SUMMARY OF FACTORING STRATEGIES

To FACTOR an algebraic expression is to rewrite the expression as a PRODUCT
- When we factor a polynomial, we rewrite the expression using multiplication.
- Factoring is the inverse operation of distributivity (the inverse of FOIL)
- There are patterns that we can use to factor

STRATAGIES FOR 4 TERM EXPRESSIONS:
- Try grouping the first two terms and the second two terms together. Work to find a greatest common factor between the groupings you've chosen and use the factor by grouping method to factor.

STRATAGIES FOR 3 TERM EXPRESSIONS:

Step 1:   Always look for a Greatest Common Factor (GCF). Factor this out.

Step 2:   Compare the general form $ax^2 + bx + c$ to any remaining quadratic polynomials. Identify the value of constants a, b, c.

Step 3:   Using the values you found for constants a, b, c, turn your quadratic polynomial
$$ax^2 + bx + c$$
into a 4 term expression using the diamond method:
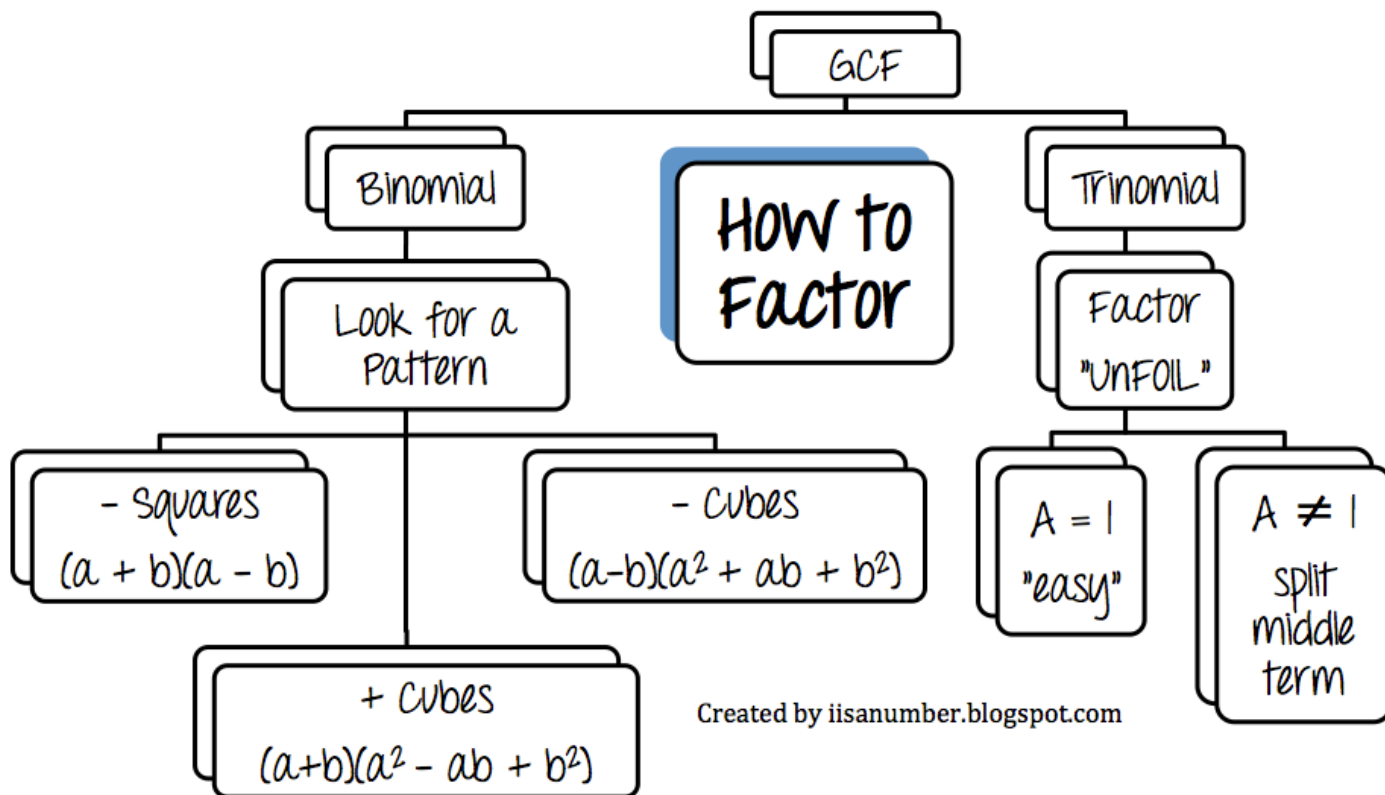
Multiply

$$a \cdot c$$

$$b$$

Add
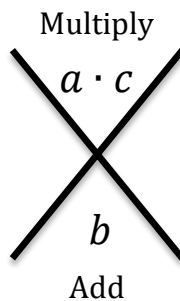
Find two numbers whose product is $a \cdot c$ and whose sum is b.

Step 4:   Factor by grouping: Rewrite the term bx using the two numbers you found above. Then find the greatest common factor between the first two terms and find the greatest common factor between the second two terms.

STRATAGIES FOR 2 TERM EXPRESSIONS:
Try to identify if your expression has a "special form":

- Difference of squares: $(a^2 - b^2) = (a - b)(a + b)$
- Difference of cubes: $(a^3 - b^3) = (a - b)(a^2 + ab + b^2)$
- Difference of 4th Degree: $(a^4 - b^4) = (a - b)(a^3 + a^2b + ab^2 + b^3)$
- Sum of cubes: $(a^3 + b^3) = (a + b)(a^2 - ab + b^2)$
- WARNING: Sum of Squares $(a^2 + b^2)$ is NOT FACTORABLE

How to Factor (flowchart)

- **GCF**
  - **Binomial**
    - **Look for a Pattern**
      - **– Squares** $(a + b)(a - b)$
      - **– Cubes** $(a-b)(a^2 + ab + b^2)$
      - **+ Cubes** $(a+b)(a^2 - ab + b^2)$
  - **Trinomial**
    - **Factor "UnFOIL"**
      - $A = 1$ "easy"
      - $A \neq 1$ split middle term

Created by iisanumber.blogspot.com

NOTES ON FACTORING POLYNOMIALS