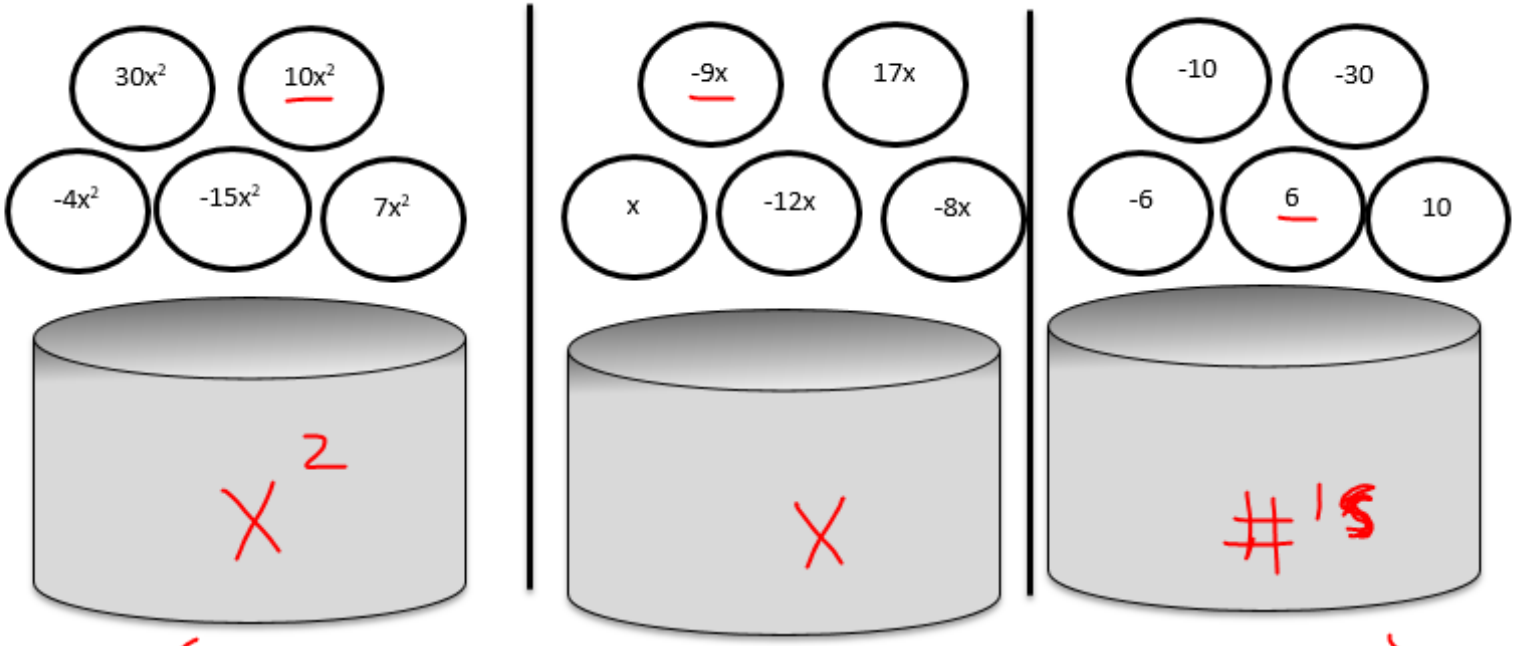
Unit 2

Operations with Polynomials

Gum Drop!

monomial



$(10x^2 - 9x + 6 =)$

Not Like terms

Objectives

Identify, evaluate, add, and subtract polynomials.

A **monomial** is a number or a product of numbers and variables with whole number exponents.

7 $2x$ $-4x^5$

A **polynomial** is a monomial or a sum or difference of monomials. Each monomial in a polynomial is a term. Because a monomial has only one term, it is the simplest type of polynomial.

$10x^2 - 9x + 6$ trinomials $\}$ $x - 4$ binomials $\}$ $3x^2$ monomial

Polynomials have no variables in denominators or exponents, no roots or absolute values of variables, and all variables have whole number exponents.

$\frac{4}{3X}$

Polynomials: $3x^4$ | $2z^{12} + 9z^3$ | $\frac{1}{2} \cdot a^7$ | $0.15x^{101}$ | $3t^2 - t^3$ |

Not polynomials: 3^x | $|2b^3 - 6b|$ | $\frac{8}{5y^2}$ | $\frac{1}{2}$ | $m^{0.75} - m$

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

Example 1: Identifying the Degree of a Monomial

Identify the degree of each monomial.

5.6 ( )

A. z^6

z^6 *Identify the exponent.*

The degree is 6.

B. 5.6

$5.6 = 5.6x^0$ *Identify the exponent.*

The degree is 0.

C. $8xy^3$

$8x^1y^3$ *Add the exponents.*

The degree is 4.

