LIFE WORKS LEARNING CENTER

Factoring Polynomials

1. First, look to see if there is something that all terms share that can be factored out (GCF).
2. Then, choose your method based on if you have a binomial, trinomial, or quadrinomial.

Binomials

Difference of Squares

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

ex: $(x^2 - 9) = (x + 3)(x - 3)$

Difference of Cubes

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

ex: $(x^3 - 8) = (x - 2)(x^2 + 2x + 4)$

The signs follow S.O.A.P.

(Same, Opposite, Always Positive)

Sum of Cubes

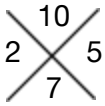
$(a^3 + b^3) = (a + b)(a^2 - ab + b^2)$

ex: $(x^3 + 8) = (x + 2)(x^2 - 2x + 4)$

Trinomials

Diamond Method

$x^2 + 7x + 10$



See what **multiplies** to the top and **adds** to the bottom.

$(x + 2)(x + 5)$

Splitting the Middle Term (When you have a number in front of x^2.)

$2x^2 + 9x + 10$

←Multiply the first term and the last term to get the top number.

$2x^2+4x + 5x+10$	Split the middle term into 4x + 5x.
$(2x^2+4x) + (5x+10)$	Use Factoring by Grouping (see below).
$2x (x + 2) + 5 (x + 2)$	
$(2x + 5) (x + 2)$	

Quadrinomials

Factoring by Grouping

$2x^3 + 5x^2 + 4x + 10$

$(2x^3 + 5x^2) + (4x + 10)$	Group first two terms and last two terms.
$x^2 (2x + 5) + 2 (2x + 5)$	Factor.
$(x^2 + 2) (2x + 5)$	Rearrange (by factoring again).