**5.3 Solving Polynomial Equations**

Objectives: To Solve Polynomials by Factoring.

To Solve Polynomials by Graphing.

We briefly talked about how to solve by factoring in 5.2 when we looked at example 1.

**Therefore, .**

*(You could have also graphed to find the roots.)*

Example 1: Solve the following Polynomial.

If we try to solve this by graphing like we’ve done in the past… we have an issue. It comes down and touches the x-axis at 0 (meaning 2 answers) but we need 4… so the other two must be imaginary!!

We can try to factor instead of graphing and see what happens. Find the GCF.

Quick Review (if you forgot Quad Form) it is:

for

So take the two parts from step 2 and set them both equal to zero.

Solve for x in both cases

**So our 4 answers are,**

Polynomial Factoring Techniques “Short Cuts” on page 297. They are helpful if you have them memorized, but you don’t need to have them memorized if you are sound in your other factoring methods.

If I were going to focus on any of them from the chart it would be the “sum or difference of cubes” method:

Example:

Example 2: Finding Real Roots by Graphing.

Method 1: Rewrite in Standard from and find the zeros (using the “F5” button and then “roots” to find x-intercepts)

x=-1.270534021

x=-0.3413246893

x=4.61185871

Method 2: Graph the two equations individually and see where they cross (using the “F5” button and then “intsect” for intersection)

x=-1.270534021

x=-0.3413246893

x=4.61185871

We should notice that the x values are the same in either method.

Example 3: Solve the following Polynomial

We’ll learn a new method… to be able to factor like this…

We’ll now use Zero Product Property to Solve.

The 4 roots/solutions/zeros are:

HMWK: page 300 #1, 3, 5, 14, 21, 25-31 (odd), 37,