Lesson 6.4 Factoring Special Forms

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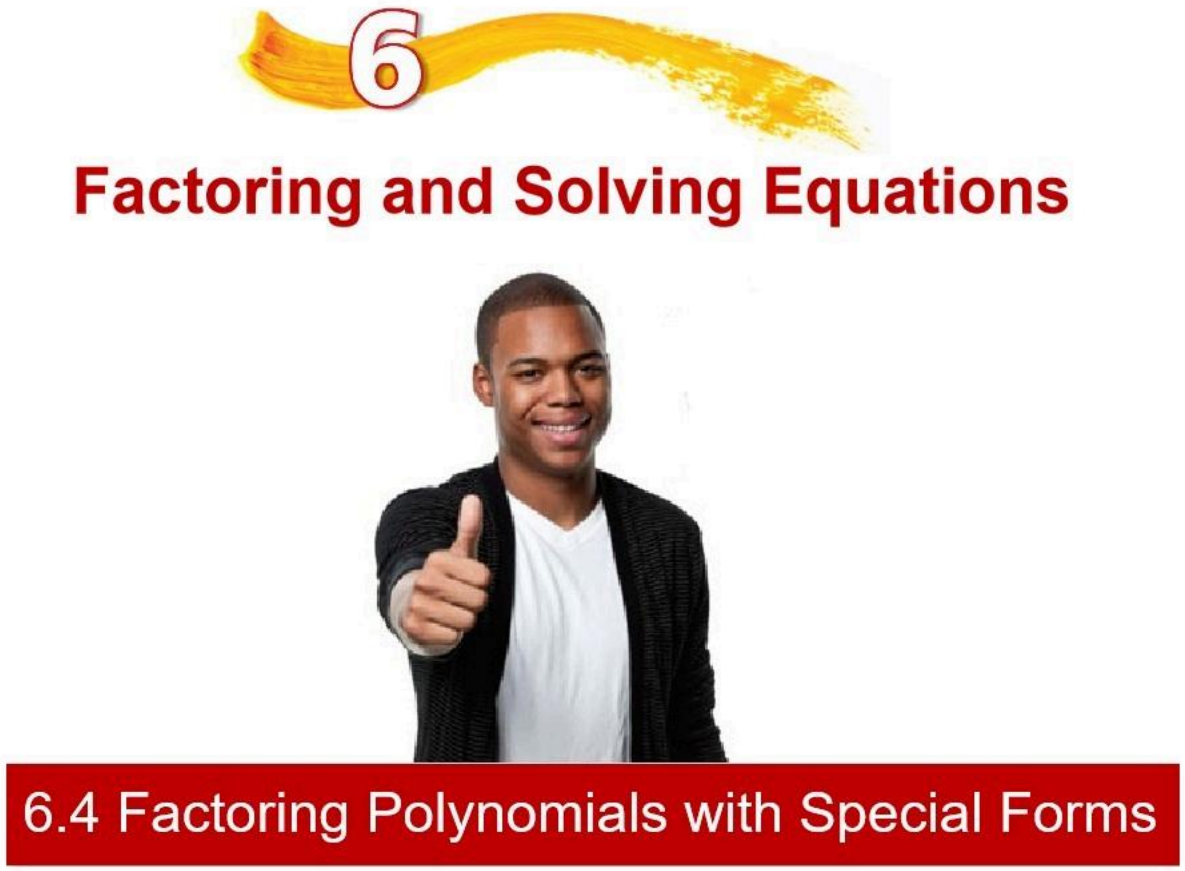
Lesson 6.4 Factoring



What You Will Learn

- Factor the difference of two squares.
- Factor a polynomial completely.
- Identify and factor perfect square trinomials.
- Factor the sum or difference of two cubes.

Difference of Two Squares 1

Difference of Two Squares

Let a and b be real numbers, variables, or algebraic expressions

$$a^2 - b^2 = (a + b)(a - b)$$

Difference — Opposite signs

To recognize perfect square terms, look for coefficients that are squares

of integers and for variables raised to *even* powers. Here are some examples.

Original Polynomials		*Difference of Squares*		*Factored Form*
$x^2 - 1$	→	$(x)^2 - (1)^2$	→	$(x+1)(x-1)$
$4x^2 - 9$	→	$(2x)^2 - (3)^2$	→	$(2x+3)(2x-3)$

-1x
1x
6x
-6x
0

4
9
16
25
36
49
64
81
100

Students, draw anywhere on this slide!

Example 1 – Factoring the Difference of Two Squares

a. $x^2 - 36 =$ $(x+6)(x-6)$

b. $81x^2 - 49 =$ $(9x+7)(9x-7)$

c. Factor the polynomial $20x^3 - 5x$

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

$5x(2x+1)(2x-1)$

Students, draw anywhere on this slide!

Example 2 – Removing a Common Monomial Factor First 1

A hammer is dropped from the roof of a building. The height of the hammer is given by the expression $-16t^2 + 64$, where t is the time in seconds.

$h = -16t^2 + 64$

$41 = -16t^2 + 64$

$-64 \quad -64$

$-23 = -16t^2$

$\frac{-23}{-16} = \frac{-16t^2}{-16}$

$1.44 = t^2$

$\sqrt{1.44} = t$

$1.2 = t$

$-16(t^2 - 4)$

$-16(t+2)(t-2)$

a. Factor the expression.

b. How many seconds does it take the hammer to fall to a height of 41 feet? 1.2 seconds

Perfect Square Trinomials 1

A **perfect square trinomial** is the square of a binomial.

a.) Factor: $x^2 + 4x + 4 =$ $(x+2)(x+2) = (x+2)^2$

$+2x$

$+2x$

$-3y$

b.) Factor the trinomial $y^2 - 6y + 9$.

$(y-3)(y-3)$

$-3y \quad -3y$

$(y-3)^2$

c.) Factor the trinomial $16x^2 + 40x + 25$

$(4x+5)(4x+5)$

$20x \quad 20x$