MAC 1105, Spring 2018

Exam #3, ver A

March 26, 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 consists of two parts. Part I contains four multiple choice questions worth 7 points each. Part II contains four open ended questions worth 16 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 and g be functions. The expression $(f \circ g)(x)$ is equivalent to

   (a) $f(x) + g(x)$
   (b) $f(x)g(x)$
   (c) $f(g(x))$
   (d) $g(f(x))$
   (e) None of the above

2. The inverse function of $f(x) = \frac{x-3}{5}$ is

   (a) $f^{-1}(x) = 5x + 3$
   (b) $f^{-1}(x) = \frac{x+3}{5}$
   (c) $f^{-1}(x) = \frac{x-5}{3}$
   (d) $f^{-1}(x) = \frac{x-3}{5}$
   (e) None of the above

3. The range of the parabola $y = 2(x-4)^2 + 4$ is

   (a) $(-\infty, \infty)$
   (b) $(4, \infty)$
   (c) $(-\infty, 4]$
   (d) $[4, \infty)$
   (e) None of the above.

4. Select a correct statement for the rational function

$$f(x) = \frac{-2x^3 + 3x - 12}{x^2 + 4}$$

   (a) f has a horizontal asymptote $y = -2$ and vertical asymptotes $x = \pm 2$
   (b) f has a horizontal asymptote $y = -2$ and no vertical asymptote
   (c) f has no horizontal asymptote and vertical asymptotes $x = \pm 2$
   (d) f has no horizontal asymptote and no vertical asymptote
   (e) None of the above.

Part II

5. Is $f(x) = \frac{x-1}{x+2}$ a one-to-one function? If yes, find its inverse.

6. Find the standard equation of the parabola below, find its range and maximum or minimum.

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

7. Find a quadratic function that has a vertex (3,-2) and y-intercept at y=7.

8. (24 points) Graph the function $f(x) = \dfrac{x-2}{x^2+4x+3}$

   (a) Domain

   (b) y–intercept

   (c) x–intercept

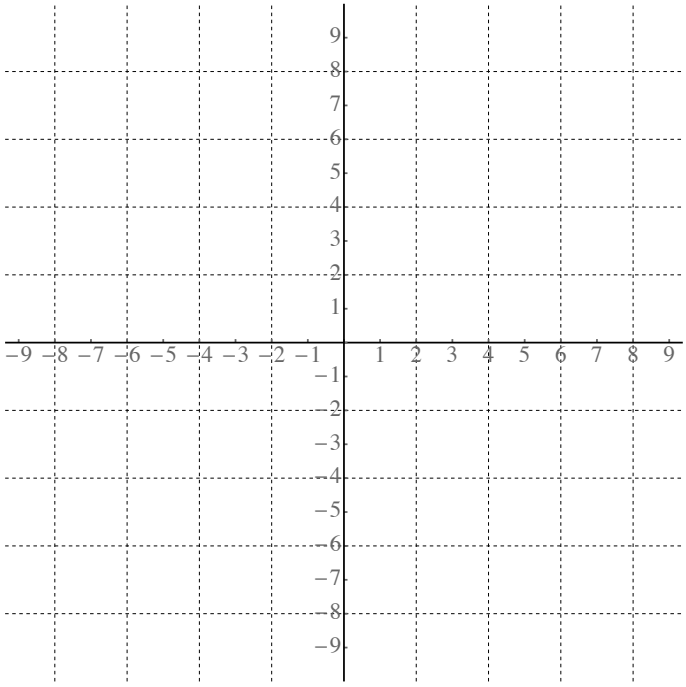
   (d) Vertical asymptote(s)

   (e) Horizontal asymptote(s)

(f) Symmetries

(g) Evaluate the function between the x-intercept(s), vertical asymptote(s) and hole(s)

(h) Graph



9. (5 extra pts) Find the horizontal asymptote for the following functions

   (a) $f(x) = \frac{-3x+2}{2x+961}$

   (b) $f(x) = \frac{-3x^2+2}{2x+961}$

   (c) $f(x) = \frac{-3x+2}{2x^2+961}$

10. (5 extra pts) Describe the difference between polynomial and rational functions.

11. (0 pts) How many hours in total did you study for this exam over the weekend?

    0 1 2 3 4 5 6 7 8 9 10 11 12 13 14+

12. (0 pts) Do you think that you could studied better? Yes No

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