Using Polynomial Division and Graphing to Solve Polynomials

Factor Theorem: If *a* is a zero (*x*-intercept or root) of a polynomial, then *(x – a)* is a factor of the polynomial P(*x*).

Theorem: A polynomial P(*x*) of degree *n* has at most *n* zeros. These zeros can be real or complex.

***Directions:***

1. Begin by graphing each polynomial and determining the number of real zeros. Find one real zero and, using this *x­*-intercept and the Factor Theorem, write one factor of the polynomial.
2. Use polynomial division to rewrite the polynomial.
3. Continue the process of breaking down the polynomial until you have found all factors (thus the solutions)
4. $0=x^{3}+3x^{2}+4x+12$
5. $x^{4}- 4x^{3}- x^{2}+16x=12$
6. $125x^{3}+ 216=0$
7. $y=2x^{2}+ 3x-5$