

Algebra 1: 7.1 Adding and Subtracting Polynomials

A polynomial is an expression with multiple **terms** of a **single variable** that has **positive, whole number exponents** and **real number coefficients**.

Example: $f(x) = 5x^5 + 3x^4 - 9x^3 + 2x^2 + x + 15$

This is an example of a degree 5 polynomial.

The **Degree** of a polynomial is **whatever the largest exponent on the variable is**. $D: 5$

Monomials, Binomials, Trinomials:

$$-32x^3$$

$$4y$$

one term

$$x^2 + 4$$

$$-12r^3 + 5$$

2 terms

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

$$2s^4 + 7s^7 - 11$$

3 terms.

7.1 Adding and Subtracting Polynomials

The **constant** is the number without a variable being multiplied to it.

Leading Coefficient: The **coefficient in front** of the **variable** with the **largest exponent**.

Write the following polynomials in Standard Form, then state the leading coefficient and constant. **° Degree.**

Ex: $g(x) = 15x^4 - 11x^3 + 6 - 3x^6$

Standard Form: $g(x) = -3x^6 + 15x^4 - 11x^3 + 6$

Rearrange the terms so the exponents are in Descending order.

Leading Coefficient (L.C.): **-3**

constant: **6** Degree: **6**

Ex: $f(x) = 3x^4 + 14x^2 - x + 2$

Standard Form (S.F.): $f(x) = 3x^4 + 14x^2 - x + 2$

L.C.: **3** Degree: **4** Constant: **2**

Ex: $g(x) = -10x + 7x^2 - 4$

S.F.: $g(x) = 7x^2 - 10x - 4$

L.C.: **7** Degree: **2** constant: **-4**

7.1 Adding and Subtracting Polynomials

Adding Polynomials:

When adding polynomials, just combine like terms.

Like terms are variables raised to the same power.

$$\begin{array}{cccc} (-3x^2 + 5x^4 - 11) & + & (6x^4 - 5x^3 + 9x^2 + 1) & \\ \text{5+6} & & & \\ 11x^4 & - & 5x^3 & + 6x^2 - 10 \end{array}$$

The parentheses are Redundant. You don't need them when Adding.

$$\begin{array}{cccc} (-x^3 + 2x - 6 + x^2) & + & (-9x^3 + 3x^2 - x + 10) & \\ -1-9 & & 1+3 & & 2-1 & & -6+10 \\ \star & \boxed{-10x^3 + 4x^2 + x + 4} & & & & & \end{array}$$

7.1 Adding and Subtracting Polynomials

Subtracting Polynomials:

- Distribute the Negative
- Drop the Parentheses
- Combine Like Terms

> you can do both of these at the same time when you do it.

$$\text{Ex: } (4x^5 + 20x^3 - 5 + 15x^2) - (10x^2 + 15x^3 - 8x^5)$$

$$= 4x^5 + 20x^3 - 5 + 15x^2 - 10x^2 - 15x^3 + 8x^5$$

$$= 12x^5 + 5x^3 + 5x^2 - 5$$

$$\text{Ex: } (7x^3 + 20x - 3) - (x^3 - 2x^2 + 14x - 18)$$

$$= 7x^3 + 20x - 3 - x^3 + 2x^2 - 14x + 18$$

$$= 6x^3 + 2x^2 + 6x + 15$$

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