

Study Guide

Adding and Subtracting Polynomials

You can use the following methods when you add polynomials.

Example 1: Find $(4x + 6y) + (3x + 9y)$.

$$\begin{aligned}(4x + 6y) + (3x + 9y) &= (4x + 3x) + (6y + 9y) \\ &= (4 + 3)x + (6 + 9)y \\ &= 7x + 15y\end{aligned}$$

Example 2: Find $(3x^2 - 5xy + 8y^2) + (2x^2 + xy - 6y^2)$.

$$\begin{array}{r}3x^2 - 5xy + 8y^2 \\ 2x^2 + \quad xy - 6y^2 \\ \hline 5x^2 - 4xy + 2y^2\end{array}$$

You can subtract a polynomial by adding its additive inverse.

$$\begin{array}{ccc} \text{Subtraction} & & \text{Addition} \\ & \downarrow & \downarrow \\ & \text{additive inverses} & \\ -1 - (-4) = 3 & & -1 + 4 = 3 \end{array}$$

Example 3: Find $(7x^2 - 8) - (-3x^2 + 1)$.

Method 1

$$\begin{aligned}(7x^2 - 8) - (-3x^2 + 1) \\ &= 7x^2 - 8 + 3x^2 - 1 \\ &= (7x^2 + 3x^2) + (-8 - 1) \\ &= 10x^2 - 9\end{aligned}$$

Method 2

$$\begin{array}{r}7x^2 - 8 \\ (-) \quad -3x^2 + 1(+)\ \\ \hline 10x^2 - 9\end{array}$$

Find each sum or difference.

1. $(4a - 5) + (3a + 6)$

2. $(3x^2 - 5xy^2 + y^3) + (-3x^2 + 5xy^2 - y^3)$

3. $(3p^2 - 2p + 3) + (p^2 - 7p + 7)$

4. $(x^2 + y^2) - (-x^2 + y^2)$

5. $(2x^2 + 5xy + 4y^2) - (2x^2 + 5xy + 4y^2)$

6. $(2a^2 - ab + b^2) + (3a^2 + 5ab - 7ab^2)$

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

8.
$$\begin{array}{r}5x + 1\frac{1}{2}y + \frac{1}{4} \\ (+) \quad 2x \quad \quad - 7 \\ \hline\end{array}$$

9.
$$\begin{array}{r}x^2 + 2xy + y^2 \\ x^2 - xy - y^2 \\ (+) \quad 3x^2 - 2xy - y^2 \\ \hline\end{array}$$

10.
$$\begin{array}{r}10x^2 + 5x - 6 \\ (-) \quad 8x^2 - 2x + 7 \\ \hline\end{array}$$

11.
$$\begin{array}{r}4.2x^2 \quad \quad - 3.2 \\ (-) \quad 5.9x^2 + 2.6x - 1.9 \\ \hline\end{array}$$

12.
$$\begin{array}{r}7p^2q^2 - 8pq + 9 \\ (-) \quad p^2q^2 - 9pq - 10 \\ \hline\end{array}$$