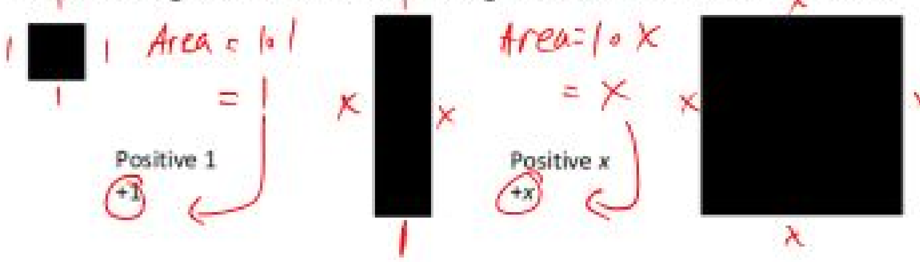
Math 9 Section 5.3 – Multiplying Polynomials

Homework: Section 5.3 on Pg. 181; #1-3half, 4-5all, 6a, 7-10half

other Color ⊕

Red ⊖

Recall our algebra tiles and how we figured out the value of each tile:



Area $= 1 \cdot 1 = 1$

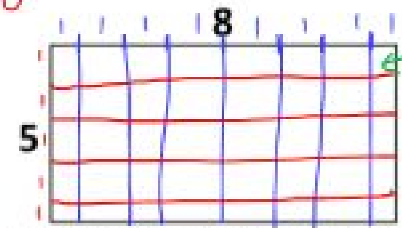
Area $= 1 \cdot x = x$

Area $= x \cdot x = x^2$

When we calculate the area of a rectangle, we multiply the sides together.

If we want to find the answer for two numbers multiplied together, that's the same as finding the area of a rectangle with the length equal to the first number and width equal to the second number.

Area = $5 \cdot 8 = 40$



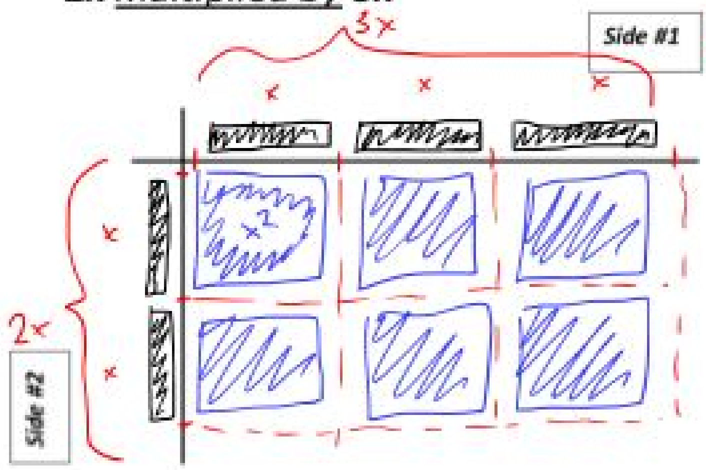
Area $= 5 \cdot 8$

Little area $= 1$

total area $= 1 \cdot$ # of squares $= 40$

This idea also works for polynomials, and we can use the algebra tiles to "measure out" the sides of the rectangle.

2x *multiplied by* **3x**



3x

Area $= 2x \cdot 3x$

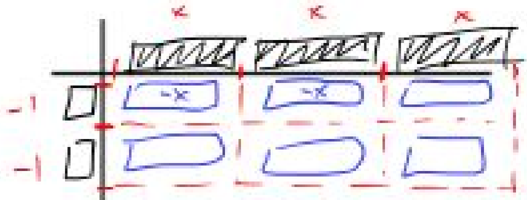
$= \underline{6x^2}$

Notice: $2 \cdot 3 = 6$

$x \cdot x = x^2$

$6 \cdot x^2 = \underline{6x^2}$

−2 *multiplied by* **3x**

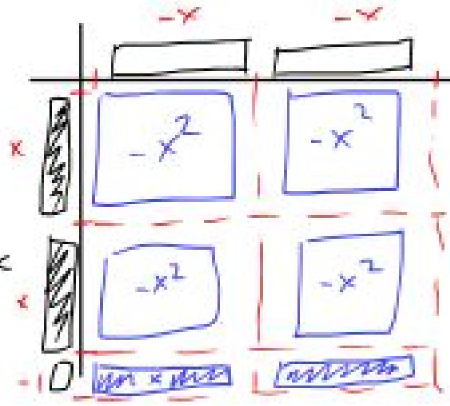


$\text{Area} = (-2)(3x) = -6x$

Notice: $(-2)(3) = -6$

$-6 \cdot x = -6x$

−2x *multiplied by* **2x − 1**



Area =

$(-2x)(2x-1)$

$= -4x^2 + 2x$

From our algebra tile pictures, we can see the pattern for multiplying polynomials:

1. multiply our Coefficients (numbers) — multiply together
2. multiply our variables (letters)
3. If there are 2 or more terms, distribute the multiplication and add together (just like subtracting)

$(-3x^2)(-7x)$ = $\left[(-3)\cdot(-7)\right]\cdot\left[x^2 \cdot x^1\right]$

$= \boxed{21x^3}$

same base

$2^2 \cdot 2^1 = 2^3$

$(-4x^2y)(x^4y^7)$= $\left[(-4)\cdot(1)\right]\cdot\left[x^2y \cdot x^4y^7\right]$

$= \boxed{-4x^6y^8}$

diff Bases (can't combine)

$(-2x)(3x^2 - 5)$ = $(-2x)(3x^2) + (-2x)(-5)$

$3x^2 + (-5)$

$= \boxed{-6x^3 + 10x}$

$(3x + 2y)(xy)$ = $(3x)(xy) + (2y)(xy)$

$= \boxed{3x^2y + 2xy^2} = \cancel{5x^2y^2}$

not like terms

$(2x^2 - x + 4)(-3x^2)$ =

$= (2x^2)(-3x^2) + (-x)(-3x^2) + (4)(-3x^2)$

$= \boxed{-6x^4 + 3x^3 - 12x^2}$