

POLYNOMIALS AND EXPONENTS

A **polynomial** is an expression which is in the form of ax^n , where a is any real number and n is a whole number.

- If a polynomial has only one term, it is called a monomial. If it has two terms, it is a binomial and if it has three terms, it is a trinomial.
- The standard form of a polynomial is when the powers of the variables are decreasing from left to right.

Mathematical operations can be performed on polynomials.

- To **add or subtract** polynomials, like terms are combined.

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using the power of ten.



PREVIEW

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by



How to use polynomials and exponents

Polynomials can be added or subtracted by combining like terms.

$$\text{Ex. } (6x^2 + 2x) + (8x^2 - x) = 14x^2 - x$$

- When adding or subtracting, the variables stay the same and the coefficients are added or subtracted. When subtracting polynomials, it is important **to distribute the negative sign** to the second polynomial.

$$\text{Ex. } (4x^2 + 5x - 3) - (3x^2 - 2x) = 4x^2 + 5x - 3 - 3x^2 + 2x$$

Notice how in the second term the $3x^2$ and $2x$ changed signs because of distributing the negative. The polynomial can be added by combining like terms and the result is $x^2 + 7x - 3$.



PREVIEW

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- When a variable with the same base is divided, the exponents are subtracted. Any number or variable to the zero power is 1.
- Polynomials can also be multiplied by a method called **FOIL**. This is used when multiplying two binomials.

$$\begin{aligned} \text{Ex. } (3x^2 + 5)(x^2 - 6) &= (3x^2)(x^2) + (3x^2)(-6) + (5)(x^2) + (5)(-6) \\ &= 3x^4 - 18x^2 + 5x^2 - 30 \\ &\quad \text{F} \quad \text{O} \quad \text{I} \quad \text{L} \end{aligned}$$

The term **FOIL** refers to the order in which the terms are multiplied: **first, inside, outside, last**. When the middle terms are combined, the final result is $3x^4 - 13x^2 - 30$.

- When using **scientific notation**, the numbers are multiplied together separately from the powers.

Ex. $(1.2 \times 10^2) \times (2.4 \times 10^5) = 2.88 \times 10^7$

Try This!

1. **Add** the polynomials: $(5x^2 + 2x + 6) + (3x^2 + 4x + 7)$

2. **Subtract** the polynomials: $(-8x^3 + 3x^2 + 5) - (4x^3 + 2x^2 - 8)$

3. M

4. M

5. S



PREVIEW

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$6^0 = \underline{\quad}?$

$x^3 \cdot x^7 = \underline{\quad}?$

$9^7/9^3 = \underline{\quad}?$

$3^{-2} = \underline{\quad}?$

6. **Multiply:** $(3.4 \times 10^5)(2.3 \times 10^2)$