

A monomial is an expression that is either a real number, a variable, or a product of real numbers and variables with whole-number exponents. A polynomial is a monomial or the sum of monomials. For any polynomial, you can write the corresponding polynomial function, as shown below.

Definition**Polynomial Function**

$P(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0$ where n is a nonnegative integer and the coefficients a_n, \dots, a_0 are real numbers.

The exponent of the variable in a term determines the **degree** of that term. The terms in the polynomial shown below are in *descending order* by degree. This order demonstrates the **standard form of a polynomial**. A one-variable polynomial in standard form has no two terms with the same degree, since all like terms have been combined.

The diagram shows the polynomial $P(x) = 2x^3 - 5x^2 - 2x + 5$ enclosed in a rounded rectangle. The entire expression is labeled "Polynomial" with an arrow pointing to the right. The coefficient "2" is boxed in pink and labeled "Leading coefficient" with a pink arrow. The term $2x^3$ is labeled "Cubic term" with a purple arrow. The term $-5x^2$ is labeled "Quadratic term" with a blue arrow. The term $-2x$ is labeled "Linear term" with a blue arrow. The constant term "5" is labeled "Constant term" with an orange arrow. A purple arrow labeled "Degree" points to the exponent "3" in the first term.

$$P(x) = 2x^3 - 5x^2 - 2x + 5$$

Labels below the polynomial:

- Leading coefficient (pink)
- Cubic term (purple)
- Quadratic term (blue)
- Linear term (blue)
- Constant term (orange)

You can classify a polynomial by the number of terms it contains. A polynomial of more than three terms does not usually have a special name. You can also classify a polynomial by its degree. The degree of a polynomial is the largest degree of any term of the polynomial. The name assigned to each degree is listed below.

Exp. Degree	Name Using Degree	Polynomial Example	Number of Terms	Name Using Number of Terms
0	constant	6	1	monomial ✗
1	linear	$x + 3$	2	binomial ✗
2	quadratic	$3x^2$	1	monomial
3	cubic	$2x^3 - 5x^2 - 2x$	3	trinomial ✗
4	quartic	$x^4 + 3x^2$	2	binomial
5	quintic	$-2x^5 + 3x^2 - x + 4$	4	polynomial of 4 terms

Write each polynomial in standard form. Then classify it by degree and by number of terms.

a. $-7x + 5x^4$ $5x^4 - 7x$

$$5x^4 - 7x$$

The term with the largest degree is $5x^4$, so the polynomial is degree 4. It has two terms. The polynomial is a quartic binomial.

4
Degree

2
of terms

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

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

The term with the largest degree is $3x^3$, so the polynomial is degree 3. It has three terms. The polynomial is a cubic trinomial.

Write each polynomial in standard form. Then classify it by degree and by number of terms.

a. $4x - 6x + 5$

$$-2x + 5$$

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

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

c. $6 - 2x^5$

$$-2x^5 + 6$$

What is a monomial?

What is a polynomial?

What is standard form of a polynomial?

What are two ways you can classify a polynomial?

What is a degree of a polynomial?