

**Exam #3, ver B**

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)  $g(f(x))$
- (d)  $f(g(x))$
- (e) None of the above

2. The inverse function of  $f(x) = 5x + 3$  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  $f(x) = \frac{x-2}{x^2+4x+3}$

(a) Domain

(b) y-intercept

(c) x-intercept

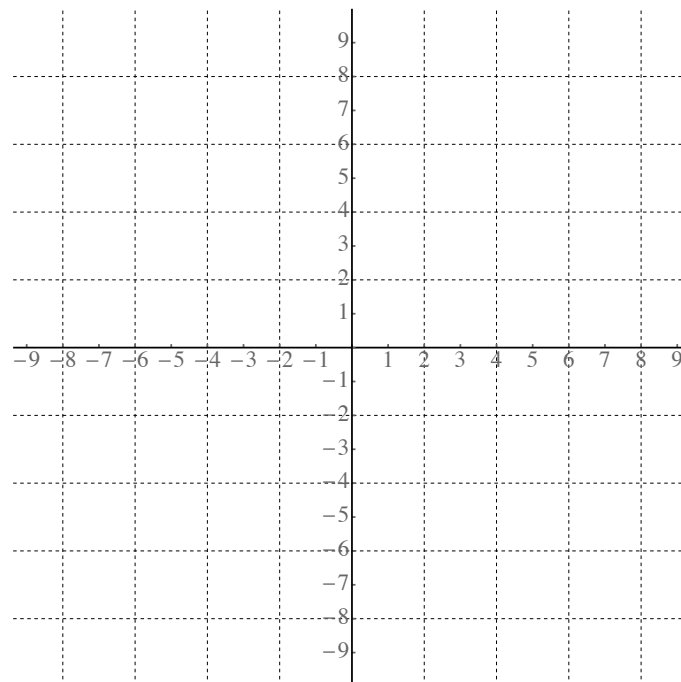
(d) Vertical asymptote(s)

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

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

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

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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