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

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

4th degree, 5 terms.

Multiplying polynomials requires us to apply the DISTRIBUTIVE PROPERTY.

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

Distrib A $[(x-1)(x^3)]+[(x-1)(6x^2)]-[(x-1)(5)]$

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

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

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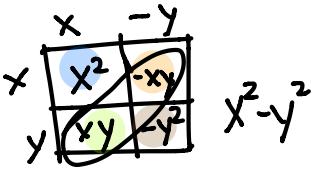
Special Products of Binomials

Sum and Difference

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



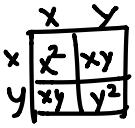
$x^2 - y^2$ ← Difference of 2 squares

Square of a binomial

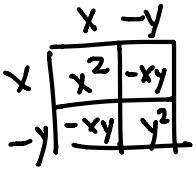
$(x + y)^2$

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

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



$(x - y)^2$



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

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:

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

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

$42w^3 - 14w + 77w^5$ $7w(\ldots)$

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

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

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

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

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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.

2 MONOMIALS $4x^2(3x^4y^3)$ $(4\cdot 3)(x^2\cdot x^4)y^3$ $12x^6y^3$ $12x^6y^3$	$-2x^4y^5(6xy^3)$ $-12x^5y^8$
Monomial x polynomial $5k(2k^2-5k+3)$ $2k^2$ $-5k$ 3 $5k$ | $10k^3$ | $-25k^2$ | $15k$ $10k^3-25k^2+15k$	$8t(3s^3+4s^2t-2t)$ ✓
Binomial x Binomial $(x^2+3)(x+2)$ x 2 x^2 | x^3 | $2x^2$ 3 | $3x$ | 6 x^3+2x^2+3x+6	$(x-4)(x^2-3)$ ✓ $x^3-4x^2-3x+12$

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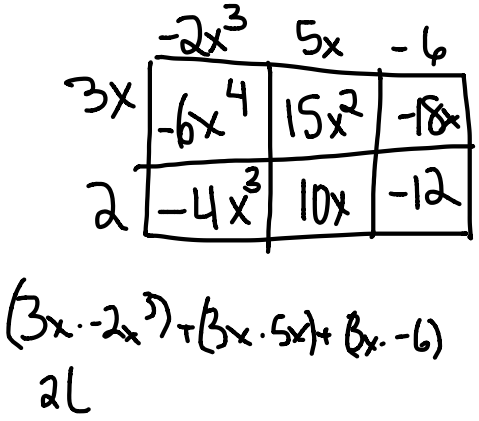
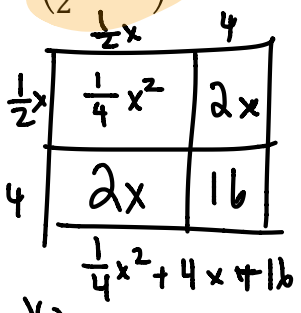
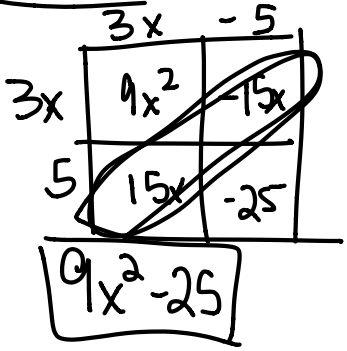
$(3x+2)(-2x^3+5x-6)$  $(3x\cdot -2x^3)+(3x\cdot 5x)+(3x\cdot -6)$ $2L$	$(3x+1)(x^3+4x^2-7)$
$(10x+7)^2$	$\left(\frac{1}{2}x+4\right)^2$  $\frac{1}{4}x^2+4x+16$ $\left(\frac{1}{2}x\right)^2+2\left(\frac{1}{2}x\right)(4)+4^2$ $\frac{1}{4}x^2+4x+16$
$(2x+6)(2x-6)$	$(3x-5)(3x+5)$ 

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Independent Practice:

Khan Academy

Activating Prior Knowledge:

We can use the distributive property:

$5(3x^3 - 11y^2)$ $(5 \cdot 3x^3) - (5 \cdot 11y^2)$ $15x^3 - 55y^2$	$12(4a^2b - 9c^5)$ $(12 \cdot 4a^2b) - (12 \cdot 9c^5)$ $48a^2b - 108c^5$

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.