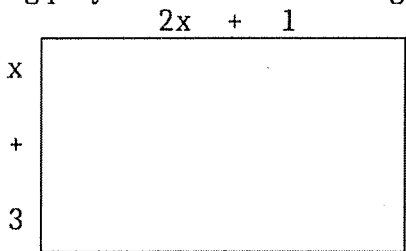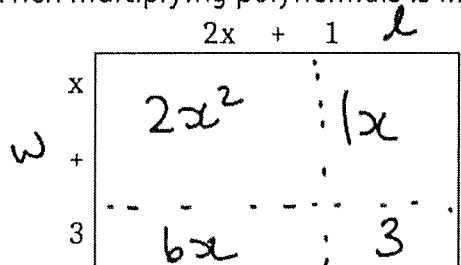## 6.7 Multiplying a Monomial by a Polynomial

If adding polynomials is like finding the perimeter:

$$P = (2x+1) + (2x+1) + (x+3) + (x+3)$$
$$= 6x + 8$$

Then multiplying polynomials is like finding the area!

$$A = \ell \cdot w$$
$$= (2x+1)(x+3)$$
$$= 2x^2 + 7x + 3$$

Multiplying a Monomial by a Monomial:

When doing these types of problems, we multiply or divide the coefficients, then use exponent laws for the variables.

Ex: 1) $3(5x) = 3 \cdot 5 \cdot x = 15x$

2) $2a(3b) = 2 \cdot 3 \cdot a \cdot b = 6ab$

$-y = -1y$

3) $-y(5y^2) = -1 \cdot 5 \cdot y \cdot y^2 = -5y^3$

4) $(2xy)(2x^2y) = 2 \cdot 2 \cdot x \cdot x^2 \cdot y \cdot y = 4x^3y^2$

Multiplying a Monomial by a Polynomial: -> waterbomb the monomial across the polynomial!

Ex:

1) $-3(2x+5) = (-3 \cdot 2x) + (-3 \cdot 5)$
$$= -6x + -15$$
$$= -6x - 15$$

2) $-2x(x-1) = (-2x \cdot x)(-2x \cdot -1)$
$$= -2x^2 + 2x$$

3) $3x^2(x^2 + 2x - 1)$

$$= (3x^2 \cdot x^2) + (3x^2 \cdot 2x) + (3x^2 \cdot -1)$$

$$= 3x^4 + 6x^3 - 3x^2$$