

## How can we Simplify Polynomials?

A polynomial is a monomial or a sum of monomials.

A monomial is a number, variable, or product of numbers and variables.

Monomials

$$x$$

$$-2x^2$$

$$\frac{7}{3}$$

$$4x^3y^2z^{25}$$

Not Monomials

$$\frac{x}{y}$$

$$2x + y \text{ [Binomial]}$$

$$3x^4 + 3x^2 - 7 \text{ [Trinomial]}$$

$$x^3 + y^2 + z^{25} + 4 \text{ [4-term Polynomial]}$$

Standard form of a polynomial is called descending order.

Write the monomial terms from highest power to lowest.

Write each polynomial in standard form and name the coefficients.

1.  $4 - x^2 + 3x$

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

C:  $-1, 3, 4$

2.  $7y - 4y^2 + 17 + y^3$

$$y^3 + (-4y^2) + 7y + 17$$

C:  $1, -4, 7, 17$

The degree of a polynomial is the highest degree of its terms. The degree of a monomial is its power. [or sum of Powers]

| Polynomial      | Degree | Name                |
|-----------------|--------|---------------------|
| $2x^2$          | 2      | Quadratic Monomial  |
| $3x + 3$        | 1      | Linear Binomial     |
| $-x^2 + 3x + 1$ | 2      | Quadratic Trinomial |
| $y^3 + 2y$      | 3      | Cubic Binomial      |
| 12              | 0      | Constant Monomial   |

## Adding and Subtracting Polynomials

Key Idea: You can only "combine" Like Terms!

Ex 1:  $(4x^2 - 2x + 1) + (8x - 7)$

Option 1: Horizontal Format

$$4x^2 + (-2x) + 8x + 1 + (-7)$$

$$4x^2 + 6x + (-6)$$

Option 2: Vertical Format

$$\begin{array}{r} 4x^2 + (-2x) + 1 \\ + \quad \quad 8x + (-7) \\ \hline \end{array}$$

$$4x^2 + 6x + (-6)$$

Ex 2: Subtract  $(2x + 3)$  from  $(6x^2 - 2)$ .

Option 1: Horizontal Format

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

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

$$\boxed{6x^2 + (-2x) + (-5)}$$

Quadratic Trinomial

Option 2: Vertical Format

$$\begin{array}{r} 6x^2 + 0x + (-2) \\ + \quad (-2x) + (-3) \\ \hline \end{array}$$

$$\boxed{6x^2 + (-2x) + (-5)}$$

Quadratic Trinomial

Ex 3:  $(2x + 3y) - (x - y)$

$$\underline{2x} + \underline{3y} + \underline{(-x)} + \underline{y}$$

$$\boxed{x + 4y}$$

Linear Binomial

Ex 4: Subtract  $(-x^2 + 3x - 1)$  from  $(8x^3 - 4x)$ .

$$8x^3 + (-4x) - (-x^2 + 3x - 1)$$

$$8x^3 + (-4x) + x^2 + (-3x) + 1$$

$$\boxed{8x^3 + x^2 + (-7x) + 1}$$

Cubic  
4-term  
Polynomial

$$\text{Ex 5: } (19x^4 + 4x^2) - (8 + 5x^2 - x^3 + 19x^4)$$

$$\underline{19x^4} + \underline{4x^2} + \underline{(-8)} + \underline{(-5x^2)} + \underline{x^3} + \underline{(-19x^4)}$$

$$\boxed{x^3 + (-x^2) + (-8)}$$

Cubic Trinomial

## Assignment #50

p. 557-558 #1-26, 30-35