

**LEARNING OBJECTIVE:** We will multiply polynomials. (Alg1M1L4)

**CONCEPT DEVELOPMENT:**

We can use ARRAY MODELS to MULTIPLY polynomials.

$$(x - 1)(x^3 + 6x^2 - 5)$$

$x^1 \cdot x^3$

	$x^3$	$6x^2$	$-5$
$x$	$x^4$	$6x^3$	$-5x$
$-1$	$-x^3$	$-6x^2$	$5$

$$x^4 + 5x^3 - 6x^2 - 5x + 5$$

4<sup>th</sup> degree polynomial w/ 5 terms

Multiplying polynomials requires us to apply the DISTRIBUTIVE PROPERTY.

$$(x - 1)(x^3 + 6x^2 - 5)$$

$$x(x^3 + 6x^2 - 5) + (-1)(x^3 + 6x^2 - 5)$$

$$x^4 + 6x^3 - 5x - x^3 - 6x^2 + 5$$

$$(x-1)(x^3) + (x-1)(6x^2) + (x-1)(-5)$$

When you multiply polynomials,  
think **ARRAY MODELS**  
think **DISTRIBUTIVE PROPERTY !!**

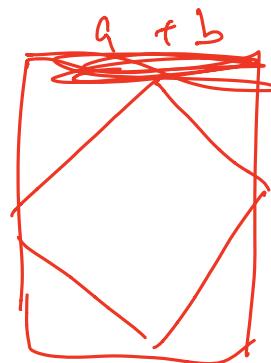
## Special Products of Binomials

### Sum and Difference

$$(x + y)(x - y)$$

	$x$	$y$	
$x$	$x^2$	$xy$	
$-y$	$-xy$	$-y^2$	

$$x^2 - y^2$$



### Square of a binomial

$$(x + y)^2 \neq x^2 + y^2$$

$$(x+y)(x+y)$$

$$x(x+y) + y(x+y)$$

$$x^2 + xy + xy + y^2$$

$$(x - y)^2 \neq x^2 - y^2$$

$$x^2 - 2xy + y^2$$

**Factoring:** the process of extracting common terms from a polynomial. It is the complement to applying the distributive property.

Example: Given the expression  $6a + 14a^2$  we can extract  $2a$  from each term to create a new expression using the distributive property:  $2a(3 + 7a)$ .

Quick Practice:

$$2x^4 + 2x^5 + 2x^{10} = 2x^4(1 + x + x^6)$$

$$6z^2 - 15z = 3z(2z - 5)$$

$$42w^3 - 14w + 77w^5 = 7w(6w^2 - 2 + 11w^4)$$

$$\frac{3}{2}s^2 + \frac{1}{2} = \frac{1}{2}(3s^2 + 1)$$

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

$$b(a-c)$$

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

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

**GUIDED PRACTICE:****Steps for Multiplying Polynomials**

1. Distribute each term in the first polynomial to each term in the second polynomial.
2. Simplify as needed.

$$4x^2(3x^4y^3)$$

$$12x^6y^3$$

Monomial  
×  
Monomial

$$-2x^4y^5(6xy^3)$$

$$5k(2k^2 - 5k + 3)$$

$$(5k \cdot 2k^2) - (5k \cdot 5k) + (5k \cdot 3)$$

$$10k^3 - 25k^2 + 15k$$

9

Monomial  
×  
Trinomial

$$8t(3s^3 + 4s^2t - 2t)$$

$$(8t \cdot 3s^3) + (8t \cdot 4s^2t) - (8t \cdot 2t)$$

$$24s^3t + 32s^2t^2 - 16t^2$$

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

	$x^2$	$3$
$x$	$x^3$	$3x$
$2$	$2x^2$	$6$

$$x^3 + 2x^2 + 3x + 6$$

binomial  
×  
binomial

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

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$$(3x + 2)(-2x^3 + 5x - 6)$$

$$(3x + 1)(x^3 + 4x^2 - 7)$$

$$(10x + 7)^2$$

$$\left(\frac{1}{2}x + 4\right)^2$$

$$(2x + 6)(2x - 6)$$

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

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Date: \_\_\_\_\_

**INDEPENDENT PRACTICE:**

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**ACTIVATING PRIOR KNOWLEDGE:**

We can use the distributive property:

$5(3x^3 - 11y^2)$	$12(4a^2b - 9c^5)$
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**CLOSURE:**

Is the product of 2 polynomials ALWAYS a polynomial?

**NOTES:**

This is Go Math Pilot, mapping to lesson 14-3. In ENY, this translates to lesson 9 of Alg 1, module 1.

Homework from Textbook Page 507-08 Questions 10-27.