

Polynomials; + - x

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We can add, subtract, multiply, and divide polynomials using the same procedures we learned in elementary school.

In the first grade you learned to add the ones column to the ones column, the tens to the tens, hundreds to hundreds. We use that same concept to add polynomials, we add numbers to numbers, x's to x's, and x²'s to x²'s. We call that combining like terms.

EXAMPLE $(3x^2 + 2x - 4) + (5x^2 - 7x - 6)$

Combining like terms, we have

$$3x^2 + 5x^2, 2x - 7x, -4 - 6$$

$$8x^2 - 5x - 10$$

Subtraction of polynomials is just as easy. We will look at subtraction as adding the opposite. In other words $5 - 2$ is the same as $5 + (-2)$. Using the reasoning, when we subtract polynomials, we will add the opposite.

EXAMPLE $(3x^2 + 2x - 4) - (5x^2 - 7x - 6)$

Changing the signs and combining like terms, we have

$$3x^2 - 5x^2, 2x + 7x, -4 - 6$$

$$-2x^2 + 9x + 2$$

Oh yes, math is a blast! Remember to change **ALL** the signs in the subtraction, then add.

Remember the procedure for multiplying a 2-digit number by a 2-digit number from fourth grade? We multiply polynomials exactly the same way.

Let's look.

$$\begin{array}{r} 32 \\ \times 13 \\ \hline 96 \\ 32 \\ \hline 416 \end{array}$$

$$\begin{array}{r} x + 5 \\ \times x + 3 \\ \hline 3x + 15 \\ x^2 + 5x \\ \hline x^2 + 8x + 15 \end{array}$$

Those two problems were done exactly the same way. That's the nice thing about algebra, all you are doing is using the same concepts and procedures you learned in elementary school.

Once you learn how to multiply polynomials using the algorithm you learned in fourth grade, high school students are better served learning a short-cut. The short-cut can also be used to multiply regular numbers too.

The short-cut is referred to as multiplying by FOIL. FOIL is an acronym, the F stands for First numbers, O stands for the Outer numbers, the I for the Inside number and the L for the Last numbers.

Let's see. In $(3x - 4)(2x + 5)$, the $3x$ and the $2x$ represent the First numbers in each parentheses. The $3x$ and 5 represent the numbers on the Outside of the parentheses, The -4 and $2x$ are the Inside numbers, and the -4 and 5 represent the last numbers in each parentheses.

$$(3x - 4)(2x + 5)$$

Multiplying the First #'s, $3x$ and $2x = 6x^2$

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