Pre-Calculus: 2.1 – 2.4
Polynomial, Power and Monomial Functions, Graph Behavior and Division

Name: _____

Date: _____ Hour: ___

SCORE: ____ / 72

Percent Correct: ____%

Be sure to SHOW ALL WORK. Answer questions completely. Be sure to write answers in spaces provided. If work or answers are in another location, please make note of that.
There are **72** points possible.

16/8/4	Correct, complete, with appropriate work or explanations.
12/6/3	Correct strategy, minor errors, appropriate work or explanations.
8/4/2	Starts with appropriate strategy, some understanding, some errors.
4/2/1	Attempted appropriate strategy, minimal understanding.
0	Little or no understanding evident – OR – no work shown.

1. Using the Rational Zero Theorem, find all of the zeros for the polynomial function. **(12 points)**

$$f(x) = x^4 + 9x^3 + 14x^2 - 54x - 120$$

Zeros: _____

2. State the end behavior for the following functions: **(6 points)**
   i. $f(x) = -5x^3 + 4x^2 - 8$ _____ and _____
   ii. $f(x) = -3x^6 - x^4 + 7x^2 + 2$ _____ and _____
   iii. $f(x) = 2x^5 - 5x + 9$ _____ and _____

3. Find the vertex and axis of symmetry for the following quadratic function. **(4 points)**

$$f(x) = -2x^2 - 12x + 4$$

Vertex: _____

Axis of Symmetry: _____

4. Divide $f(x) = -4x^4 + x^3 + 2x^2 + 3x - 1$ by $d(x) = x - 1$. **(4 points)**

Fraction Form:

_____

5. Determine whether the following are polynomial, power or monomial functions. If so, state by underlying the correct term and filling in the blank appropriately. **(8 points)**

A. $f(x) = 4x^3$

Circle **all** that apply:
Polynomial Power Monomial

Degree/Power: _____

Leading Coefficient/C.O.V.: _____

B. $f(x) = -3x^5 + 2x^3 - 5$

Circle **all** that apply:
Polynomial Power Monomial

Degree/Power: _____

Leading Coefficient/C.O.V.: _____

6. Find the quadratic equation that has a **vertex** of $(-4, 13)$ and **point** $(-6, 1)$. **(4 points)**

Final Equation: _____

7. State the degree and zeros of the polynomial function. State the multiplicity of each zero and what the behavior of the graph is at that zero (crosses/kisses). **(10 points)**

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

Degree: _____

Zeros	Multiplicity	Crosses/Kisses
$x =$		
$x =$		
$x =$		

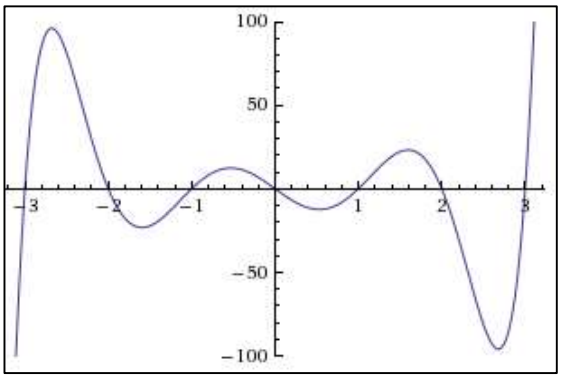
8. Write the statements below as a power function equation. **(4 points)**

m varies directly with the fourth root of t.	
g is inversely proportional to the cube of f.	

9. Write a sentence that expresses the relationship in the **power** formula, using the language of variation or proportion. **(4 points)**

$y = -5x^{-3}$	
$V = \frac{4}{3}\pi r^3$ $(V = Volume\ and\ r = radius)$	

10. Given the graph, state the following: **(4 points)**



i. Number of Zeros: _____

ii. Number of Extrema: _____

11. Using long division, divide $f(x) = 3x^4 + 2x^3 + 10x^2 + 4x - 5$ by $d(x) = x^2 + 2$. **(8 points)**

Polynomial Form:

_____

12. Write the equation for the linear equation with the **points** $(-3,5)$ and $(-4,8)$. **(4 points)**

Final Equation: _____