Concepts
Finding and Using Zeros of Polynomial Functions

Based on power point presentations by Pearson Education, Inc.
Revised by Ingrid Stewart, Ph.D.

Learning Objective

1. Use the *Zeros* of polynomial functions to better analyze their graphs.
2. Find the *Zeros* of a subset of polynomial functions.

1. Use the *Zeros* of Polynomial Functions (1 of 2)

In the previous lesson we discussed *Zeros* of polynomial functions. We actually use them to better analyze their graphs. Specifically,

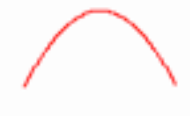
a. The real *Zeros* are the *x*-intercepts of the graphs of polynomial functions.

b. Imaginary *Zeros* CANNOT be seen on the graphs, but they help shape them.

c. Multiplicity provides another connection between the *Zeros* and the graphs of polynomial functions. That is, they also help shape their graphs.

Let ***r*** be a *Zero* of a polynomial function with multiplicity ***m***.

- If ***m*** is EVEN, the graph of a polynomial function TOUCHES the *x*-axis at ***(r, 0)*** mimicking the picture of a parabola.



Use the *Zeros* of Polynomial Functions (2 of 2)

- If ***m*** is ODD and greater than ***1***, the graph of a polynomial function CROSSES the *x*-axis at ***(r, 0)*** mimicking the picture of a cubic function.

- ***m*** equals ***1***, the graph of a polynomial function CROSSES the *x*-axis at ***(r, 0)*** in a straight line.

2. Find the *Zeros* of a Subset of Polynomial Functions

In this course we will only find *Zeros* of a subset of polynomial functions. Specifically, these functions will all be factorable. Therefore, we must recall some factoring techniques, but also the *Quadratic Formula* and the *Square Root Property*. If necessary, review the "Factoring" lesson 7PRE and the "Quadratic Equations" lesson 7.

1. Set the polynomial function equal to 0. Now we have a polynomial equation!
2. Factor out the greatest common factor if one exists.
3. Then apply one or more factoring methods and/or use the *Quadratic Formula* and/or use the *Square Root Property.*