

Autumn 2016

Name (Print): _____

Form A

Signature: _____

OSU name.#: _____

Lecturer: _____

Recitation Instructor: _____

Recitation Time: _____

Math 1148: Midterm Exam 2

Instructions:

- Show ALL work to receive full credit. Answers with insufficient supporting work will receive little or no credit.
- Please CIRCLE your answers
- If you find the solution to a problem using a graph from your calculator (*where allowed*), you need to sketch that graph and label all relevant information.
- The exam consists of 10 problems starting on page 2 and ending on page 7. Make sure your exam is not missing any pages before you start.

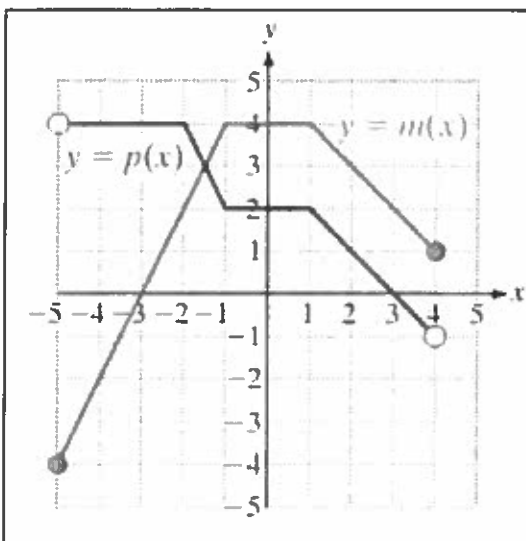
Page	2	3	4	5	6	7	Total
Maximum Points	24	16	12	12	16	20	100
Student Score							

1. For the given function, $f(x) = 3x^2 - 15x - 7$
 - a. Write function in vertex form (6 points)

- b. Identify the vertex (2 points).

2. Suppose a formula for the number of units sold in terms of the price per unit (in dollars) is $n(x) = 75 - 5x$. Find formula for revenue from sales if you set the price at 'x' dollars. What price will maximize the revenue? Briefly explain your method. Round to nearest cent. (8 points)

3. Use the following graphs of the functions $p(x)$ and $m(x)$ to determine the following: (8 points)



$$\left(\frac{p}{m}\right)(-2) =$$

$$(p \circ m)(4) =$$

$$(m \circ p)(4) =$$

$$(p \circ p)(0) =$$

4. Divide the following polynomials. (Synthetic division will not work)

(8 points)

$$\frac{5x^3+x^2-3x+2}{x^2+3}$$

Quotient Polynomial = $Q(x) =$

Remainder Polynomial = $R(x) =$

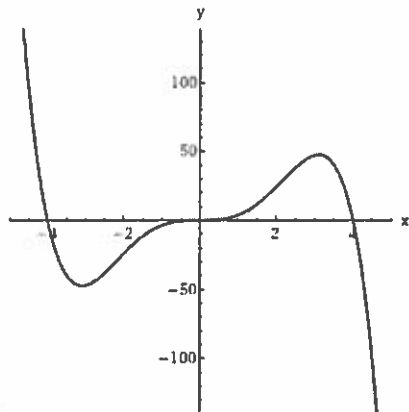
5. Solve the following inequality (8 points)

$$\frac{4-x}{x+5} \leq 2$$

6. Consider the graph below: Complete the following table of roots/asymptotes and multiplicities
 Not all the spaces will necessarily be filled in.
 Also give a possible polynomial or rational function corresponding to the graph.
 (Do not worry about vertical scaling): (12 points)

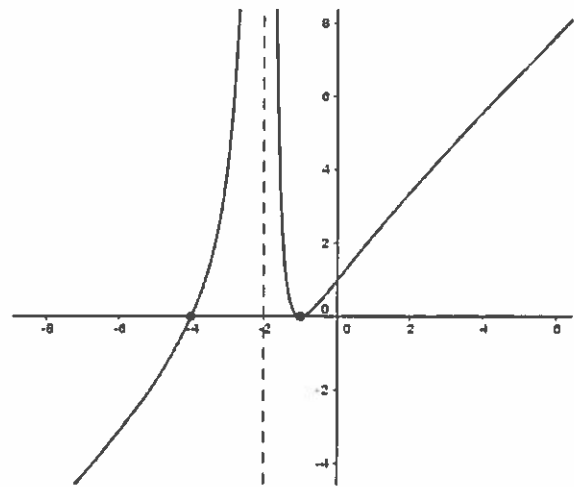
Root	Multiplicity
$x =$	
$x =$	
$x =$	
$x =$	

$f(x) =$



Root	Multiplicity
$x =$	
$x =$	
Asymptote	Multiplicity
$x =$	
$x =$	

$g(x) =$



7. A golf ball is hit from the ground and lands 240 meters down the fairway. Further it reached a maximum height of 55 meters. Assume that the path of the ball is a parabola (ignoring air resistance). Find a quadratic function to model the height of the ball when it has travelled 'x' meters horizontally (6 points)

8. Solve the following inequality: (6 points)

$$\frac{(3-x)(4-x)^4}{(x-5)^2} \leq 0$$

9. Factor the following polynomial by the following procedure:

$$P(x) = x^4 - 7x^3 - 11x^2 + 87x + 90$$

a. First, use the fact that $P(-3)=0$ and polynomial division to factor $P(x)$ as follows: (6 points)

$$P(x) = (x + 3)Q(x)$$

.

$$Q(x) =$$

b. Second, use the fact that $P(5)=0$ and polynomial division with $Q(x)$ from above to factor $P(x)$ as follows: (6 points)

$$P(x) = (x + 3)(x - 5)G(x)$$

$$G(x) =$$

c. Find all four real roots of $P(x)$ and express $P(x)$ as a product of four linear terms. (4 points)

$$P(x) =$$

10. Given the rational function $r(x) = \frac{(x-1)^2}{(x+4)(x-5)^2}$ find:

a. the y -intercept, if any (2 points)

b. the x -intercept(s), if any (4 points)

c. the **equation** of any vertical asymptotes (4 points)

d. the **equation** of any horizontal asymptote (4 points)

e. the graph of $r(x)$, plot and label ALL information from Parts a – d. (6 points)

