Add + Sub. Polynomials

#add exponents

1 EXAMPLE   Find the degree of each monomial.

a. 18   Degree: 0   The degree of a nonzero constant is 0.

b. $3xy^3$ Degree: 4   The exponents are 1 and 3. Their sum is 4.

c. $6c$ Degree: 1 $6c = 6c^1$. The exponent is 1.

2 EXAMPLE   Write each polynomial in <u>standard form</u>. Then name each polynomial by its degree and the number of its terms.

Highest → Lowest Exponents (Degree)

a. $-2 + 7x$

   $7x - 2$ Place terms in order.

   linear binomial

b. $3x^5 - 2 - 2x^5 + 7x$

   $3x^5 - 2x^5 + 7x - 2$ Place terms in order.

   $x^5 + 7x - 2$ Combine like terms.

   fifth degree trinomial

3 EXAMPLE   Simplify $(6x^2 + 3x + 7) + (2x^2 - 6x - 4)$

Method 1: Add vertically.

Line up like terms. Then add the coefficients.

$6x^2 + 3x + 7$
$\underline{2x^2 - 6x - 4}$
$8x^2 - 3x + 3$

Method 2: Add horizontally.

Group like terms. Then add the coefficients.

$(6x^2 + 3x + 7) + (2x^2 - 6x - 4) = (6x^2 + 2x^2) + (3x - 6x) + (7 - 4)$

$$= 8x^2 - 3x + 3$$

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

Method 1: Subtract vertically.

Line up like terms. Then add the coefficients.

$$\begin{array}{lll} 2x^3 + 4x^2 & -\ 6 & \text{Line up like terms.}\\ -(5x^3 \qquad\ + 2x & -\ 2) \end{array}$$

$$\begin{array}{ll} \begin{aligned} 2x^3 + 4x^2 \qquad\quad -\ 6\\ -5x^3 \qquad\quad -\ 2x +\ 2\\ \hline -3x^3 + 4x^2 - 2x - 4 \end{aligned} & \text{Add the opposite.} \end{array}$$

Method 2: Subtract horizontally.

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

$= 2x^3 + 4x^2 - 6 - 5x^3 - 2x + 2$ Write the opposite of each term in the polynomial being subtracted.

$= (2x^3 - 5x^3) + 4x^2 - 2x + (-6 + 2)$ Group like terms.

$= -3x^3 + 4x^2 - 2x - 4$ Simplify.