

## Characteristics of Polynomials Notes

Name \_\_\_\_\_

Date \_\_\_\_\_

**Polynomial Function:** Term or set of terms with the following:

- Coefficients are real numbers
- Variables have exponents which are natural numbers

Ex. Is it a polynomial?

$$a) f(x) = 1x^3 + 3x^1 \quad \text{Yes}$$

$$b) f(x) = 1x^4 + 3x^1 - 2x^2 - 5x^0 \quad \text{No}$$

$$c) f(x) = 6x^4 - 2x^{-1} + x \quad \text{No}$$

$$d) f(x) = -0.5x + \pi x^2 - \sqrt{2} \quad \text{Yes}$$

A polynomial is in **STANDARD FORM** when:

- They are ordered from left to right in descending order; which means from the largest exponent to the smallest.

The **DEGREE** is:

- The largest exponent in polynomial. It determines the classification.

Ex:  $-7x^1 + 9 - 4x^2$  The degree is 2.

$$-4x^2 - 7x + 9$$

Classifying:

Quadratic Trinomial

The **LEADING COEFFICIENT** is:

- The number in front once in Standard Form.

Ex:  $-4x^2 - 7x + 9 \rightarrow -4$

A **CONSTANT** is:

- The term without a variable. Ex:  $-4x^2 - 7x + 9 \rightarrow 9$

$$a) g(x) = 2x^2 - 4 - 3x^4 + 12x^3$$

standard form:  $-3x^4 + 12x^3 + 2x^2 - 4$

degree: 4

leading coefficient: -3

constant: -4

$$b) h(x) = 3 - x$$

standard form:  $-x + 3$

degree: 1

leading coefficient: -1

constant: 3

4+ terms are called polynomials

You can classify polynomials by # of terms and degree.

Polynomial	# of Terms	Name by # of Terms	DEGREE	Name by Degree
$f(x) = 12$	1	Monomial	0	Constant
$k(x) = 8x$	1	Monomial	1	Linear
$j(x) = 4x^2 + 3$	2	Binomial	2	Quadratic
$g(x) = 5x^3 + x^2$	2	Binomial	3	Cubic
$h(x) = 3x^2 - 4x + 6$	3	Trinomial	2	Quadratic
$s(t) = 7t^4 - 7t + 3$	3	Trinomial	4	Quartic

### Adding and Subtracting Polynomials:

Adding:

- Combine like-terms

Subtracting:

- Distribute the negative
- Combine like-terms

$$1. (4y^3 - 5y^2) + (12y^5 - 2y^3 + 14y^2)$$

$$2y^3 + 9y^2 + 12y^5$$

$$12y^5 + 2y^3 + 9y^2$$

$$2. (3y^5 + 8y^3 - 10y^2) - (-12y^5 + 4y^3 + 14y^2)$$

$$+ 12y^5 - 4y^3 - 14y^2$$

$$15y^5 + 4y^3 - 24y^2$$

$$3. (-7n^2 + 8n - 4) - (-11n + 2 - 14n^2)$$

$$11n - 2 + 14n^2$$

$$7n^2 + 19n - 6$$

$$4. (-10k^2 + 7k + 6k^4) + (-14 - 4k^4 - 14k)$$

$$2k^4 - 10k^2 - 7k - 14$$