The **standard form of a polynomial** that contains one variable is written with the terms in order from greatest degree to least degree. When written in standard form, the coefficient of the first term is called the **leading coefficient**.

Coefficient - the #'s out in front of the variables

Example 3A: Writing Polynomials in Standard Form

Write the polynomial in standard form. Then give the leading coefficient.

$6x - 7x^5 + 4x^2 + 9$

$-7x^5 + 4x^2 + 6x + 9$

L.C. -7

$y^2 + y^6 - 3y$

$16 - 4x^2 + x^5 + 9x^3$

$x^5 + 9x^3 - 4x^2 + 16$

L.C. $= 1$

$18y^5 - 3y^8 + 14y$

$-3y^8 + 18y^5 + 14y$

L.C. $= -3$

Example 5: *Application*

A tourist accidentally drops her lip balm off the Golden Gate Bridge. The bridge is 220 feet from the water of the bay. The height of the lip balm is given by the polynomial $-16t^2 + 220$, where t is time in seconds. How far above the water will the lip balm be after 3 seconds?

Adding Polynomials

$15m^3 + 6m^2 + 2m^3$

$17m^3 + 6m^2$

$2x^2 + 3x^2 + x$

$5x^2 + x$

$4y^4 + 6y^3 + 2y^4$

$6y^4 + 6y^3$

Add & Sub → Poly

- combine like terms
  - terms w/ same var. & same exp.
  - Add or Sub. coefficients

Adding Polynomials

$(5x^2 + 4x + 1) + (2x^2 + 5x + 2)$

$(4b^5 + 8b) + (3b^5 + 6b + 7b^5 + b)$

$14b^5 + 15b$

$(5a^3 + 3a^2 - 6a + 12a^2) + (7a^3 - 10a)$

Adding Polynomials

$(4m^2 + 5) + (m^2 - m + 6)$

$(10xy + x) + (-3xy + y)$

$(6x^2 - 4y) + (3x^2 + 3y - 8x^2 - 2y)$

7.5 Pg. 479

Algebra Daily Practice

Find the degree of each monomial.

4. 10^6 5. $-7xy^3$ 6. $0.4n^4$ 7. 2

Find the degree of each polynomial.

8. $x^2 - 2x + 1$ 9. $0.75a^2b - 2a^3b^4$ 10. $15y - 84y^3 + 108 - 3y^2$

11. $r^3 + r^2 - 5$ 12. $a^3 + a^2 - 2a$ 13. $3k^4 + k^2 - 2k^5 + k$

Write each polynomial in standard form. Then give the leading coefficient.

14. $-2h + 5 + h^2$ 15. $9a^8 - 8a^9$ 16. $5s^2 - 3s + 3 - s^3$

17. $2x + 3x^3 - 1$ 18. $5g - 7 + g^2$ 19. $3c^2 + 5c^4 + 5c^3 - 4$

Classify each polynomial according to its degree and number of terms.

20. $x^2 + 2x + 3$ 21. $x - 7$ 22. $8 + k + 5k^4$

23. $q^2 + 6 - q^3 + 3q^3$ 24. $5k^2 + 7k^2$ 25. $2a^2 + 4a^2 - a^2$

26. **Geometry** The surface area of a cone is approximated by the polynomial $3.14r^2 + 3.14r\ell$, where r is the radius and ℓ is the slant height. Find the approximate surface area of this cone.

7.6A - Pg. 487

Add or subtract.

1. $7a^2 - 10a^2 + 9a$ 2. $13x^2 + 9y^2 - 6x^2$ 3. $0.07r^4 + 0.32r^3 + 0.19r^4$

4. $\frac{1}{4}p^2 + \frac{2}{3}p^2$ 5. $5b^2c + b^2c - 3b^2c$ 6. $-8m + 5 - 16 + 11m$

Add.

7. $(5n^3 + 3n + 6) + (18n^3 + 9)$ 8. $(3.7q^2 - 8q + 3.7) + (4.3q^2 - 2.9q + 1.6)$

9. $(-3x + 12) + (9x^2 + 2x - 18)$ 10. $(9x^4 + x^3) + (2x^4 + 6x^3 - 8x^4 + x^2)$

Add.

25. $(2t^2 - 8t) + (8t^2 + 9t)$ 26. $(-7x^2 - 2x + 3) + (4x^2 - 9x)$

27. $(x^5 - x) + (x^4 + x)$ 28. $(-2z^3 + z + 2z^2 + z) + (3z^3 - 5z^2)$

34. **Geometry** The length of a rectangle is represented by $4a + 3b$, and its width is represented by $7a - 2b$. Write a polynomial for the perimeter of the rectangle.

Subtracting Poly

$(a^4 - 2a) - (-3a^4 + 3a - 1)$

$-2a^4 + a - 1$

$(7m^4 - 2m^2) - (5m^4 - 5m^2 + 8)$

$7m^4 - 2m^2 - 5m^4 + 5m^2 - 8$

$2m^4 + 3m^2 - 8$

$(-10x^2 - 3x + 7) + (x^2 - a)$

$-9x^2 - 3x - 2$