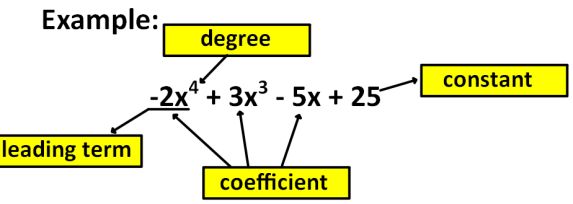
*Unit 2 Polynomials and Rational Functions*

***Review of Terminology***

*polynomial: any function whose variables are to positive, whole # exponents*

*terms: the pieces of the polynomial that are sep. by + or –*

*like terms: terms with same power and same variable(s)*

*binomial: two termed poly; contains one sign*

*trinomial: three termed poly; contains 2 signs*

*degree: the highest exponent on a variable*

*leading coefficient: the coefficient of the term with the highest exponent; take their sign*

*Zeros of a Polynomial: the location where the graph crosses the x-axis; synonyms: x-intercepts, roots, solutions*

*Standard form of a Polynomial: polynomial written from highest exponent to lowest exponent*

***Types of Polynomials by Degree***

*\*linear: degree 1*

*\*quadratic: degree 2*

*\*cubic: degree 3*

*\*quartic: degree 4*

*\*The degree (n) of the polynomial gives a hint as to shape of the curve.*

*\*number of zeros = n*

*\*the maximum number of local extrema = (n-1)*

***End Behavior***

*~odd degree ends opposite directions*

*~even degree ends in same direction*

*1. pos LC and odd degree:*



*2. neg LC and odd degree:*

*3. pos LC and even degree:*

*4. neg LC and even degree:*

*Complex Zeros: total number of zeros including both real and imaginary zeros*

*Imaginary Zeros: won't show on a graph; always show up as conjugate pairs:*

*Descartes Rule of Signs helps determine the possible number of real zeros*

*~possible number of positive, real zeros: put the function in standard form, then count the number of sign changes from one term*

*to the next. List that value and subtract two until you reach 1 or 0*

*~possible numbe of negative, real zeros: put the function in standard form, then change the sign of the odd degreed terms and*

*count the number of sign changes from one term to the next. List that value and subtract*

*two until you reach 1 or 0*

*Graphs of Higher Powers*

*\*if in the form then we transform them just like we do all other graphs that we've learned. If n is odd, graph like a cubic. If n is even, graph like a quadratic.*

*\*if not in that form, then use a calculator!*

**

*Ex For state the following:*

*A. Standard Form: B. Degree: C. Leading Coefficient: D. Type of Polynomial by Degree:*

*E. End Behavior using Limit Notation: F. Number of Roots/Number of Complex Zeros:*

*G. Maximum Number of Relative Extrema: H. Possible Number of Positive, Real Roots:*

*I. Possible Number of Negative, Real Roots: J. Number of Imaginary Zeros:*

**Finding Zeros of a Polynomial**

\*to find the zeros of a polynomial, set the function = 0 and solve.

\*The following techniques may be used for solving:

~factoring

~quadratic formula

~long division

~synthetic division (rational root theorem)

~use of the graphing calculator

I. Factoring and/or Quadratic Formula



Ex Find the zeros: Ex State the roots of

Ex Find the solutions of

~If a polynomial is in factored form already, just set the factors equal to zero and solve.

Ex State the zeros of

Multiplicity

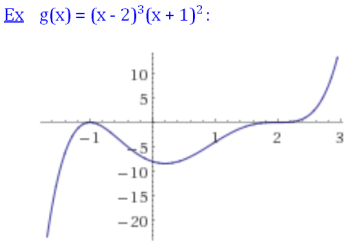
\*When in factored form, the outer exponent represents the number of roots that factor represents. Factors with an outer

exponent greater than 1 are said to have *multiplicity*.

\*Multiplicity tells us something about the graph of the polynomial.

~if the multiplicity is odd, the graph will transition THROUGH the root to the other side of the *x-*axis.

~If the multiplicity is even, the graph will TOUCH/KISS the *x*-axis and return to the same side of the *x*-axis from where it came.



Intermediate Value Theorem --> a sign change in the range implies a real zero exists somewhere between the two values of the range.

