Lesson #2: Multiplying Binomials

Learning Goal: We are learning to multiply two binomials by using the distributive property.

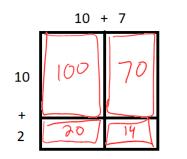**Review: Expand by using the Distributive Property**

1) $2x(4x + 7)$

$= 8x^2 + 14x$

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

$= -6x^2 + 36x$

As you can see, the monomial in front gets multiplied into each term of the binomial. What happens if we have two binomials being multiplied? We follow a very similar method! Let's illustrate our strategy by doing 12 x 17. But let's think of 12 as (10+2) and 17 as (10+7)

$$
\begin{array}{c|c|c}
 & 10 & +\;7 \\
\hline
10 & 100 & 70 \\
\hline
+ & & \\
2 & 20 & 14 \\
\end{array}
\quad = 204
$$

Notice that each term in our first bracket (10 and 2) gets multiplied by each term in our second bracket (10 and 7). So there are a total of four multiplications that are then added together. This is called the "Double Distributive" property. You are distributing each term from the first bracket into the second. Since there are two terms in the first bracket, you have to distribute twice!

Expand

3) $(4x - 6)(7x + 8)$
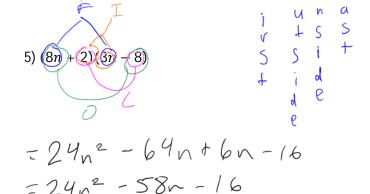
$= 7x(4x - 6) + 8(4x - 6)$

$= 28x^2 - 42x + 32x - 48$

$= 28x^2 - 10x - 48$

4) $(5v - 7)(2v + 2)$

$= 2v(5v - 7) + 2(5v - 7)$

$= 10v^2 - 14v + 10v - 14$

$= 10v^2 - 4v - 14$

FOIL

5) $(8n + 2)(3n - 8)$

$= 24n^2 - 64n + 6n - 16$
$= 24n^2 - 58n - 16$

6) $(x + 1)(3x - 8)$

$= 3x^2 - 8x + 3x - 8$
$= 3x^2 - 5x - 8$

7) $(5x + 3)(5x - 3)$

$= 25x^2 - 15x + 15x - 9$
$= 25x^2 - 9$

Difference of squares.

8) $(4x - 7)^2 (4x - 7)$

$= 16x^2 - 28x - 28x + 49$
$= 16x^2 - 56x + 49$

Expand the binomials FIRST, then distribute the number in front.

9) $4(x + 9)(x - 5)$

$= 4(x^2 - 5x + 9x - 45)$
$= 4(x^2 + 4x - 45)$
$= 4x^2 + 16x - 180$

10) $-\frac{1}{2}(x - 10)(x + 4)$

$= -\frac{1}{2}(x^2 + 4x - 10x - 40)$
$= -\frac{1}{2}(x^2 - 6x - 40)$
$= -\frac{1}{2}x^2 + 3x + 20$

11) $-4(2v + 2)(v + 3)$

$= -4(2v^2 + 6v + 2v + 6)$
$= -4(2v^2 + 8v + 6)$
$= -8v^2 - 32v - 24$

12) $5(8x + 9)^2$

$= 5(8x + 9)(8x + 9)$
$= 5(64x^2 + 72x + 72x + 81)$
$= 5(64x^2 + 144x + 81)$
$= 320x^2 + 720x + 405$

Success Criteria
- I can multiply two binomials by using the distributive property.