

# 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.

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

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

Use a horizontal format. Group like terms and simplify.

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

## Practice

Check your answers at [BigIdeasMath.com](http://BigIdeasMath.com).

### Find the sum or difference.

1.  $(-8x + 2) + (-10x - 7)$   $-18x - 5$

2.  $(x^3 + 9x) - (4x^3 - x)$   $-3x^3 + 10x$

3.  $(x^2 - 2x - 6) + (6x^2 + x + 8)$   $7x^2 - x + 2$

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

5.  $(-7x^3 - x^2 + 10) - (3x^2 + 2x - 2)$   
 $-7x^3 - 4x^2 - 2x + 12$

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

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

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

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

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