

9.1 Add and Subtract Polynomials

TEKS A.1.C, A.4.A, A.4.B

Before

You added and subtracted integers.

Now

You will add and subtract polynomials.

Why?

So you can model trends in recreation, as in Ex. 37.



Key Vocabulary

- monomial
- degree
- polynomial
- leading coefficient
- binomial
- trinomial

A **monomial** is a number, a variable, or the product of a number and one or more variables with whole number exponents. The **degree of a monomial** is the sum of the exponents of the variables in the monomial. The degree of a nonzero constant term is 0. The constant 0 does not have a degree.

Monomial	Degree
10	0
$3x$	1
$\frac{1}{2}ab^2$	$1 + 2 = 3$
$-1.8m^5$	5

Not a monomial	Reason
$5 + x$	A sum is not a monomial.
$\frac{2}{n}$	A monomial cannot have a variable in the denominator.
4^a	A monomial cannot have a variable exponent.
x^{-1}	The variable must have a whole number exponent.

A **polynomial** is a monomial or a sum of monomials, each called a *term* of the polynomial. The **degree of a polynomial** is the greatest degree of its terms.

When a polynomial is written so that the exponents of a variable decrease from left to right, the coefficient of the first term is called the **leading coefficient**.

$$\begin{array}{ccc}
 \text{leading coefficient} & \text{degree} & \text{constant term} \\
 \swarrow & \downarrow & \downarrow \\
 2x^3 + x^2 - 5x + 12
 \end{array}$$

EXAMPLE 1 Rewrite a polynomial

Write $15x - x^3 + 3$ so that the exponents decrease from left to right. Identify the degree and leading coefficient of the polynomial.

Solution

Consider the degree of each of the polynomial's terms.

$$\begin{array}{ccc}
 \text{Degree is 1.} & \text{Degree is 3.} & \text{Degree is 0.} \\
 \swarrow & \downarrow & \swarrow \\
 15x - x^3 + 3
 \end{array}$$

The polynomial can be written as $-x^3 + 15x + 3$. The greatest degree is 3, so the degree of the polynomial is 3, and the leading coefficient is -1 .