## Exercise 75

For the following exercises, write the polynomial function that models the given situation.

A rectangle has a length of 10 units and a width of 8 units. Squares of x by x units are cut out of each corner, and then the sides are folded up to create an open box. Express the volume of the box as a polynomial function in terms of x.

Solution

Draw a schematic of the cut-out box.
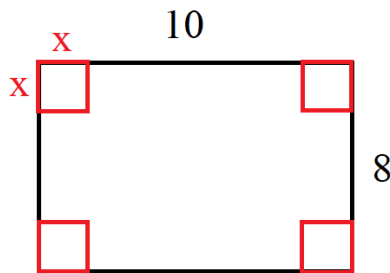
The area of the box's base is the new length times the new width.

$$A = (10 - 2x)(8 - 2x)$$

$$= 80 - 36x + 4x^2$$

Multiply it by the box's height to get the volume.

$$V = Ah = (80 - 36x + 4x^2)x$$

$$= 4x^3 - 36x^2 + 80x$$