

# 6.3 Factoring

## Part 3

# Old Quadratic Binomial & Trinomial Factoring

Ways to factor quadratics

Binomial	Trinomial
1. GCF	1. GCF
2. Difference of Squares	2. Factoring Trinomial

Factor.

$$\textcircled{1} 16x^2 - 8x = 8x(2x - 1)$$

$$\textcircled{2} 6uv - 9v^2 = 3v(2u - 3v)$$

$$\textcircled{3} x^2 - 4 = (x - 2)(x + 2)$$

$$\textcircled{4} 4y^2 - 9 = (2y - 3)(2y + 3)$$

$$\textcircled{5} x^2 + 9x + 14 = (x + 7)(x + 2)$$

$$\textcircled{6} x^2 + 5x - 14 = (x + 7)(x - 2)$$

$$\textcircled{7} 2x^2 + 10x - 12 \\ = 2(x^2 + 5x - 6) = (x + 6)(x - 1)$$

$$\textcircled{8} 2x^2 + 11x + 9 = (2x + 9)(x + 1)$$

$$\textcircled{9} 4x^2 + 4x - 3 = (2x + 3)(2x - 1)$$

## New-A Factoring Part 3

Cubic Factoring Formulas:

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

[Examples] Factor.

$$\textcircled{1} x^3 - 8 = x^3 - 2^3 \\ = (x - 2)(x^2 + 2x + 2^2) \\ = (x - 2)(x^2 + 2x + 4)$$

$$\textcircled{2} x^3 + 27 = x^3 + 3^3 \\ = (x + 3)(x^2 + 3x + 3^2) \\ = (x + 3)(x^2 + 3x + 9)$$

$$\begin{aligned} \textcircled{3} \quad 27x^3 + 1 &= (3x)^3 + 1^3 \\ &= (3x+1)((3x)^2 - 3x(1) + 1^2) \\ &= (3x+1)(9x^2 - 3x + 1) \end{aligned}$$

$$\begin{aligned} \textcircled{4} \quad x^3 - 64 &= x^3 - 4^3 \\ &= (x-4)(x^2 + 4x + 4^2) \\ &= (x-4)(x^2 + 4x + 16). \end{aligned}$$

## new-B Factoring Part 3

### Cubic Factoring by grouping

$$\begin{aligned} \textcircled{1} \quad x^3 - 2x^2 - 9x + 18 \\ &= x^2(x-2) - 2(x-2) \\ &= (x^2-2)(x-2). \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad 2x^3 - 8x^2 + 3x - 12 \\ &= 2x^2(x-4) + 3(x-4) \\ &= (2x^2+3)(x-4). \end{aligned}$$

$$\begin{aligned} \textcircled{3} \quad 4x^3 + 16x^2 - x - 4 \\ &= 4x^2(x+4) - 1(x+4) \\ &= (4x^2-1)(x+4). \end{aligned}$$