



## Hot Words

Monomial is a real number, variable, or a product of a real number and one or more variables with whole number exponents.

Examples of monomials: 18      z       $-4x^2$        $2.5xy^3$        $\frac{a}{3}$

The degree of a monomial is the sum of the exponents of its variables. The degree of a constant (other than zero) is 0. (Zero has no degree.)

### FINDING THE DEGREE OF A MONOMIAL:

Find the degree of each of the monomials:

A.  $8x$  1      B.  $4x^2y^5$   $2+5=7$       C.  $7$  0

### ADDING AND SUBTRACTING MONOMIALS:

To add or subtract monomials they must be like terms.

D.  $-6x^4 + 11x^4 = (-6+11)x^4 = 5x^4$       E.  $2x^2y^4 - 7x^2y^4 = (2-7)x^2y^4 = -5x^2y^4$   
 F.  $2x^2 + 7x^2 = (2+7)x^2 = 9x^2$       G.  $8x^2y - 3x^2y = (8-3)x^2y = 5x^2y$

\* Add/Subtract the coefficients of like terms.

Practice: Try these on your own:

Find the degree of each monomial.

1.  $8a^3$  \_\_\_\_\_      2.  $2b^8c^2$  \_\_\_\_\_      3.  $-3$  \_\_\_\_\_      4.  $0$  \_\_\_\_\_

Simplify:

5.  $2m^3n^3 + 9m^3n^3 =$  \_\_\_\_\_      6.  $3t^4 + 11t^4 =$  \_\_\_\_\_

7.  $30v^4w^3 - 12v^4w^3 =$  \_\_\_\_\_      8.  $5bc^4 - 13bc^4 =$  \_\_\_\_\_

## CLASSIFYING POLYNOMIALS

A polynomial is a monomial or a sum of monomials. The standard form of a polynomial means the degrees of its monomial terms decrease from left to right. The degree of a polynomial in one variable is the same as the degree of the monomial with the greatest exponent.

A polynomial can be named based on its degree or the number of terms it contains.

Polynomial	Degree	Name Using Degree	Number of Terms	Name Using Number of Terms
6	0	constant	1	monomial
$5x + 9$	1	linear	2	binomial
$4x^2 + 7x + 3$	2	quadratic	3	trinomial
$2x^3$	3	cubic	1	monomial
$8x^4 - 2x^3 + 3x$	4	fourth degree	3	trinomial

Write each polynomial in standard form. What is the name of the polynomial based on its degree and number of terms?

H.  $6 + 2x^2 = \underline{2x^2 + 6}$  Place terms in order

This is a quadratic binomial

I.  $2 + 3x^2 + x^2 + 4x^3 = \underline{-4x^3 + 3x^2 + x^2 + 2}$

$= \underline{-4x^3 - 2x^2 + 2}$  (simplify)

This is a cubic trinomial.

Practice:

Write each polynomial in standard form. Then name based on degree and number of terms.

9.  $-2q + 7$  \_\_\_\_\_

10.  $6x^2 - 13x^2 - 4x + 4 =$  \_\_\_\_\_

11.  $3z^4 - 5z - 2z^2 =$  \_\_\_\_\_

**ADDING POLYNOMIALS**

Method 1: Add vertically. Line up like terms. Then add the coefficients.

$$(2x^2 + 120x) + (-0.5x^2 - 300x - 8000)$$

$$\begin{array}{r} 2x^2 + 120x \\ -0.5x^2 - 300x - 8000 \\ \hline 1.5x^2 - 180x - 8000 \end{array}$$

Method 2: Add horizontally. Group like terms. Then add the coefficients.

$$(-12x^3 + 106x^2 - 241x + 4477) + (14x^2 - 14x + 1545)$$

$$\begin{array}{r} -12x^3 + (106x^2 + 14x^2) + (-241x + -14x) + (4477 + 1545) \\ \hline -12x^3 + 120x^2 - 255x + 6022 \end{array}$$

**SUBTRACTING POLYNOMIALS**

Method 1: Subtract vertically. Line up like terms. Change each sign of the second polynomial. Then add the coefficients.

$$(2x^3 + 4x^2 - 3x) - (6x^3 + 5x^2 - 4)$$

$$\begin{array}{r} 2x^3 + 4x^2 - 3x \\ - 6x^3 + 5x^2 - 4 \\ \hline 2x^3 + 4x^2 - 3x \\ + -6x^3 - 5x^2 + 4 \\ \hline -4x^2 - x^2 - 3x + 4 \end{array}$$

Method 2: Subtract horizontally. Change each sign of the second polynomial. Group like terms. Then add the coefficients.

$$(x^3 - 3x^2 + 5x) + (7x^3 + 5x^2 + 12) = (x^3 - 3x^2 + 5x) + (-7x^3 + -5x^2 + 12)$$

$$= (x^3 + -7x^3) + (-3x^2 + -5x^2) + 5x + 12$$

$$= -6x^3 - 8x^2 + 5x + 12$$

Practice:

$$\begin{array}{r} 12. 6x^2 + 7 \\ + 3x^2 + 1 \\ \hline \end{array}$$

$$13. (5x^2 + 3) + (15x^2 + 2)$$

$$\begin{array}{r} 14. 6x^3 + 17 \\ - (4x^3 + 9) \\ \hline \end{array}$$

$$15. (14h^4 + 3h^3) - (9h^4 + 2h^3)$$

