MID UNIT REVIEW

<u>Directions</u>: Describe the right-hand and left-hand end behavior of the graph using the Leading Coefficient Test.

1.) $f(x) = -x^2 + 6x + 9$		2.) $f(x) = \frac{3}{4}(x^4 + 3x^2)$		3.) $f(x) = -x^5 - 7x^2 + 1$		4.) $f(x) = \frac{1}{2}x^3 + 2x$	
$x \to \infty$	$f(x) \to$ _____	$x \to \infty$	$f(x) \to$ _____	$x \to \infty$	$f(x) \to$ _____	$x \to \infty$	$f(x) \to$ _____
$x \to -\infty$	$f(x) \to$ _____	$x \to -\infty$	$f(x) \to$ _____	$x \to -\infty$	$f(x) \to$ _____	$x \to -\infty$	$f(x) \to$ _____

<u>Directions</u>: Determine whether the function is even, odd, or neither. Then describe the symmetry.

5.) $f(x) = x^8 - 5x^4 - 3$ 6.) $f(x) = x^3 - 6x$ 7.) $f(x) = x^4 + 3x^3 - x^2 + 5x$

<u>Directions</u>: Find all factors, zeros (including multiplicity!), x-intercepts, and possible turning points for each function.

8.) $f(x) = 2x^2 + 11x - 21$

                                                      Factors: _____

                                                       Zeros: _____

                                                     x-intercept(s):   _____

                                                     Possible turning points: _____

9.) $f(x) = x^3 + 2x^2 - 4x - 8$

                                                       Factors: _____

                                                       Zeros: _____

                                                     x-intercept(s):   _____

                                                     Possible turning points: _____

10.) $f(x) = x^4 - x^3 - 2x^2$

                                                       Factors: _____

                                                       Zeros: _____

                                                     x-intercept(s):   _____

                                                     Possible turning points: _____

Directions: Use the graph of $g(x)$ to answer the following questions.

11.) Describe the increasing & decreasing intervals.
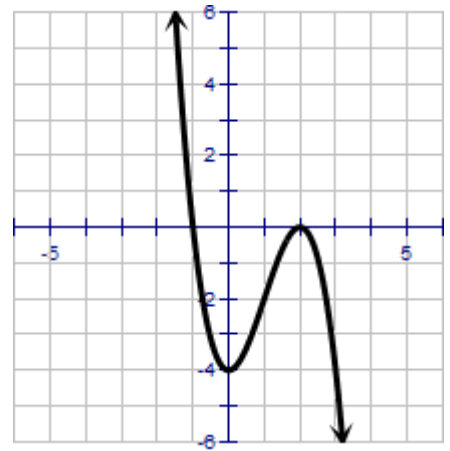
    Decreasing: _____   Increasing: _____

12.) What is the least degree of $f(x)$?

13.) Describe the end behavior.

    $x \to -\infty$ $g(x) \to$ _____ $x \to \infty$ $g(x) \to$ _____

14.) Determine the linear factorization of $g(x)$.

15.) Write the equation of the polynomial function $g(x)$.

Directions: Write a polynomial function of least degree with the given zeros.

16.) $x = -3$, $x = -\frac{1}{3}$, and $x = 5$ 17.) $x = 4$ (multiplicity of 2) and $x = 3i$

Directions: Verify the given factor(s) of the function $f(x)$. Then state the complete factorization and zeros of $f(x)$.

18.) $f(x) = x^3 - 5x^2 + 36x - 180$ Factor: $(x - 5)$ Factors: _____

                                                                      Zeros: _____

                                                                      x-int: _____

19.) $f(x) = 8x^4 - 14x^3 - 71x^2 - 10x + 24$ Factors: $(x + 2)(x - 4)$ Factors: _____

                                                                      Zeros: _____

                                                                      x-int: _____