Pre-Calculus Chapter 2 Pre-Test

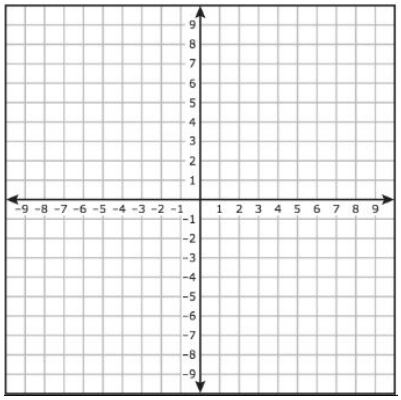
1.) (2.5 pts each, 5 pts total) Determine whether each of the following is a polynomial. If so, identify the degree

a) $f(x) = 2x^5 - 3x^3 + 7x^2 - 9x$

b) $f(x) = 5x^3 + 12x^2 + \sqrt{9x}$

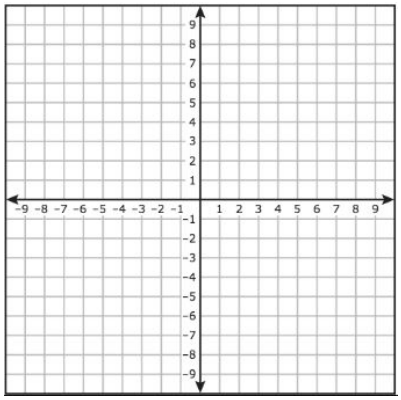
2.) (5 pts) Graph the quadratic function, which is given in standard form

$f(x) = (x + 2)^2 - 4$



3.) (10 pts) Rewrite the quadratic function in standard form by completing the square. Then graph.

$f(x) = 2x^2 + 8x + 5$



4.) (5 pts) Find all of the real zeros (and their state of multiplicities) for the polynomial.

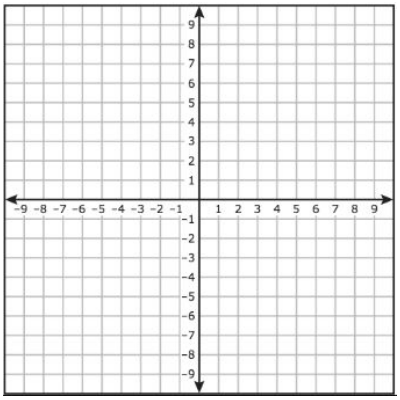
$$f(x) = 6x^2(x - 2)^4(x + 7)^3$$

5.) (10 pts) Find a polynomial of minimum degree that has the given zeros.

-2, 0, 1, 3

6.) (10 pts) For the polynomial function: (a) list each real zero and its multiplicity; (b) determine whether the graph touches or crosses at each x-intercept; (c) find the y-intercept; (d) sketch-ish the graph.

$$f(x) = x^5 - 4x^3$$



7.) (7.5 pts each, 15 pts total) Divide the polynomials by either long division or synthetic division.

a) $(x^4 - 2x^3 - 7x^2 + 8x + 12) \div (x + 2)$

b) $(x^5 + 4x^4 + 3x^2 + 19x + 28) \div (x + 4)$

8.) (10 pts) For the function:

$$x^4 + 8x^3 + 9x^2 - 38x - 40$$

a) Find all potential zeros.

b) Find the number of possible *positive* zeros.

c) Find the number of possible *negative* zeros.

d) Attempt to find **3 zeros** using long division or synthetic division. Show all work.

9.) (10 pts) Find a polynomial of minimum degree with the following zeros:

$-4, 3 - i, 3 + i$

10.) (10 pts) Given a zero of the polynomial, determine all other zeros (real or complex) and write the polynomial as a product of linear factors.

$$x^4 + x^3 - 8x^2 + 4x - 48 \text{ , zero } = 2i$$

11.) (5 pts each, 10 pts total) Find the domain and asymptotes (vertical and horizontal) of each of the following rational functions.

a) $\frac{x^2 - 4}{3x^2 - 8x + 4}$

b) $\frac{4x^2 - 3x + 6}{8x^3 - 16x^2 + 8x}$