1.3 Algebraic Expressions

Objectives: Be able to simplify expressions; factor trinomials; use special factoring formulas; factor by grouping.

Simplifying Expressions

Example 1 Simplify the expression: $(x\,y - y^2)(x^2 + x\,y + y^2)$

Example 2 Simplify: $\left(\sqrt{h^2+1}\ + 1\right)\left(\sqrt{h^2+1}\ - 1\right)$

Factoring Expressions

Example 3 Factor the trinomials:

(a) $x^2 - 10\,x - 24$ **(b)** $10\,x^2 + 29\,x - 21$ **(c)** $x^4 + 3\,x^2\ - 28$

Example 4 Factor: $3\,x^3 + 5\,x^2 - 6\,x - 10$

Example 5 Factor: $12\,x^3\,y^5 + 8\,x^5\,y^4$

Example 6 Factor: $2\,x^{-1}\,y + 10\,x^{-2}\,y^2 + 12\,x^{-3}\,y^3$

The next two factoring examples are expressions that result from *The Product Rule* used in Calculus I.

Example 7 Factor: $4\,(2\,x + 5)^3\,2\,(x + 4)^6 + (2\,x + 5)^4\,6\,(x + 4)^5$

Example 8 Factor: $3\,x^2(2\,x + 1)^{1/2} + x^3 \cdot \frac{1}{2} \cdot (2\,x + 1)^{-1/2} \cdot 2$