# 15-3 Subtracting Polynomials

**Objective:** To subtract polynomials.

**Rule for Subtracting Polynomials**
To subtract a polynomial, add the opposite of each term of the polynomial.

***Example*** Subtract.

**a.** $(8a^2 - 3a + 1) - (3a^2 - a - 5)$ **b.** $(6b^3 - b + 2) - (-4b^3 + 2b^2 - 10)$

***Solution***

**a.** $(8a^2 - 3a + 1) - (3a^2 - a - 5)$

$= (8a^2 - 3a + 1) + (-3a^2 + a + 5)$ ← Add the opposite of $(3a^2 - a - 5)$.

$= (8a^2 - 3a^2) + (-3a + a) + (1 + 5)$

$= 5a^2 - 2a + 6$

**b.** Line up like terms. Insert zero terms as needed. Add the opposite.

$$\begin{array}{r} 6b^3 + 0b^2 - b + 2 \\ -4b^3 + 2b^2 + 0b - 10 \end{array} \rightarrow \begin{array}{r} 6b^3 + 0b^2 - b + 2 \\ 4b^3 - 2b^2 - 0b + 10 \\ \hline 10b^3 - 2b^2 - b + 12 \end{array}$$

**Subtract.**

1. $(10c^2 + 9c - 11) - (-5c^2 + c + 6)$
2. $(-3z^2 + 2z + 9) - (z^2 + 5z - 4)$
3. $(4x^4 - 2x^3 + 3x^2 + 5x - 1) - (-2x^4 - x^3 + 2x^2 + 4x + 6)$
4. $(2d^2 + d - 3) - (15d^2 - 7d + 8)$
5. $(-9x^5 + 2x^2 + 4) - (2x^5 + 4x^3 - 3x^2)$
6. $(-9a^2 + 4a + 8) - (4a^2 + 2a - 3)$
7. $(3m^5 - 4m^3 + 5m - 2) - (6m^4 + 2m^2 - 5)$
8. $(7x^2 + x + 3) - (10x^2 + 3x + 1)$
9. $(x^2 - 4x + 9) - (-3x^2 - 7x + 5)$
10. $(5v^4 - 2v^3 + v^2 - 3v) - (3v^4 + 2v^2 - 2v + 4)$
11. $(8x^2 + 8x + 8) - (15x^2 + 17x + 19)$
12. $(b^3 + 4b^2 - 6b - 5) - (-b^3 + 3b^2 + 2b - 9)$

## 15-3 Subtracting Polynomials *(continued)*

**Subtract.**

**13.** $(-4c^3 + 8c^2 - 3c) - (-3c^3 + 3c^2 - 9c)$

**14.** $(2y^2 + 3y + 4) - (5y^2 + 7y + 9)$

**15.** $(3a^3 - 5a^2 + 7) - (2a^3 + 4a^2 - 2a)$

**16.** $(8t^5 - 4t^3 + t - 2) - (4t^5 + 6t^4 - 3t^2 + 5)$

**17.** $(-2u^2 + 7u - 9) - (u^2 - 4u - 2)$

**18.** $(6n^2 + 9n + 10) - (8n^2 + 4n + 2)$

**19.** $(w^4 - 3w^2 + 2) - (3w^4 + 5w - 2w^2)$

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

### Spiral Review

**21.** Make a frequency table for the given data. Use intervals such as 51–60. *(Lesson 11-1)*

**Scores on a Mathematics Test**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 68 | 92 | 84 | 98 | 75 | 77 | 81 | 88 |
| 94 | 63 | 55 | 57 | 74 | 83 | 90 | 80 |

**22.** Find the volume of a pyramid with base 121 in.$^2$ and height 15 in. *(Lesson 14-4)*

**23.** Find the difference: $(3x^2 + 5x + 6) - (2x^2 - 3x - 1)$ *(Lesson 15-3)*

**24.** Solve and graph: $-3n + 4 < -2$
Use the number line at the right.
*(Lesson 13-7)*