Today's Learning Goal(s):

By the end of the class, I will be able to:

a) solve problems algebraically that involve polynomial functions & equations arising from real-world applications

3.6.1 Applications of Polynomial Equations

Date: _Oct. 18/18_

1. A school is to be built on a rectangular lot measuring 80 m by 60 m.
   A lawn of uniform width is to surround the school.
   The area of the lawn is equal to the area of the school.
   How wide will the strip of lawn be **AND** what are the dimensions of the school?
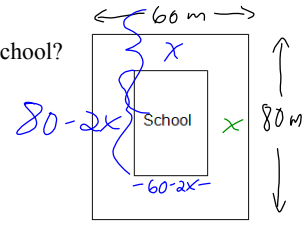
Solution

Let x represent the width of the **lawn**, in m.
Let $80-2x$ represent the length of the school, in m.
Let $60-2x$ represent the width of the school, in m.

$$P_{lot} = 2(60)+2(80)$$
$$= 120+160$$
$$= 280 \text{ m}$$

$$A_{lot} = 60(80)$$
$$= 4800 \text{ m}^2$$

$$A_{lot} = A_{lawn} + A_{school}$$

$$A_{lawn} = A_{school}$$

$$\therefore A_{lawn} = \frac{4800}{2}$$
$$= 2400 \text{ m}^2$$
$$= A_{school}$$

$$A_{school} = (80-2x)(60-2x)$$
$$= 4800 - 60x - 120x + 4x^2$$

$$2400 = 4x^2 - 280x + 4800$$

$$0 = 4x^2 - 280x + 4800 - 2400$$
$$= 4x^2 - 280x + 2400$$
$$= 4(x^2 - 70x + 600)$$
$$= 4(x-10)(x-60)$$

$$\therefore x = 10 \quad \text{or} \quad x = 60$$

1	600
2	300
3	200
4	150
5	120
6	100
7	
8	75
9	
10	60

if $x = 10$
$$l = 80-2x \quad \& \quad w = 60-2x$$
$$= 80-2(10) \qquad = 60-2(10)$$
$$= 60 \qquad\qquad = 40$$

$$l = 80-2x$$
$$= 80-2(60)$$
$$= 80-120$$
$$= -40$$
Not possible

$$\therefore x = 60 \text{ is}$$
inadmissible

∴ the strip of the lawn is 10 m, and the dimensions of the school are 60 m × 40 m.