

## Section 5.4: Factoring by Grouping and Special Forms

## Objectives:

- ✦ Factor the greatest common monomial factors from polynomials.
- ✦ Factor polynomials by grouping.
- ✦ Factor the difference of two squares.
- ✦ Factor the sum and difference of two cubes.
- ✦ Factor polynomials completely.

$$a^3 - b^3 = ?$$

$$x^2 + 2xy + y^2 = ?$$

$$a^2 + b^2 = ?$$

GCF: Greatest Common Factor

Find the GCF.

a)  $5x^4$ ,  $20x^3$ ,  $15x^5$

b)  $21a^4b$ ,  $12a^2b$ ,  $15a^5b$

① EXAMPLE:

Factor out the greatest common factor.

a)  $24x^3 - 32x^2$

b)  $4x^2(3x - 1) - 6(3x - 1)$

c)  $x^3 - 5x^2 + x - 5$

d)  $(3x + 7)(2x - 1) + (x - 6)(2x - 1)$

Difference of squares

② EXAMPLE

Factor these

a)  $9x^2 - 25$

b)  $a^2 - \frac{1}{16}$

c)  $(x + 3)^2 - 49$

Sum and Difference of Cubes

$$u^3 + v^3$$

$$u^3 - v^3$$

③ Example

Factor these.

a)  $x^3 - 64$

b)  $8w^3 + 27$

c)  $3x^4 + 81x$

d)  $2a^3 - 32a$

What about the sum of two squares?

$$x^2 + y^2$$