

Factoring Strategies and Formulas

When asked to factor, always factor out any Greatest Common Factor [GCF] before using any other method. Then your choice of technique depends on the number of terms.

1. Two Terms—

- If the terms are perfect squares, use Difference of Squares Formula first.
- If possible, use Difference of Cubes or Sum of Cubes Formula.

2. Three Terms—

- Use the Trial and Error Method
- Or Use the alternate method called either “AC, By Grouping”, “FOIL”, or “Master Product”.

Note: the Riverside Learning Lab has a handout called *Factoring Trinomials*, which displays both these methods.

3. Four Terms—

- Use the “By Grouping” method.

When finished make sure the GCF is listed as a factor and no GCF remains in any of the factors. Also look at the binomial factors for a remaining Difference of Squares, Difference of Cubes, or Sum of Cubes.

Special Product Formulas

I. Difference of Squares ~ Conjugates

$$x^2 - y^2 = (x - y)(x + y) \quad \text{or Use} \quad a^2 - b^2 = (a - b)(a + b)$$

II. Perfect Square

$$x^2 + 2xy + y^2 = (x + y)^2 \quad \text{or Use} \quad a^2 + 2ab + b^2 = (a + b)^2$$

III. Sum of Cubes

$$x^3 + y^3 = (x + y)(x^2 - xy + y^2) \quad \text{or Use} \quad a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

IV. Difference of Cubes

$$x^3 - y^3 = (x - y)(x^2 + xy + y^2) \quad \text{or Use} \quad a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

For clarity you may wish to use the a & b version if the problem contains x or y. Alternately, use the x and y, if the problem contains a or b.