**FACTORING POLYNOMIALS**

1. Is there a **GCF**?
Example:
2. How many terms does it have?
	1. If there are two terms:
		1. Is it a **Difference of Squares** ?
			1. Are both terms perfect squares?
			2. Are the two terms being subtracted?

Example:



* + 1. A sum of two squares is prime in the real number system.
		2. Is it a **sum or difference of cubes** (both terms are perfect cubes)?



* 1. If there are three terms:
		1. Is it a **perfect square trinomial?**
			1. First and last terms are perfect squares.
			2. The coefficient of the middle term is an even number.



* + 1. Is the **lead coefficient one**?
			1. Look at the possible factors of the last term.
			2. Is the product negative or positive?
			3. Is the middle term negative or positive?

Example: x 2+ 3xy - 18y2

The factors of **18** are: 1·18, 2·9, 3·6
The product is negative so we need the set of factors that yields a **difference**of 3.
(x + 6y)(x - 3y)
Check: x2 - 3xy + 6xy -18y2

* + 1. If it is a **general trinomial** :
			1. Factor the **coefficients** of the **first** and **last** terms.
			2. Determine whether the middle term is a **sum** or a **difference** (was it **O** + **I** or **O** – **I** )



The product is **negative** so the middle term of **–19x** represents a **difference** of the possible factor combinations.

(4x + 1)(x - 5)

* 1. If there are four terms and no **GCF** :

i. Group the first two terms together and the last two terms together

6ab2 - 3ab - 14b + 7

(6ab2 - 3ab) + (-14b + 7)

ii. Factor out the **GCF** for each group

3ab(2b - 1) + (-7)(2b - 1)

iii. The binomial factor from each group should be the same and therefore is the **GCF**

(2b - 1)(3ab - 7)