Zeros of Polynomial Functions

If f is a polynomial function, then the values of x for which f(x) is equal to 0 are called the **zeros of f**. These values of x are the **roots**, or **solutions**, of the polynomial equation f(x) = 0.

- Each real root of the polynomial equation appears as an x-intercept of the graph of the polynomial function.

Multiplicity and x-intercepts

- If r is a zero of **even multiplicity**, then the graph **touches** the x-axis and **turns around** at r.
- If r is a zero of **odd multiplicity**, then the graph **crosses** the x-axis at r.

Regardless of whether the multiplicity of a zero is even or odd, graphs tend to flatten out near zeros with multiplicity greater than one.

Example 3: Find the zeros for each polynomial function and give the multiplicity for each zero. State whether the graph crosses the x-axis, or touches the x-axis and turns around, at each zero.