

Algebra 2

Lesson 6-1: Polynomial Functions

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A polynomial is a series of algebraic terms, monomials, with + and – signs between them.

The **degree** of a polynomial is the largest exponent value in the expression.

A polynomial is in **standard** form when all “like” terms have been combined and the polynomial has been written in **descending** order.

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

Some expressions look like polynomials but are **NOT** polynomials.

Examples: 5^x $3n^{4.25} - 4n^2$, $4\sqrt{x}$

The reason this is so is that by definition a polynomial is:

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_2 x^2 + a_1 x^1 + a_0$$

(That is: a series of integers multiplied by a variable raised to a whole number!)

Polynomials are to be written in standard form. When there are multiple polynomials, simplify through distribution, and adding or subtracting like terms. Take extra care when working negatives and coefficients outside parentheses.

Simplify, write in standard form, and classify:

$x^2 + x^3 - 9$ degree: # of terms:	$2a(a^2 - 4)$ degree: # of terms:
$(3x^3 - 4x + 1) - (1 - 4x + x^2)$ degree: # of terms:	$5x^4 - 7$ degree: # of terms:

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Write *sometimes*, *always*, or *never* for each of the following statements.

A cubic polynomial must have 3 terms.

A quadratic polynomial must have a degree of 2.

The leading coefficient is the largest coefficient in the expression.

An expression with a variable as the exponent is a polynomial. (e.g. $5^x + 4 - 3x^2$)