EXAMPLE 5
on p. 348
for Exs. 38–47

SPECIAL PRODUCTS **Find the product.**

38. $(x + 5)(x - 5)$ **39.** $(w - 9)^2$ **40.** $(y + 4)^3$

41. $(2c + 5)^2$ **42.** $(3t - 4)^3$ **43.** $(5p - 3)(5p + 3)$

44. $(7x - y)^3$ **45.** $(2a + 9b)(2a - 9b)$ **46.** $(3z + 7y)^3$

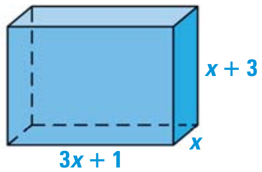
47. **TAKS REASONING** Which expression is equivalent to $(3x - 2y)^2$?

Ⓐ $9x^2 - 4y^2$ Ⓑ $9x^2 + 4y^2$

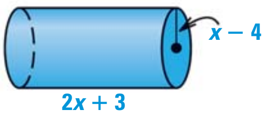
Ⓒ $9x^2 + 12xy + 4y^2$ Ⓓ $9x^2 - 12xy + 4y^2$

GEOMETRY **Write the figure's volume as a polynomial in standard form.**

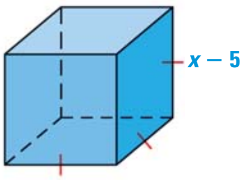
48. $V = \ell wh$



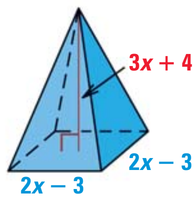
49. $V = \pi r^2 h$



50. $V = s^3$



51. $V = \frac{1}{3}Bh$



SPECIAL PRODUCTS **Verify the special product pattern by multiplying.**

52. $(a + b)(a - b) = a^2 - b^2$ **53.** $(a + b)^2 = a^2 + 2ab + b^2$

54. $(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$ **55.** $(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$

56. **TAKS REASONING** Let $p(x) = x^4 - 7x + 14$ and $q(x) = x^2 - 5$.

a. What is the degree of the polynomial $p(x) + q(x)$?

b. What is the degree of the polynomial $p(x) - q(x)$?

c. What is the degree of the polynomial $p(x) \cdot q(x)$?

d. In general, if $p(x)$ and $q(x)$ are polynomials such that $p(x)$ has degree m, $q(x)$ has degree n, and $m > n$, what are the degrees of $p(x) + q(x)$, $p(x) - q(x)$, and $p(x) \cdot q(x)$?

57. **FINDING A PATTERN** Look at the following polynomial factorizations.

$x^2 - 1 = (x - 1)(x + 1)$

$x^3 - 1 = (x - 1)(x^2 + x + 1)$

$x^4 - 1 = (x - 1)(x^3 + x^2 + x + 1)$

a. Factor $x^5 - 1$ and $x^6 - 1$ into the product of $x - 1$ and another polynomial. Check your answers by multiplying.

b. In general, how can $x^n - 1$ be factored? Show that this factorization works by multiplying the factors.

58. **CHALLENGE** Suppose $f(x) = (x + a)(x + b)(x + c)(x + d)$. If $f(x)$ is written in standard form, show that the coefficient of x^3 is the sum of a, b, c, and d, and the constant term is the product of a, b, c, and d.

 ◯ = WORKED-OUT SOLUTIONS on p. WS1 = TAKS PRACTICE AND REASONING