Name: ________________________________

Define:

- Zero of a polynomial function

- X-intercepts

- Factors of polynomials

- Solutions of polynomial equation

Review Let p(x) be a polynomial function with real coefficients. If p(s) = 0

1. s is a zero for the polynomial function p(x).
2. s is a solution to the equation p(x) = 0
3. x - s is a factor of p(x).
4. The point (s , 0) is an x intercept of the graph of p(x).

Example: let $p(x) = x^3 - 2 \cdot x^2 + 2 \cdot x - 4$

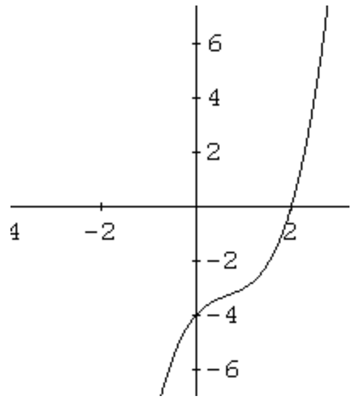
1. $p(2) = 2^3 - 2*2^2 + 2*2 - 4$

   = 8 - 8 + 4 - 4
   = 0
   2 is a zero of p(x).

2. x = 2 is a solution of p(x) = 0

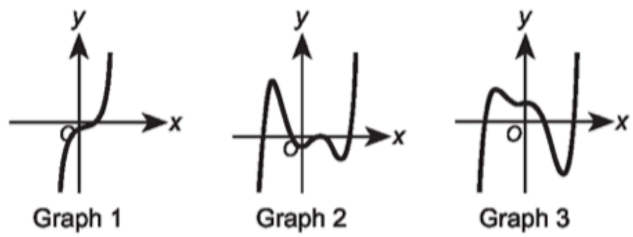
3. p(x) can be written in factored form as
   $p(x) = (x - 2) \cdot (x^2 + 2)$

4. The graph of p(x) below shows an x intercept at x = 2.



1) What is the connection among zeroes of a polynomial function, x-intercepts, factors of polynomials, and solutions of polynomial equations? (Use the information above)

1) Ms. Phillips explained to her class that polynomial functions of degree 5 with real coefficients always have 5 roots. She showed her students the following 3 graphs of polynomial functions of degree 5.



A. State how many distinct real roots there are for each graphed polynomial. Use evidence from the graphs to explain your answer.

B. Each of the graphed polynomials has a different number of real roots. State how many real and complex roots each graphed polynomials has. Use evidence from the graphs to explain your answer.