

# Multiplying Polynomials using FOIL

*The FOIL method is one of 2 major methods that we use to multiply polynomials in Algebra 1, the other one being Distributive Property.*

**It is important to know that FOIL only works when you are multiplying 2 binomials (polynomials with 2 terms each) together.**

**FOIL** stands for **First Outer Inner Last** and each word represents 2 terms being multiplied together in each binomial.

Examples:

$$(x + 5)(x + 4)$$

Let's walk through each letter of FOIL to get our answer:

**F** - Multiply the first term in each binomial

$$(x \cdot x = x^2)$$

**O** - Multiply the first term in the first binomial and the second term in the second binomial

$$(x \cdot 4 = 4x)$$

**I** - Multiply the second term in the first binomial and the first term in the second binomial

$$(5 \cdot x = 5x)$$

**L** - Multiply the second term in each binomial

$$(5 \cdot 4 = 20)$$

Write out the terms that we got from each step of FOIL.

$$x^2 + 4x + 5x + 20$$

Finally, combine like terms to get our final answer.

$$x^2 + 9x + 20$$

That's **FOIL!** It will come easy with more practice!

$$(2x - 3)(x - 2)$$

$$\text{First (F): } 2x \cdot x = 2x^2$$

$$\text{Outer (O): } 2x \cdot (-2) = -4x$$

$$\text{Inner (I): } (-3) \cdot x = -3x$$

$$\text{Last (L) : } (-3) \cdot (-2) = 6$$

Write down the terms after FOILING the binomials

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

Combine like terms to get our final answer.

$$2x^2 - 7x + 6$$

You can follow this strategy for any binomial, regardless of what the 2 terms are in each binomial.

## Tips for Solving Problems:

1. Follow the steps First, Outer, Inner, Last in this order whenever you are trying to multiply 2 binomials. This strategy will always work when multiplying 2 binomials.

2. When going through the steps of FOIL, watch your signs. If there are binomials with minus signs in them (like  $x - 3$  for example), when you get to the steps involving 3, you need to include the negative sign with the 3 (so  $-3$  in this case).

3. Remember that FOIL only works when you are multiplying 2 binomials together. Any other polynomial multiplication, even if 1 of the 2 polynomials you are multiplying is a binomial but the other is not, has to be done using the distributive property.