Polynomials – Quick Reference

What is a Polynomial?

Polynomials can also be classified according to the number of terms. Let's take a look!

$2x$	Monomial	Monomials consist of 1 term
$2x + 3y$ ↑ ↑ 1 2	Binomial	Binomials consist of 2 terms
$2x^2 + 3x + 5$ ↑ ↑ ↑ 1 2 3	Trinomial	Trinomials consist of 3 terms.
$3x^3 + 2x^2 - 6x + 2$ ↑ ↑ ↑ ↑ 1 2 3 4	Polynomial	If there are more than 3 terms, use the term polynomial.

What is the Degree of a Polynomial?

Let's take a look at one more definition! The **degree** of a polynomial **with one variable** is the **highest power** to which the variable is raised. Take a look!

Degree of Polynomials

$6x^3 – 2x^2 + 2x – 1$ Largest power is 3	A polynomial of degree 3
$2x -9$ **When there is no exponent, it is assumed to be 1; therefore this is a degree of 1.	A binomial of degree 1
$-8x^5$ The exponent is 5	A monomial of degree 5

Adding Polynomials

You must remember that you can only add terms that are **like terms.**

$(3a^4 + 2a^3 – 2a^2 + a + 5) + (4a^4 – a^3 +5a^2 -2a -4)$	
$3a^4+ 4a^4 +2a^3 – a^3 – 2a^2 +5a^2 +a -2a +5 -4$	Rewrite with like terms together.
$7a^4 + a^3 + 3a^2 – a +1$	Combine like terms.
Solution: $7a^4 + a^3 + 3a^2 – a +1$	**This is the solution.**

F irst Terms

O utside Terms

I nside Terms

L ast Terms

Squaring a Binomial

$$(x+y)^2 = x^2 + 2xy + y^2$$

$$(x-y)^2 = x^2 – 2xy + y^2$$

Subtracting Polynomials

You must remember to use Keep Change Change.

If you have a **subtraction** sign **preceding** a set of **parenthesis**, then you must rewrite the problem as an addition problem. We are going to **ADD the OPPOSITE**

Subtraction sign & parenthesis

$(2x -6) – (3x^2 + 2x – 6)$ Rewritten as: $(2x -6) + (-3x^2 – 2x + 6)$

$(2x -6)$	$–$	$(3x^2 + 2x – 6)$
Keep the same	Change to Addition	Change the sign of every term
$(2x -6)$	$+$	$-3x^2 – 2x + 6$

**You must change the sign of every term (to its' opposite sign) inside the set of parenthesis that follows the subtraction sign.

Multiplying Polynomials

We must use our laws of exponents in order to multiply polynomials.

$2a^2b^2 (a^3 + 3ab – b^3)$	**Original Problem**
$2a^2b^2 (a^3) + 2a^2b^2(3ab) + 2a^2b^2(-b^3)$	Distribute $2a^2b^2$ througho the parenthesis.
$2a^5b^2 \quad + 6a^3b^3 \quad – 2a^2b^5$	Multiply the coefficients and add the exponents of like bases for each term.

Solution:
$2a^5b^2 + 6a^3b^3 – 2a^2b^5$

Using FOIL

$(3x -4) (2x +1)$	Original Problem
$(3x -4) (2x +1)$	Multiply the First terms: $(3x)(2x) = 6x^2$
$6x^2$	
$(3x -4) (2x +1)$	Multiply the Outside terms: $(3x)(1) = 3x$
$6x^2 +3x$	
$(3x -4) (2x +1)$	Multiply the Inside terms: $(-4)(2x) = -8x$
$6x^2 +3x – 8x$	
$(3x -4) (2x +1)$	Multiply the Last terms: $(-4)(1) = -4$
$6x^2 +3x – 8x - 4$	
$6x^2 – 5x - 4$	Combine like terms: $3x – 8x = -5x$ *Notice how this step is the same as the 4th step of Examp 1.
$6x^2 – 5x - 4$	Solution.