

Polynomials

Key Points:

- A polynomial is an expression that can be written in the form $a_nx^n + \dots + a_2x^2 + a_1x + a_0$, where n is a positive integer.
- Each of the “ a ” terms are coefficients, which are numbers – they can be whole numbers, fractions, or decimals. The degree of the polynomial is the highest “ n ” term. The leading coefficient is the coefficient attached to the highest “ x^n ” term. Finally, the leading term is the term with the highest “ x^n ” term.

A diagram showing a polynomial expression $a_nx^n + \dots + a_2x^2 + a_1x + a_0$. A red arrow points from the text "Leading coefficient" to the coefficient a_n . A green arrow points from the text "Degree" to the exponent n . A blue bracket under the entire first term a_nx^n is labeled "Leading term".

For example:

$3 + 2x^2 - 4x^3$ is a polynomial in x with degree 3, leading coefficient -4 and leading term $-4x^3$

- We can multiply, add, and subtract polynomials.

Polynomial Videos

- [Polynomials: Identifying Degree, Leading Term & Leading Coefficient](#)
- [Polynomials: Adding & Subtracting](#)
- [Polynomials: Multiplication Using Distributive Property](#)
- [Polynomials: Multiplication FOIL Method](#)
- [Polynomials: Multiplication--Perfect Square Trinomial](#)
- [Polynomials: Special Product-Difference of Square](#)

Practice Exercises

Follow the directions for each exercise below:

1. Identify the degree, leading term, and leading coefficient of the polynomial

$$5t^5 - 2t^3 + 7t$$

2. Find the sum of the polynomials: $(12x^2 + 9x - 21) + (4x^3 + 8x^2 - 5x + 20)$

3. Find the difference of the polynomials:

$$(7y^4 - y^2 + 6y + 1) - (5y^3 - 2y^2 + 3y + 2)$$

4. Multiply the polynomials: $(2x + 1)(3x^2 - x + 4)$

5. Multiply (these are polynomials with two terms, also called Binomials):

$$(2x - 18)(3x + 3)$$

6. Expand the perfect square: $(3x - 8)^2$

7. Multiply (the result of this multiplication is called a Difference of Squares):

$$(9x + 4)(9x - 4)$$

Answers:

1. Degree: 5

Leading Coefficient: 5

Leading Term: $5t^5$

2. $4x^3 + 20x^2 + 4x - 1$

3. $7y^4 - 5y^3 + y^2 + 3y - 1$

4. $6x^3 + x^2 + 7x + 4$

5. $6x^2 - 48x - 54$

6. $9x^2 - 48x + 64$

7. $81x^2 - 16$