

**Factoring Binomials**

I. Difference of two squares.

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

Examples:

1.  $d^2 - 16$

2.  $-25 + m^4$

3.  $36x^6 - 16y^{10}$

4.  $(x - 2)^2 - 36$

5.  $4n^2 + 25m^2$

II. Sum or Difference of two cubes.

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

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

Examples:

6.  $x^3 + 8$

7.  $27x^3 - 1$

8.  $64x^3y^6 + 125z^9$

9.  $8x^8 - y^{15}$

## Factoring by Grouping

### Steps:

1. Take out *GCF*.
2. Look for perfect square trinomial.
3. Group first 2 and second 2 together.
4. Take out *GCF* of each group.
5. Factor it out.

### Examples:

1.  $3a^2 + 15a + xa + 5x$

2.  $2mn - 4n^3 + mp - 2n^2p$

3.  $12bc + 4c + 6b^2 + 2b$

4.  $6ab - 3b + 2a - 1$

5.  $8x^2y + 4xy - 6xy^2 - 3y^2$

6.  $4xa + 3x^2b - 2xb - 6x^2a$

7.  $30x^2m + ny - 6my - 5nx^2$

8.  $x^2 + 4x + 4 - y^2$

## Factoring Trinomials

### Rules:

1. Take out *GCF* first!

2. Always look at second sign

If second sign is a \_\_\_\_\_, both signs are whatever the first sign is.

$$x^2 + bx + c = (\_ + \_)(\_ + \_)$$

$$x^2 - bx + c = (\_ - \_)(\_ - \_)$$

If second sign is a \_\_\_\_\_, both signs are different.

$$x^2 + bx - c = (\_ + \_)(\_ - \_)$$

$$x^2 - bx - c = (\_ + \_)(\_ - \_)$$

3. If the two signs are the same, the last term will "add" to make the middle term. If the two signs are different, the last term will "subtract" to make the middle term.

### Examples:

1.  $4x^2 + 8x + 3$

2.  $2x^2 - 13x + 15$

3.  $3x^2 + 17x - 28$

4.  $10x^2 - 39x - 27$

5.  $6x^2 + 9x + 3$

6.  $25x^2 + 20x + 4$

7.  $10x^2y - 34xy + 28y$

8.  $12x^4 + 30x^2y^2 + 12y^4$

**This is the process you should be going through when factoring any problem.**

## FACTORING