D. a^2bc^3

$a^2b^1c^3$ *Add the exponents.*

The degree is 6.

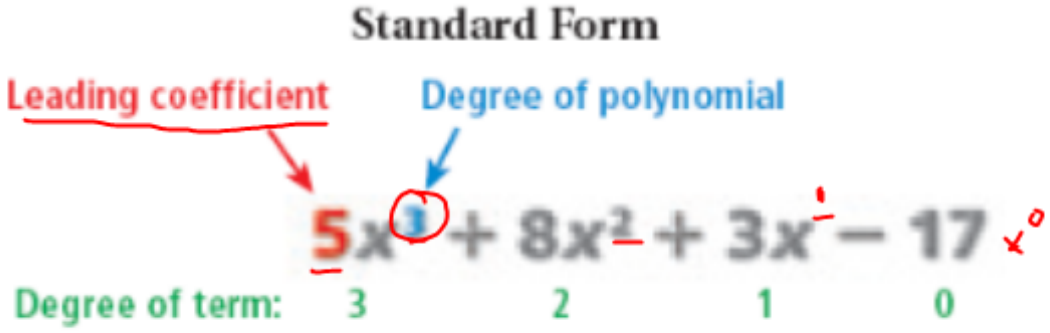
$a^2 b c^3$

$a^2 b^1 c^3$

A **degree of a polynomial** is given by the term with the greatest degree.

A polynomial with one variable is in standard form when its terms are written in descending order by degree.

So, in standard form, the degree of the first term indicates the degree of the polynomial, and the **leading coefficient** is the coefficient of the first term.



A polynomial can be classified by its number of terms.
A polynomial with two terms is called a **binomial**, and a polynomial with three terms is called a **trinomial**.
A polynomial can also be classified by its degree.

Classifying Polynomials by Degree		
Name	Degree	Example
Constant	0	-9
Linear	1	$x - 4$
Quadratic	2	$x^2 + 3x - 1$
Cubic	3	$x^3 + 2x^2 + x + 1$
Quartic	4	$2x^4 + x^3 + 3x^2 + 4x - 1$
Quintic	5	$7x^5 + x^4 - x^3 + 3x^2 + 2x - 1$

Example 2: Classifying Polynomials

Rewrite each polynomial in standard form. Then identify the leading coefficient, degree, and number of terms. Name the polynomial.

A. $3 - 5x^2 + 4x$

Write terms in descending order by degree.

$-5x^2+4x+3$

Leading coefficient: -5
Degree: 2
Terms: trinomial
Name: quadratic

B. $3x^2 - 4 + 8x^4$

Write terms in descending order by degree.

$8x^4 + 3x^2 - 4$

Leading coefficient: 8
Degree: 4
Terms: trinomial
Name: quartic

Rewrite each polynomial in standard form. Then identify the leading coefficient, degree, and number of terms. Name the polynomial.

a. $4x - 2x^2 + 2$

b. $-18x^2 + x^3 - 5 + 2x$

Write terms in descending order by degree.

$-2x^2 + 4x + 2$

Leading coefficient: -2
Degree: 2
Terms: trinomial
Name: quadratic

Write terms in descending order by degree.

$x^3 - 18x^2 + 2x - 5$

Leading coefficient: 1
Degree: 3
Terms: polynomial w/ 4 terms
Name: cubic

Example 3: Adding and Subtracting Polynomials

Add or subtract. Write your answer in standard form.

A. $(2x^3 + 9 - x) + (5x^2 + 4 + 7x + x^3)$

Add vertically.

$2x^3 + 9 - x$

$+\ x^3 + 4 + 7x + 5x^2$

$3x^3 + 13 + 6x + 5x^2$

$= 3x^3 + 5x^2 + 6x + 13$

Example 3: Adding and Subtracting Polynomials

Add or subtract. Write your answer in standard form.

distribute

B. $(3 - 2x^2) - (x^2 + 6 - x)$

Add the opposite horizontally.

$3 - 2x^2 - x^2 - 6 + x = -3 - 3x^2 + x$

$-3x^2 + x - 3$

Add or subtract. Write your answer in standard form.

$(-36x^2 + 6x - 11) + (6x^2 + 16x^3 - 5)$

$= 16x^3 - 30x^2 + 6x - 16$

Add or subtract. Write your answer in standard form.

$(5x^3 + 12 + 6x^2) - (15x^2 + 3x - 2)$

+2

$5x^3 - 9x^2 - 3x + 14$

$5x^3 - 9x^2 - 3x + 14$

Box of Chocolates!!

Group 1:

Jordan
Bri
Josiah
Emalee
Matthew

Group 2:

Karson
Cleatus
Alyssa
Lexie

Group 3:

Anna Lee
Aleesia
Blake
Decoda

Golden Ticket!!!

Turn in before you leave!