84. A travel agency offers a group rate of \$600 per person for a weekend in Lake Tahoe if 20 people sign up. For each additional person who signs up, the price per person is reduced by \$10.
   a. Write expressions for the size of the group and the price per person if x additional people sign up.
   b. Write a polynomial for the travel agency's total income if x additional people sign up for the trip.
   c. If 25 members of a ski club sign up for the weekend, what is the travel agency's income? If 30 members sign up?

B

■ *Simplify each expression. Assume that all exponents denote natural numbers. See Examples 7 and 8.*

85. $a^{2n}a^{n-3}$ 86. $b^n b^{2n+1}$ 87. $y^{2n+6}y^{4-n}$ 88. $a^{2n-2}a^{n+3}$
89. $(x^{2n}y)^3$ 90. $(xy^{3n})^2$ 91. $(x^{2n+1}y^{n-1})^3$ 92. $(x^{n-2}y^{2n+1})^2$
93. $x^n(2x^n - 1)$ 94. $3t^n(2t^n + 3)$ 95. $a^{2n+1}(a^n + a)$ 96. $b^{2n+2}(b^{n-1} + b^n)$
97. $(1 + a^n)(2 - a^n)$ 98. $(a^n - 3)(a^n + 2)$
99. $(2a^n - b^n)(a^n + 2b^n)$ 100. $(a^{2n} - 2b^n)(a^{3n} + b^{2n})$

■ *Verify each product.*

101. $(x + a)(x - a) = x^2 - a^2$ 102. $(x - a)^2 = x^2 - 2ax + a^2$
103. $(x + a)^2 = x^2 + 2ax + a^2$ 104. $(x + a)(x + b) = x^2 + (a + b)x + ab$
105. $(x + a)(x^2 - ax + a^2) = x^3 + a^3$ 106. $(x - a)(x^2 + ax + a^2) = x^3 - a^3$

1.4

FACTORING

It is sometimes useful to write a polynomial as a single *term* composed of two or more *factors.* This process is the reverse of multiplication and is called *factoring.* For example, observe that

$$3x^2 + 6x = 3x(x + 2).$$

Of course, we can also write

$$3x^2 + 6x = 6\left(\frac{1}{2}x^2 + x\right),$$