MAC 1140, Spring 2018

Exam #2, ver. A

February 20, 2018

Name _____

- You will be told when to begin the work and when to terminate work on the examination. You must stop when instructed. Points may be deducted in case of violations.
- Please show your work to support your answers that require calculations. Correct but unsupported answers may not be given full credit.
- The use of a cell phone or other electronic communication devices during the examination is not allowed. The exam will be canceled and a grade of "0" will be assigned to anyone who uses a cell phone during the examination or if one is found within hands reach.
- Calculators are not allowed on this exam.
- The exam consist of two parts. Part I contains five multiple choice questions worth 7 points each. Part II contains five open ended questions worth 17 points each if not stated otherwise.

Part I

Choose your answer from five available choices. No partial credit will be given for wrong answers.

1. Let $f(x) = 2x^3 - 3x^2 + 18x - 27$ and let $3i$ be a complex zero of f. How many real zeros does the polynomial have?

   (a) 0
   (b) 1
   (c) 2
   (d) 3
   (e) None of the above

2. Which of the following statements are true?

   I. $f(x) = \frac{1}{x+1}$ is a rational function.
   II. The domain of a rational function consists of all real numbers except those that make the denominator zero.
   III. The graph of a rational function does not intersect with a vertical asymptote, if any, but may intersect with the horizontal asymptote, if any.

   (a) I & II
   (b) II & III
   (c) I & III
   (d) I & II & III
   (e) None of the above.

3. $x = -6$ is a zero of the polynomial function $f(x) = 3(x+6)^2(x-6)^3(x^2+6)$. Which of the following is the multiplicity of $x = -6$?

   (a) 0
   (b) 1
   (c) 2
   (d) 3
   (e) None of the above.

4. Which of the following functions represent a polynomial function? Circle all that apply.

   (a) $-2x^3 + x^2 - 4x + 21$
   (b) $x^2 + 2\sqrt{x}$
   (c) $x^2 + 3 - 6x^4 + x$
   (d) $\frac{2x-1}{x+2}$
   (e) None of the above.

5. Let $f(x) = \frac{(x+3)(2x-1)}{x^2-9}$. Which of the following statements are true?

   I. $x = 3$ and $x = -3$ are vertical asymptotes of f

   II. $y = 2$ is a horizontal asymptote of f

   III. $x = \frac{1}{2}$ and $x = -3$ are the x–intercepts

   (a) I & II

   (b) III

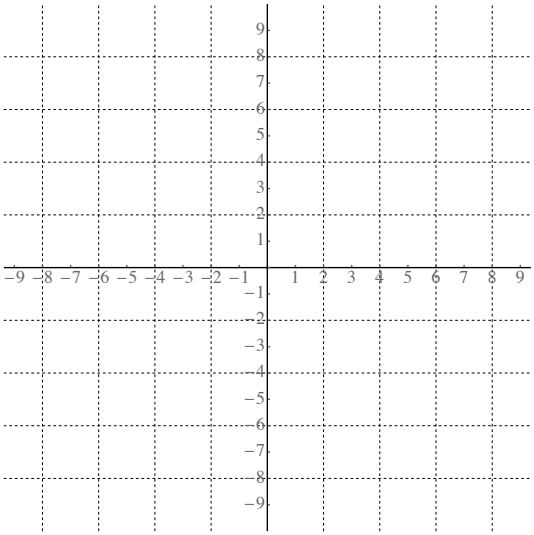
   (c) II

   (d) I & II & III

   (e) None of the above.

Part II

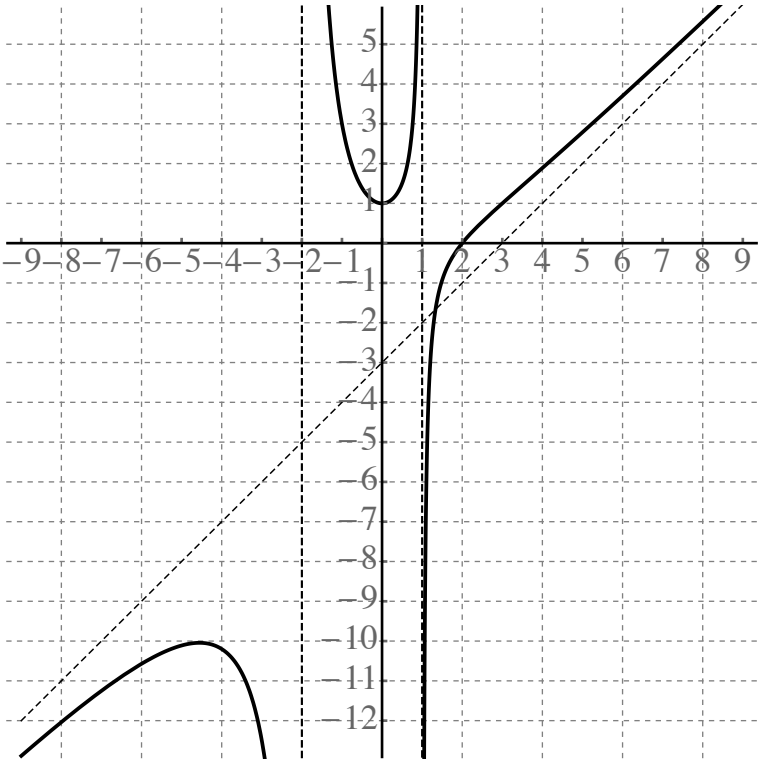
6. Sketch the graph of $f(x) = -2(x-4)^2(x+1)(x+5)^3$.



7. (7 pts) Determine if $x = 2$ is a solution of the rational inequality

$$\frac{(x+1)^2(x+2)}{(x-1)} > 0$$

8. Given the graph of $f(x)$ below, answer the following:



(a) Write the solution of the inequality $f(x) > 0$.

(b) List the horizontal asymptote, if any.

(c) List the slant asymptote, if any.

(d) List the intercepts of the graph, if any.

(e) Write the domain in interval notation.

9. Find the domain if the function $f(x) = \sqrt{\frac{x}{2x-1} - 1}$.

10. Given the polynomial function $f(x) = 2x^4 - x^3 - 19x^2 + 36$, answer the following questions:

    (a) Find all possible rational zeros of the polynomial.

    (b) Find the zeros of the polynomial. [Use the next page if you need additional space.]

(c) Solve the inequality $f(x) \leq 0$ and write the answer in interval notation.

Use the page if you need additional space.