Polynomial Equations and Factoring (5.3) **Math 098**

Example 1: Consider $x^2 = -5x$

a.) Using the graphing calculator, solve using the *intersect method*.

b.) Using the graphing calculator, solve using the *zero method*.

<u>Vocabulary</u>: Zeros and Roots: The *x*-values for which a function $f(x)$ is 0 are called the *zeros* of the function. The *x*-values for which an equation such as $f(x)=0$ is true are called the *roots* of the equation.

Example 2: Find the zeros of the function $f(x)=x^3-2x^2-3x$ using the graphing calculator.

Here is a very important obvious fact. The principle of zero products: For any real numbers *a* and *b*, $ab = 0$ if and only if $a = 0$ or $b = 0$.

When a polynomial is written as a product, we say it is _______________________.

The zeros of a polynomial function are zeros described by the _______________________ of the polynomial.

Example 3: Solve $(x-2)(x+5)=0$

Example 4: Given $f(x) = x(2x+5)$, find the zeros of the function.

To _______________________ an expression means to write it as a product.

To factor out the greatest common factor (GCF) we will do ______________________________________.

Example 5: Factor out the greatest common factor (GCF)

a.) $6x^3 - 24$

b.) $12r^2s^3 - 9r^5s^6 + 15r^3s^2$

c.) $-5x^2 + 10x - 25$

d.) $-4x^4 + 6x^3 - 2x^2$

Example 6: Factor by grouping

a.) $(x-2)(x^2-3)+(x-2)(5-3x^2)$

b.) b^3-b^2+2b-2

c.) $t^3+6t^2-2t-12$

d.) $ax-bx+by-ay$

Example 7: Solve $8x^2=40x$

Summary: <u>To use the principle of zero products</u>

1.) Write an equivalent equation with 0 on one side, using the additions principle.
2.) Factor the nonzero side of the equation.
3.) Set each factor that is not a constant equal to 0.
4.) Solve the resulting equations.