

# Polynomials (Pages 382–387)

A **monomial** is a number, a variable, or a product of numbers and variables that have only positive exponents. A **polynomial** is the sum of one or more monomials. A **binomial** is the sum of two monomials, and a **trinomial** is the sum of three monomials. The **degree** of a monomial is the sum of the exponents of its variables. To find the degree of a polynomial, you must find the degree of each term. The greatest degree of any term is the degree of the polynomial. The terms of a polynomial are usually arranged so that the powers of one variable are in ascending or descending order.

## EXAMPLES

Consider the expression  $3x^2 + 7x + 5$ .

**A** If the expression is a polynomial, identify it as a *monomial*, *binomial*, or *trinomial*.

The expression is a polynomial since it is the sum of 3 monomials. Since there are 3 monomials, it is a trinomial. Note the powers of  $x$  are in descending order.

**B** Find the degree of the polynomial.

The degree of  $3x^2$  is 2, the degree of  $7x$  is 1, and the degree of 5 is 0. The greatest degree is 2, so the degree of the polynomial is 2.

## PRACTICE

Determine whether each expression is a monomial. Explain why or why not.

1.  $\frac{1}{80}z^3$

2.  $a^8 - \frac{1}{5}a$

3.  $\frac{n^2}{17m}$

State whether each expression is a polynomial. If the expression is a polynomial, identify it as a monomial, a binomial, or a trinomial.

4.  $2x + 6z - 3y$

5.  $d^3$

6.  $4st^3 + 1.2t^2$

Find the degree of each polynomial.

7.  $7u^3$

8.  $a^8bc^2 - 9ac^2$

9. 18

Arrange the terms of each polynomial so that the powers of  $x$  are in descending order.

10.  $2 + x^4 + x^2$

11.  $6x - 3x^2 + 4 - 2x^8$

12.  $a^2bx^6 - bcx^5 + 24 - x^2$

Arrange the terms of each polynomial so that the powers of  $x$  are in ascending order.

13.  $8x^4 - 2x^8 + 4x^9 + \frac{3}{10}x^5$

14.  $3a^2x^8 - 2a^2x^5 + \frac{1}{4}x^2 + \frac{1}{2}x$

15.  $17xy^3 + 6x^4y - x^3y^2 + y^5$



**16. Standardized Test Practice** What is the degree of the polynomial  $3x^2y - 4xy^3$ ?

A 1

B 2

C 3

D 4

**Answers:** 1. yes; product of a number and a variable 2. no; includes subtraction 3. no; includes division 4. yes; trinomial 5. yes; monomial 6. yes; binomial 7. 3 8. 11 9. 0 10.  $x^4 + x^2 + 2$  11.  $-2x^8 - 3x^2 + 6x + 4$  12.  $a^2bx^6 - bcx^5 - x^2 + 24$  13.  $8x^9 - 2x^8 + 4x^4 + \frac{3}{10}x^5$  14.  $\frac{1}{4}x^8 - 2a^2x^5 + \frac{1}{2}x^2 + \frac{1}{2}x$  15.  $17xy^3 + 6x^4y - x^3y^2 + y^5$  16. D