FACTORING

Any Polynomials

GCF – Greatest Common Factor

- Try to "take out" the largest number that goes into each coefficient
- Try to "take out" the most amount of variables from each term. You MUST have the same variable in each term, in order to take it out.

Ex…… $3x^3+15x$ *More Examples* → *HERE*

$3x(x^2+5)$

4 Term Polynomials ONLY

Grouping

- Group up the first two terms and the last two terms
- Use GCF on each group
  - * You have to take something out of each group
  - * The sign of the third term is the sign of the number you take out of the second group
  - * What's left in the parenthesis should be exactly the same
- Use GCF on the entire expression

Ex…… $3x^3+15x+2x^2+10$

$(3x^3+15x)(+2x^2+10)$ *More Examples* → *HERE*

$3x(x^2+5)+2(x^2+5)$ *Even More* → *HERE*

$(3x+2)(x^2+5)$

Trinomials ONLY (ax^2+bx+c)

If *a* = 1

- Find factors of *c* that add up to *b*
- Put each factor in a set of parenthesis, after the variable you are using

Ex…… $y^2-3y-10$ Ex…… x^2-6x+8 *More Examples* → *HERE*

$(y-5)(y+2)$ $(x-4)(x-2)$ *Even More* → *HERE*

If $a \neq 1$ → Split The Middle Term

- Find factors of *ac* that add up to *b*
- Split the middle term, using those factors and the variable
- Use Grouping.

Ex…… $3x^2+10x-8$

$3x^2-2x+12x-8$

$(3x^2-2x)(+12x-8)$ *More Examples* → *HERE*

$x(3x-2)+4(3x-2)$ *Even More* → *HERE*

$(x+4)(3x-2)$

Binomials ONLY

Difference of Squares

- If a^2-b^2, then $(a+b)(a-b)$.

Ex…… $25x^6-81y^2$ *More Examples* → *HERE*

$(5x^3+9y)(5x^3-9y)$ *Even More* → *HERE*

Difference of Cubes

- If $a^3 - b^3$, then $(a-b)(a^2+ab+b^2)$. Ex…… $x^6 - 8y^3$

$(x^2 - 2y)(x^4 + 2x^2y + 4y^2)$

Sum of Cubes

- If $a^3 + b^3$, then $(a+b)(a^2-ab+b^2)$. Ex…… $27x^3 + 125$

$(3x+5)(9x^2 - 15x + 25)$

More Examples → *HERE*
Even More → *HERE*

Factoring COMPLETELY

1. Always try GCF first, regardless of how many terms there are.
2. Try factoring the remaining set of parenthesis, using one of the other methods.
3. Repeat Step 2 until you can not factor any of the remaining sets of parenthesis .