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Lesson 9-1 *(pp. 456–461)* Adding and Subtracting Polynomials

Lesson Objectives	**NAEP 2005 Strand:** Algebra
1 Describing polynomials 2 Add and subtract polynomials	**Topic:** Variables, Expressions, and Operations **Local Standards:** _____

Vocabulary

A monomial is _____

_____

The degree of a monomial is _____

_____

A polynomial is _____

_____

In the standard form of a polynomial, _____

_____

The degree of a polynomial is _____

_____

A binomial is _____

A trinomial is _____

Example

1 Degree of a Monomial Find the degree of each monomial.

a. 18 Degree: ☐ **The degree of a nonzero constant is ☐.**

b. $3xy^3$ Degree: ☐ **The exponents are ☐ and ☐. Their sum is ☐.**

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

Check Understanding

1. Critical Thinking What is the degree of $9x^0$? Explain.

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Examples

❷ Classifying Polynomials Write each polynomial in standard form combining like terms. Then name each polynomial by its degree and the number of its terms.

a. $-2 + 7x$

$7x -$ ☐

☐ ☐

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

$3x^5 -$ ☐ $+ 7x -$ ☐

☐ $+ 7x - 2$

☐ degree ☐

❸ Adding Polynomials Simplify $(6x^2 + 3x + 7) + (2x^2 - 6x - 4)$.

Line up like terms. Then add the coefficients.

$$\begin{array}{rrrrrr} 6x^2 & + & 3x & + & 7 \\ 2x^2 & - & 6x & - & 4 \\ \hline \square & - & \square & + & \square \end{array}$$

❹ Subtracting Polynomials Simplify $(2x^3 + 4x^2 - 6) - (5x^3 + 2x - 2)$.

Method 1 Subtract vertically.

Line up like terms. Then add the coefficients.

$$\begin{array}{rrrrrrr} 2x^3 & + & \square & & & - & 6 \\ -(5x^3 & & & + & \square & - & 2) \\ \hline 2x^3 & + & \square & & & - & 6 \\ -5x^3 & & & \square & \square & \square & 2 \\ \hline \square & + & 4x^2 & - & 2x & - & \square \end{array}$$

Line up like terms.

Add the opposite.

Method 2 Subtract horizontally.

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

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

$= \left(2x^3 - \square\right) + 4x^2 - 2x + \left(\square + 2\right)$ **Group like terms.**

$=$ ☐ $+ 4x^2 -$ ☐ $-$ ☐ **Simplify.**

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Check Understanding

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

a. $6x^2 + 7 - 9x^4$

b. $3y - 4 - y^3$

c. $8 + 7v - 11v$

3. Simplify each sum.

a. $(t^2 - 6) + (3t^2 + 11)$

b. $(2p^3 + 6p^2 + 10p) + (9p^3 + 11p^2 + 3p)$

4. Simplify each difference.

a. $(v^3 + 6v^2 - v) - (9v^3 - 7v^2 + 3v)$

b. $(4x^2 + 5x + 1) - (6x^2 + x + 8)$