Algebra 1: 12.1 Guided Notes **Name _____ Period _____**
Adding and Subtracting Polynomials

A **term** is a real number, a variable, or the product of a real number and a variable. Terms are separated by + or – signs.

Examples: x 7 $8x^2$

A **coefficient** is a number that is multiplied by a variable.

$9x^3$ Coefficient: 9

$4x + 3$ Coefficient: 4

A **constant** is a number on its own.

7 Constant: 7

$5x + 2$ Constant: 2

A **polynomial** is a mathematical expression that involves the sum of terms consisting of coefficients multiplied by 1 or more variables with whole number exponents.

A polynomial in one variable is of the form $a_1x^k + a_2x^{k-1} + \ldots a_nx^0$, where a_n is any real number and k is a *whole number exponent* (0, 1, 2, 3...).

Examples: $2x + 12$ $x^2 - 3x$ $5x^6 + 7x^2 - 8$

A polynomial consisting of ***1*** term is a monomial.

A polynomial consisting of ***2*** terms is a binomial.

A polynomial consisting of ***3*** terms is a trinomial.

The polynomial $m^3 + 8m^2 - 10m + 5$ has 4 terms.

1st term: m^3 **Variable:** m

Coefficient of m^2: 8 **Highest exponent:** 3

Constant: 5

Identify the terms and coefficients of each polynomial.

1. $-2x^2 + 100x$

   Terms: $-2x^2$ and $100x$ **Coefficients:** -2 and 100

2. $x^2 + 4x + 3$

   Terms: x^2, $4x$, and 3 **Coefficients:** 1 and 4

3. $4m^3 - 2m^2 + 5$

   Terms: $4m^3$, $-2m^2$, and 5 **Coefficients:** 4 and -2

The **degree of a term** is its exponent.

$5x$ Degree: 1

4 Degree: 0

The **degree of a polynomial** is equal to the largest exponent.

Example: $3x^4 - 2x^3 + 6x^2 - 7x + 9$ Degree: 4

A **polynomial written in standard form** means the degree of its monomials decreases from left to right.

Example: $x^4 - 2x^3 + 4x^2 + 3x - 8$ ***Always write polynomials in standard form!***

Polynomial	Degree	Classification Using Degree	Number of Terms	Classification Using the Number of Terms
-6	0	Constant	1	Monomial
$125p$	1	Linear	1	Monomial
$-13s + 6$	1	Linear	2	Binomial
$-6x^2 + 4x$	2	Quadratic	2	Binomial
$4x^2 + 7x + 3$	2	Quadratic	3	Trinomial
$2x^3$	3	Cubic	1	Monomial
$78j^3 - 3j$	3	Cubic	2	Binomial
$8x^4 - 2x^3 + 3x$	4	Fourth degree	3	Trinomial

Exit Slip

Ali says that $3x^{-2} + 4x - 1$ is a polynomial of degree 1 because 1 is the greatest exponent and it is a trinomial because it has 3 terms. Luke disagrees and says that it is not a polynomial at all because the power of the 1st term is not a whole number. Who is correct? Why?

Luke is correct. The exponent, -2, is not a whole number so the expression is NOT a polynomial. Since it is not a polynomial, it cannot be classified as a trinomial.

Describe why each expression is not a polynomial.

1. $\frac{4}{x}$

$\frac{4}{x} = 4x^{-1}$ and exponents cannot be negative.

2. $\sqrt{x}$

$\sqrt{x} = 4x^{1/2}$ and exponents cannot be fractions.