Multiplying Polynomials using the Distributive Property

The Distributive Property is one of the 2 methods that are used to multiply polynomials in Algebra 1, the other being FOIL

The Distributive Property HAS to be used for multiplying any polynomials that are not 2 binomials since FOIL only works with 2 binomials.

Typically in Algebra 1, you use the Distributive Property when multiplying a monomial by a polynomial and a binomial by a trinomial. We will practice both of these in this lesson.

Examples:

1) 5xy (4x + 2y)

These types of problems are simple. Multiply the monomial by each term of the binomial first.

$5xy * 4x = 20x^2 y$

$5xy * 2y = 10xy^2$

Then, put the 2 terms together with the correct sign in between them.

Make sure the term with the HIGHER exponent that is attached to the EARLIER letter in the alphabet is placed first.

$20x^2y + 10xy^2$

2) $(3x + 5y)(5x^2 + 10xy - 12)$

While this problem looks like a lot at first, using the Distributive Property in small steps makes the problem a lot easier.

We first should distribute 3x (the first term in the binomial) to each term in the trinomial.

$3x \cdot 5x^2 = 15x^3$

$3x \cdot 10xy = 30x^2y$

$3x \cdot (-12) = -36x$

Then we should follow the same process with 5y (the second term in the binomial).

$5y \cdot 5x^2 = 25x^2y$

$5y \cdot 10xy = 50xy^2$

$5y \cdot (-12) = -60y$

Write down the 6 terms we found.

$15x^3 + 30x^2y - 36x + 25x^2y + 50xy^2 - 60y$

Combine like terms and order the polynomial correctly to get the final answer.

$15x^3 + 55x^2y + 50xy^2 - 36x - 60y$

Tips for Solving Problems:

1. When dealing with distributing a monomial, make sure the monomial is distributed to each term in the polynomial (each term in the polynomial is multiplied by the monomial).

2. When multiplying a binomial by a trinomial, break down the multiplication into smaller Distributive Property steps. Focus on one term in the binomial first and multiply it by each term in the trinomial before doing the same for the 2nd term in the binomial.

3. Make sure to order the terms that you get from using the Distributive Property by first starting with the term having the highest exponent on the earlier alphabetical variable and ending with the term having the lowest exponent on the later alphabetical variable.