

13-3 Subtracting Polynomials (Pages 678–681)

Recall that you can subtract a rational number by adding its additive inverse. You can also subtract a polynomial by adding its additive inverse. To find the additive inverse of a polynomial, multiply the entire polynomial by -1 , which effectively changes the sign of each term in the polynomial.

Examples Find each difference.

a. $(9y + 7) - (4y + 6)$

To subtract vertically, align the like terms and then subtract.

$$\begin{array}{r} 9y + 7 \\ (-) 4y + 6 \\ \hline 5y + 1 \end{array}$$

b. $(6z + 2) - (5z - 8)$

To subtract horizontally, add the additive inverse of the second polynomial.

$$\begin{aligned} (6z + 2) - (5z - 8) &= (6z + 2) + (-1)(5z - 8) \\ &= 6z + 2 + (-5z + 8) && \text{Group like terms.} \\ &= (6z - 5z) + (2 + 8) \\ &= 1z + 10 \text{ or } z + 10 \end{aligned}$$

Try These Together

Find each difference.

1. $(3t + 2) - (2t + 1)$

2. $(-2y + 4) - (10y + 3)$

3. $(6x + 7) - (8x + 4)$

Practice

State the additive inverse of each polynomial.

4. $8xy$

5. $k^2 + 7k$

6. $-3m + n - 7n^2$

Find each difference.

7. $(-9g - 2) - (-3g + 5)$

8. $(-11x + 4) - (3x + 2)$

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

10. $(5a - 12b) - (3a - 13b)$

11. $(4x^2 - 3) - (2x^2 + 5)$

12. $(c^2 + 7) - (c^2 - 5)$

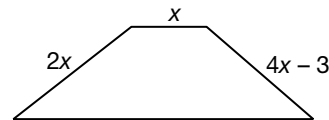
13. $(6r^2 + 8r - 3) - (2r^2 + 4r - 1)$

14. $(5b^2 + 3b - 15) - (-3b^2 + 4b - 2)$

15. $(7m^2 - 4m - 5) - (-2m^2 - 3m - 3)$

16. $(7x^3 - 2x^2 + 4x + 9) - (5x^3 - 2x^2 - x + 4)$

17. **Geometry** The perimeter of the trapezoid is $8x + 18$. Find the missing length of the lower base.



18. **Standardized Test Practice** Find the difference of $10x^3 + 4x^2 - 6x + 15$ and $5x^3 - 2x^2 - 5x - 3$.

A $5x^3 + 6x^2 - x + 18$

B $-5x^3 - 6x^2 - x + 18$

C $15x^3 + 2x^2 + x + 18$

D $-15x^3 - 6x^2 - x + 18$

Answers: 1. $t + 1$ 2. $-12y + 1$ 3. $-2x + 3$ 4. $-8xy$ 5. $-k^2 - 7k$ 6. $3m - n + 7n^2$ 7. $-6g - 7$ 8. $-14x + 2$ 9. $4x - y$ 10. $2a + b$ 11. $2x^2 - 8$ 12. 12 13. $4t^2 + 4r - 2$ 14. $8b^2 - b - 13$ 15. $9m^2 - m - 2$ 16. $2x^3 + 5x + 5$ 17. $x + 21$ 18. A