

## 7-1 Polynomials Introduction

**MONOMIALS:** a number, a variable, or a product of numbers and variables with whole-number exponents.

Monomials	Not Monomials
$7x, 5, -4xy^2$	$7x+y, x+y-2$

The degree of a monomial is the sum of the exponents of the variables.  
A constant has a degree 0.

EXAMPLES: Find the degree of each monomial.

1.  $4p^4q^3$   
7

2.  $7ed^1$   
2

3. 3  
0

**POLYNOMIALS:** a monomial or a sum or different of monomials (poly ~ more than one).

The degree of a polynomial is the degree of the term with the greatest degree.

Examples: Find the degree of each polynomial.

1.  $11x^7 + 3x^3$   
7

2.  $\frac{1}{3}w^3z + \frac{1}{2}z^4 - 5$   
4

**STANDARD FORM OF A POLYNOMIAL:** written with the terms in order from greatest degree to least degree. When writing in standard form, the coefficient of the first term is called the leading coefficient.

Examples:

Write the polynomial in standard form. Then give the leading coefficient.

1.  $6x - 7x^5 + 4x^2 + 9$   
 $-7x^5 + 4x^2 + 6x + 9$   
L.C. is -7

2.  $y^2 + y^6 - 3y$   
 $1y^6 + y^2 - 3y$   
L.C. is 1

3.  $16 - 4x^2 + x^5 + 9x^3$   
 $x^5 + 9x^3 - 4x^2 + 16$   
L.C. is 1

## NAMING POLYNOMIALS

Some polynomials have special names based on their degree and the number of terms they have.

DEGREE	NAME
0	constant
1	linear
2	quadratic
3	cubic
4	quartic
5	quintic
6, 7, 9, etc...	6th, 7th, 9th

TERMS	NAME
1	monomial
2	binomial
3	trinomial
4 or more	polynomial

**EXAMPLES:** Classify each polynomial according to its degree and number of terms.

1.  $5n^3 + 4n$   
cubic binomial

2.  $4y^6 - 5y^3 + 2y - 9$   
6th degree  
polynomial

3.  $-2x$   
linear  
monomial

4.  $x^3 + x^2 - x + 2$   
cubic  
polynomial

5.  $-3y^8 + 18y^5 + 14y$   
8th degree  
trinomial

6.  $6$   
constant  
monomial

## REAL-WORLD APPLICATION (Evaluating Polynomials)

A tourist accidentally drops her lip balm off the Golden Gate Bridge. The bridge is 220 feet from the water of the bay. The height of the lip balm is given by the polynomial  $-16t^2 + 220$ , where  $t$  is the time in seconds. How far above the water will the lip balm be after 3 seconds?

$$-16t^2 + 220$$

$$-16(3)^2 + 220$$

$$\boxed{76}$$