Def: A **term** is a number and/or a variable raised to a power.

Note: A term may have more than one variables multiplied together where each is raised to a power.

Def: When all variables in a term are raised to a whole number power, the term is a **monomial**.

Ex: Show some examples of a monomial.

Ex: Show an example of term which is not a monomial.

Def: A **polynomial** is a monomial or the sum of monomials.

Def: A **polynomial in x** is a polynomial with only one variable, x.

Note: this variable can appear more than once, there just cannot be a second TYPE of variable anywhere.

Def: A Polynomial with two terms is called a binomial

Def: A polynomial with three terms is called a trinomial.

Note: more than three terms and it is called a polynomial.

Def: The **degree** of a monomial is the sum of the exponents of the variables.

Ex: Find the degree of the following monomials

1. $2^{3}x^{2}$
2. $7∙6z^{5}$
3. $3x^{2}y^{4}$
4. $3^{3}xy$

Def: The number in front of the variable(s) of a monomial is called the **coefficient.**

Ex: for the 4 problems above, find the coefficient of each.

Def: The **leading term** of a polynomial is the term of highest degree.

Def: The coefficient of the leading term is called the **leading coefficient.**

Def: The **degree of a polynomial** is the same as the degree of its leading term.

Note: we call tell a term because it is always separated by a + or – sign.

Def: The term with a zero degree is called the **constant term.**

Ex: For each polynomial find the degree of the polynomial, the leading coefficient, the leading term, the coefficient of the 3rd degree term, and the 0th degree term.

1. $x^{4}+2x^{3}+3x^{2}-4x+5$
2. $3x^{4}y+2x^{3}y^{3}+3x^{2}y-4xy^{2}+5y$

Def: A ***polynomial function,***$p(x)$***,*** is a function in which ordered pairs, $\left(x,p\left(x\right)\right)$, are determined by evaluating a polynomial.

Ex: For the functions $f\left(x\right)=x^{4}+2x^{3}+3x^{2}-4x+5$ and $p\left(x\right)=x^{2}+2x-8$

Find $f\left(0\right),f\left(-1\right),p\left(2\right),p\left(-4\right), \& p(3)$

Def: Two terms are called **similar or like terms** if they have the exact same variable(s) raised to exactly the same power(s).

## Adding Polynomials

When adding polynomials we combine all like terms. If two terms are not like, the can not be combined.

Ex: Add the polynomials:

1. (5.1.58) $2a+11-8a+5a+7a^{2}+9$
2. (5.1.62) $a^{2}-2ab+b^{2}+9a^{2}+5ab-4b^{2}+a^{2}$
3. (5.1.68) $\left(9ab-3ac+5bc\right)+(13ab-15ac-8bc)$

## The opposite of a polynomial and Subtraction

Def: Two polynomials are **opposites** or **additive inverses** if when added they sum to zero.

Ex: $2x^{2} \&-2x^{2} $are opposites since $2x^{2}-2x^{2}=0$

Ex: $x-1-\left(x-1\right)=0$ so $x-1 \&-(x-1)$ are opposites.

The opposite of a polynomial P can be written as –P, or equivalently by replacing each term with its opposite.

Ex: so $2x^{3}+3x2-7$ has the additive inverse $-\left(2x^{3}+3x2-7\right)=-2x^{3}-3x2+7$

Ex: Subtract the polynomials:

1. (5.1.78) $7y+11-(-7y-4)$
2. (5.1.82) $9r-5s-t-(7r-5s+3t)$
3. (5.1.88) $\frac{5}{6}y^{4}-\frac{1}{2}y^{2}-7.8-(-\frac{3}{8}y^{4}+\frac{3}{4}y^{2}+3.4y)$