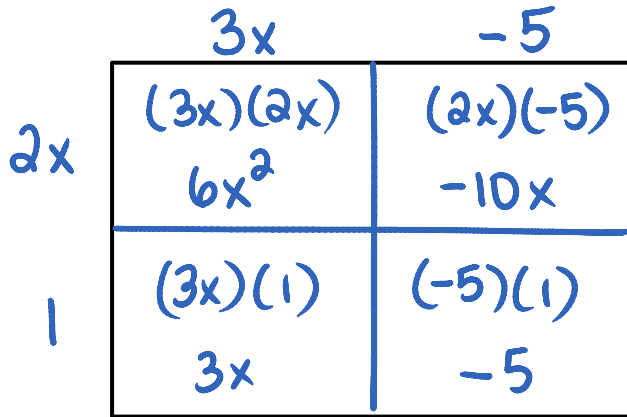


## Lesson 4: Multiplying Polynomials

### BINOMIAL X BINOMIAL

Can be done with Algebra Tiles (concretely)

Example 1) Rectangle Model (pictorially)



$$(3x-5)(2x+1)$$

FOIL!

$$6x^2 + 3x - 10x - 5$$

$$6x^2 - 7x - 5$$


---

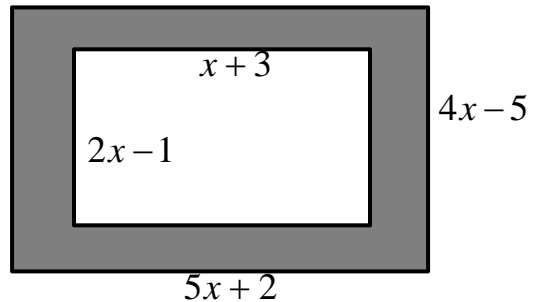

$$6x^2 - 10x + 3x - 5$$

$$6x^2 - 7x - 5$$

Example 2) Write a polynomial to represent the area of the shaded region.

$$(5x+2)(4x-5)$$

$$= 20x^2 - 25x + 8x - 10$$



$$= 20x^2 - 17x - 10$$

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

$$= 2x^2 + 6x - x - 3 = 2x^2 + 5x - 3$$

A = larger - smaller

$$A = (20x^2 - 17x - 10) + (2x^2 + 5x + 3)$$

$$A = 18x^2 - 22x - 7$$

### BINOMIAL X TRINOMIAL (6 products)

Example 3)  $(3x-1)(x^2+6x-4) =$

$$3x(x^2+6x-4) - 1(x^2+6x-4)$$

$$= 3x^3 + 18x^2 - 12x - x^2 - 6x + 4$$

\* collect like terms!

$$= 3x^3 + 17x^2 - 18x + 4$$

## TRINOMIAL X TRINOMIAL ( 9 products)

Example 4)  $(x^2 - 2x - 4)(x^2 + 5x + 3)$

$$\begin{aligned} & x^2(x^2 + 5x + 3) - 2x(x^2 + 5x + 3) - 4(x^2 + 5x + 3) \\ = & x^4 + \underline{5x^3} + \underline{3x^2} - \underline{2x^3} - \underline{10x^2} - \underline{6x} - \underline{4x^2} - \underline{20x} - 12 \\ = & x^4 + 3x^3 - 11x^2 - 26x - 12 \end{aligned}$$

### PRODUCT OF 3 NUMBERS

Example 5)  $2 \times 3 \times 5$

$$\begin{array}{c} \text{---} \\ 2 \times 3 \\ \text{---} \\ 6 \times 5 \\ \text{---} \\ 30 \end{array}$$

or  $2 \times 3 \times 5$

$$\begin{array}{c} \text{---} \\ 2 \times 3 \\ \text{---} \\ 10 \times 3 \\ \text{---} \\ 30 \end{array}$$

or  $2 \times 3 \times 5$

$$\begin{array}{c} \text{---} \\ 2 \times 3 \\ \text{---} \\ 2 \times 15 \\ \text{---} \\ 30 \end{array}$$

$$30$$

$$30$$

$$30$$

### PRODUCT OF 3 POLYNOMIALS

- Pick two to multiply together
- Then multiply their product by the remaining polynomial

FOIL

Example 6)  $2(x - 5)(x + 4)$

$$2(x^2 + 4x - 5x - 20)$$

$$2(x^2 - x - 20)$$

$$2x^2 - 2x - 40$$

or  $2(x - 5)(x + 4)$

$$(2x - 10)(x + 4)$$

$$2x^2 + 8x - 10x - 40$$

$$2x^2 - 2x - 40$$

FOIL

Example 7)  $(x + 7)(x - 3)(x - 4)$

$$(x^2 - 3x + 7x - 21)(x - 4)$$

$$(x^2 + 4x - 21)(x - 4)$$

$$x(x^2 + 4x - 21) - 4(x^2 + 4x - 21)$$

$$x^3 + \cancel{4x^2} - \cancel{21x} - \cancel{4x^2} - \underline{16x} + 84$$

collect like terms

page 177 #(5,6,9,10)ac - #6 Rectangle model or algebra tiles

Page 186 #(8,13)ac,15bd,17,19abc,21ab

$$x^3 - 37x + 84$$