

8-5 Study Guide and Intervention *(continued)***Adding and Subtracting Polynomials**

Subtract Polynomials You can subtract a polynomial by adding its additive inverse. To find the additive inverse of a polynomial, replace each term with its additive inverse or opposite.

Example Find $(3x^2 + 2x - 6) - (2x + x^2 + 3)$.

Horizontal Method

Use additive inverses to rewrite as addition. Then group like terms.

$$\begin{aligned} (3x^2 + 2x - 6) - (2x + x^2 + 3) \\ &= (3x^2 + 2x - 6) + [(-2x) + (-x^2) + (-3)] \\ &= [3x^2 + (-x^2)] + [2x + (-2x)] + [-6 + (-3)] \\ &= 2x^2 + (-9) \\ &= 2x^2 - 9 \end{aligned}$$

The difference is $2x^2 - 9$.

Vertical Method

Align like terms in columns and subtract by adding the additive inverse.

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

The difference is $2x^2 - 9$.

Exercises

Find each difference.

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

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

3. $(9xy + y - 2x) - (6xy - 2x)$

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

5. $(6p^2 + 4p + 5) - (2p^2 - 5p + 1)$

6. $(6x^2 + 5xy - 2y^2) - (-xy - 2x^2 - 4y^2)$

7. $(8p - 5q) - (-6p^2 + 6q - 3)$

8. $(8x^2 - 4x - 3) - (-2x - x^2 + 5)$

9. $(3x^2 - 2x) - (3x^2 + 5x - 1)$

10. $(4x^2 + 6xy + 2y^2) - (-x^2 + 2xy - 5y^2)$

11. $(2h - 6j - 2k) - (-7h - 5j - 4k)$

12. $(9xy^2 + 5xy) - (-2xy - 8xy^2)$

13. $(2a - 8b) - (-3a + 5b)$

14. $(2x^2 - 8) - (-2x^2 - 6)$

15. $(6z^2 + 4z + 2) - (4z^2 + z)$

16. $(6x^2 - 5x + 1) - (-7x^2 - 2x + 4)$

8-5 Study Guide and Intervention (continued)

Adding and Subtracting Polynomials

Subtract Polynomials You can subtract a polynomial by adding its additive inverse. To find the additive inverse of a polynomial, replace each term with its additive inverse or opposite.

Example Find $(3x^2 + 2x - 6) - (2x + x^2 + 3)$.

Horizontal Method

Use additive inverses to rewrite as addition. Then group like terms.

$$\begin{aligned} &(3x^2 + 2x - 6) - (2x + x^2 + 3) \\ &= (3x^2 + 2x - 6) + [(-2x) + (-x^2) + (-3)] \\ &= [3x^2 + (-x^2)] + [2x + (-2x)] + [-6 + (-3)] \\ &= 2x^2 + (-9) \\ &= 2x^2 - 9 \end{aligned}$$

The difference is $2x^2 - 9$.

Vertical Method

Align like terms in columns and subtract by adding the additive inverse.

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

The difference is $2x^2 - 9$.

Exercises

Find each difference.

1. $(3a - 5) - (5a + 1)$
 $-2a - 6$

3. $(9xy + y - 2x) - (6xy - 2x)$
 $3xy + y$

5. $(6p^2 + 4p + 5) - (2p^2 - 5p + 1)$
 $4p^2 + 9p + 4$

7. $(8p - 5q) - (-6p^2 + 6q - 3)$
 $6p^2 + 8p - 11q + 3$

9. $(3x^2 - 2x) - (3x^2 + 5x - 1)$
 $-7x + 1$

11. $(2h - 6j - 2k) - (-7h - 5j - 4k)$
 $9h - j + 2k$

13. $(2a - 8b) - (-3a + 5b)$
 $5a - 13b$

15. $(6z^2 + 4z + 2) - (4z^2 + z)$
 $2z^2 + 3z + 2$

2. $(9x + 2) - (-3x^2 - 5)$
 $3x^2 + 9x + 7$

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

6. $(6x^2 + 5xy - 2y^2) - (-xy - 2x^2 - 4y^2)$
 $8x^2 + 6xy + 2y^2$

8. $(8x^2 - 4x - 3) - (-2x - x^2 + 5)$
 $9x^2 - 2x - 8$

10. $(4x^2 + 6xy + 2y^2) - (-x^2 + 2xy - 5y^2)$
 $5x^2 + 4xy + 7y^2$

12. $(9xy^2 + 5xy) - (-2xy - 8xy^2)$
 $17xy^2 + 7xy$

14. $(2x^2 - 8) - (-2x^2 - 6)$
 $4x^2 - 2$

16. $(6x^2 - 5x + 1) - (-7x^2 - 2x + 4)$
 $13x^2 - 3x - 3$