAMPLE: A wire of length $10x$ is bent into the shape of a circle. (a) Express the circumference of the circle as a function of x . (b) Express the area of the circle as a function of x .

EXAMPLE: A rectangle is bounded by the x-axis and the semicircle $y = \sqrt{9 - x^2}$ (see figure). Express the area A of the rectangle as a function of x .

