Pre-AP Algebra II
Notes Day #4
Distribution & FOIL

$$\boxed{a(b+c) = a \bullet b + a \bullet c}$$

The above property is called the distributive **property. It is an important property because it links the two fundamental operations of multiplication and addition together.**

Directions: **Use the distributive property to simplify the following examples.**

Ex. 1: $2(3+2) = 2 \cdot 3 + 2 \cdot 2$

$6 + 4$

$\boxed{10}$

Ex. 2: $\frac{1}{2}(3x+2) = \frac{1}{2} \cdot 3x + \frac{1}{\cancel{2}} \cdot \cancel{2}$

$= \boxed{\frac{3}{2}x + 1}$

Ex. 3: $y(x+2) = x \cdot y + 2 \cdot y$

$\boxed{xy + 2y}$

Looking at the result of Example 3, we have $xy+2y$**. Now say we are told that** $y=(x+4)$**. Let us reexamine Example 3 by replacing** y **with** $x+4$**.**

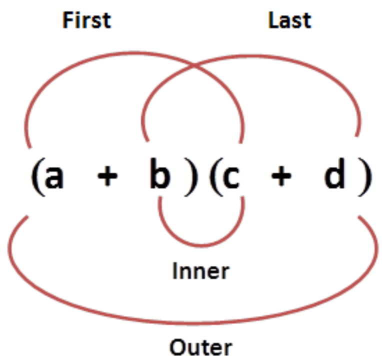
Directions: **Substitute** y **with** $x+4$**. Then apply the distributive property again and simplify.**

Ex. 4: $xy+2y = x(x+4) + 2(x+4)$

$= x^2 + 4x + 2x + 8$

$= \boxed{x^2 + 6x + 8}$

Notice if we had known $y = (x+4)$ from the start of Example 3 the problem would have been $(x+4)(x+2)$. This is a problem where we use the FOIL **(First-Outer-Inner-Last) technique.**



How do we know when to use FOIL? Take a look at the above diagram. The first set of parentheses is a binomial **(two terms). The second set of parentheses also has two terms. If we are multiplying two terms with two terms, then basic arithmetic says we should have** four **terms in total.**

FOIL is a useful mnemonic for remembering how to multiply a pair of binomials. At some point however, it is much simpler to recognize this process as the distributive property applied twice. The first term from the first parentheses is distributed to the second set of parentheses. Then, the second term of the first parentheses is distributed to the second set of parentheses. This thought process is particularly more useful when understanding how to multiply polynomials with more than two terms.

Directions: **Multiply the following polynomials using the distributive property.**

Ex. 5: $(x^2+3)(x^3+x) =$

$x^5 + x^3 + 3x^3 + 3x$

$\boxed{x^5 + 4x^3 + 3x}$

Ex. 6: $(x^2+5)(x^3+2x+3) =$

$x^5 + 2x^3 + 3x^2 + 5x^3 + 10x + 15$

$\boxed{x^5 + 7x^3 + 3x^2 + 10x + 15}$