

Adding and Subtracting Polynomials

To add polynomials, add like terms. You can use a vertical or a horizontal format.

Example 1 Find each sum.

a. $(5x^2 + 3x - 7) + (x^2 + 2)$

Use a vertical format. Align like terms vertically and add.

$$\begin{array}{r} 5x^2 + 3x - 7 \\ + \quad x^2 \quad + 2 \\ \hline 6x^2 + 3x - 5 \end{array}$$

b. $(-4x^3 - x + 1) + (2x^2 + 8x - 9)$

Use a horizontal format. Group like terms and simplify.

$$\begin{aligned} (-4x^3 - x + 1) + (2x^2 + 8x - 9) &= (-4x^3 + 2x^2) + (-x + 8x) + (1 - 9) \\ &= -2x^3 + 7x - 8 \end{aligned}$$

To subtract a polynomial, add its opposite. To find the opposite of a polynomial, multiply each of its terms by -1 .

Example 2 Find each difference.

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

Use a vertical format. Align like terms vertically and subtract.

$$\begin{array}{r} 6x^3 \quad \quad - 2x - 5 \\ - (-x^3 + 3x^2 \quad + 4) \\ \hline 7x^3 - 3x^2 - 2x - 9 \end{array}$$

b. $(5x^2 + 7x - 3) - (4x^2 - \quad + 2x - 1)$

Use a horizontal format. Group like terms and simplify.

$$\begin{aligned} (5x^2 + 7x - 3) - (4x^2 - \quad + 2x - 1) &= 5x^2 + 7x - 3 - 4x^2 + 2x + 1 \\ &= (5x^2 - 4x^2) + (7x + 2x) + (-3 + 1) \\ &= x^2 + 9x - 2 \end{aligned}$$

Practice

Check your answers at BigIdeasMath.com.

Find the sum or difference.

1. $(-8x + 2) + (-10x - 7)$

2. $(x^3 + 9x) - (4x^3 - x)$

3. $(x^2 - 2x - 6) + (6x^2 + x + 8)$

4. $(2x^3 + 5x^2 - x) + (x^3 - 10x^2 + 5x)$

5. $(-7x^3 - x^2 + 10) - (3x^2 + 2x - 2)$

6. $(x^3 + 8x + 3) - (-x^3 + 2x^2 - 5)$

7. $(x^2 + 4x + 1) + (-x^2 - 1)$

8. $(3x^3 - 2x^2) - (5x^3 - x^2 - x)$

9. $(2x^3 - 5) - (-8x^2 - 5x)$

10. $(-x^2 - 4) + (x^3 - 4x^2)$