76. $3x^2 - 3x + 2xy - 2y$
77. $x^3y^2 + x^3 - 3y^2 - 3$
78. $12 - 4y^3 + 3x^2 - x^2y^3$
79. $x^3 + 8 + 2x^2 + 4x$
80. $x^3 + 9 + 3x^2 + 3x$
81. $2x^3 - 3 - 3x^2 + 2x$
82. $2x^3 + 14 + 7x^2 + 4x$

■ *Factor completely. See Example 8.*

83. $3x^2y + 12xy + 12y$
84. $2x^2y + 6xy - 20y$
85. $2a^3 + 15a^2 + 7a$
86. $2a^3 - 8a^2 - 10a$
87. $40a^2 - 80ab + 40b^2$
88. $20a^2 + 60ab + 45b^2$
89. $6x^3y - 11x^2y^2 + 3xy^3$
90. $9x^3y + 18x^2y^2 + 8xy^3$
91. $6u^3v^2 - 15u^2v + 6u$
92. $9u^2v^3 + 12uv^2 - 12v$
93. $12s^4t^4 - 10s^3t^3 + 2s^2t^2$
94. $16s^3t^3 - 16s^2t^2 - 12st$

B

■ *Factor completely. Assume that all variables in exponents denote natural numbers. See Example 9.*

95. $x^{2n} - x^n$
96. $x^{4n} + x^{2n}$
97. $x^{3n} - x^{2n} - 2x^n$
98. $4y^{4n} + 3y^{3n} + 2y^{2n}$
99. $2x^{n+2} + 4x^n - 2x^2$
100. $6x^{n+2} - 3x^{n+1} - 3x^n$

1.5

SPECIAL PRODUCTS AND FACTORS

The products below are special cases of the multiplication of binomials. They occur so often that you should learn to recognize them on sight:

I. $(x + a)^2 = (x + a)(x + a) = x^2 + 2ax + a^2$;
II. $(x - a)^2 = (x - a)(x - a) = x^2 - 2ax + a^2$;
III. $(x + a)(x - a) = x^2 - a^2$.

Common Errors

Note that in (I) $(x + a)^2 \neq x^2 + a^2$ and in (II) $(x - a)^2 \neq x^2 - a^2$.

EXAMPLE 1

a. $3(x + 4)^2$
$= 3(x^2 + 2 \cdot 4x + 4^2)$
$= 3x^2 + 24x + 48$

b. $(y + 5)(y - 5)$
$= y^2 - 5^2$
$= y^2 - 25$