Algebra Body of Knowledge

Standard 3: Linear Equations and Inequalities

- MA.912.A.3.2
  Identify and apply the distributive, associative, and commutative properties of real numbers and the properties of equality.

Polynomials

Any **expression** in which the operations are addition, subtraction, multiplication, and division, and all **powers** of the **variables** are **natural numbers** (also known as **counting numbers**). These types of expressions are called **rational expressions**. *Rational expressions* are **fractions** whose **numerator** and/or **denominator** are **polynomials**. Examples of rational expressions are as follows:

$$\frac{x+y}{3x} \qquad x - \frac{1}{x} \qquad \frac{2x+3y}{x-y}$$

Any rational expression with no *variable* in the *denominator* is called a *polynomial*. Examples of polynomials are as follows:

x^2 $\qquad$ 7 $\qquad$ $3y^2 - 2y + 1$ $\qquad$ $x^2y + 2x - y$

A **term** is a number, variable, **product**, or **quotient** in an expression.

- If a polynomial has only one *term*, we call it a **monomial**, because "mono" means *one*.

  Examples of *monomials*:
  3 $\qquad$ a^3b $\qquad$ $3xy$

- If a polynomial has exactly two terms, we call it a **binomial**, because "bi" means *two*.

  Examples of *binomials*:
  $x + y$ $\qquad$ $2x + 3y$ $\qquad$ $3a^2 - 4b$ $\qquad$ $-3y + 7$

- If a polynomial has three terms, we call it a **trinomial**, because "tri" means *three*.

  Examples of *trinomials*:

  $4x + 2y - 3z$ $\qquad$ $x^2 + 3x + 2$ $\qquad$ $5ab + 2a - 3b$

Notice above that a plus or minus sign separates the terms in all polynomials. Be careful to notice where those signs occur in the expression.

Note: A polynomial is named *after* it is in its **simplest form**. For example, $3(x + 2y^3)$ must first be *simplified*. Therefore, $3(x + 2y^3) = 3x + 6y^3$, which is a binomial.