

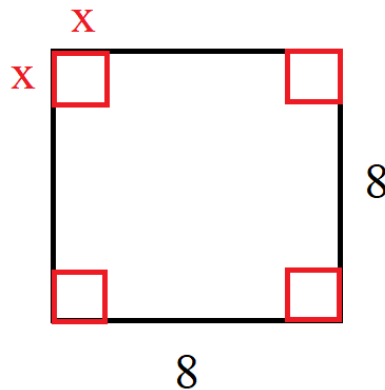
Exercise 69

For the following exercises, use the written statements to construct a polynomial function that represents the required information.

An open box is to be constructed by cutting out square corners of x -inch sides from a piece of cardboard 8 inches by 8 inches and then folding up the sides. Express the volume of the box as a function of x .

Solution

Draw a schematic of the square with edges cut out.



The new area is $(8 - 2x)(8 - 2x) = 64 - 16x - 16x + 4x^2 = 64 - 32x + 4x^2$, and the height of the box is x . Therefore, the volume of the open box is

$$\begin{aligned} V(x) &= (\text{area})(\text{height}) \\ &= (64 - 32x + 4x^2)x \\ &= 64x - 32x^2 + 4x^3. \end{aligned}$$