MAC 1105, Fall 2017

Exam #2

October 24, 2017

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 5 points each if not stated otherwise. Part II contains 7 open ended questions worth 10 points each if not stated otherwise.

Honor Code: *On my honor, I have neither received nor given any aid during this examination.*

Signature: _____

Part I

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

1. The function $f(x)$ is even if

   (a) $f(-x) = -f(x)$
   (b) $f(-x) = f(x)$
   (c) $f(x)$ is a polynomial.
   (d) $f(x)$ contains only even numbers
   (e) None of the above

2. Find the domain of

$$g(x) = \frac{(x-2)}{(x-2)(x+3)}$$

   (a) $(-\infty, -3) \cup (-3, 2) \cup (2, \infty)$
   (b) $(-\infty, -3) \cup (-3, \infty)$
   (c) $(-\infty, -3) \cap (-3, \infty)$
   (d) $(-\infty, -3) \cup (-3, 2] \cup [2, \infty)$
   (e) None of the above

3. Find $f(3)$ of the following piecewise function

$$f(x) = \begin{cases} 4, & \text{if } x < 0 \\ -x, & \text{if } 0 \leq x < 3 \\ x^2 - x + 3, & \text{if } x \geq 3 \end{cases}$$

   (a) $f(3) = -3$
   (b) $f(3) = 6$
   (c) $f(3) = 9$
   (d) $f(3) = 4$
   (e) None of the above.

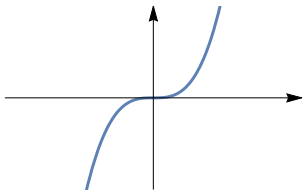
4. (10 points) Match each function with a graph. [Hint: One graph can be used multiple times.]

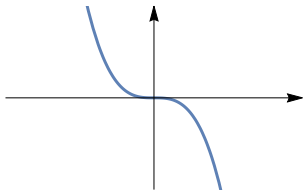
   (a) $f(x) = \sqrt{-x}$

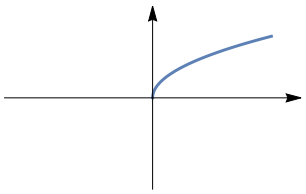
   (b) $f(x) = -\sqrt{x}$

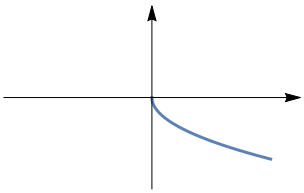
   (c) $f(x) = (-x)^3$

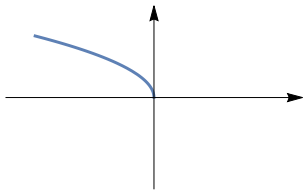
   (d) $f(x) = -x^3$

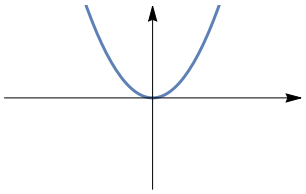
(1) 

(2) 

(3) 

(4) 

(5) 

(6) 

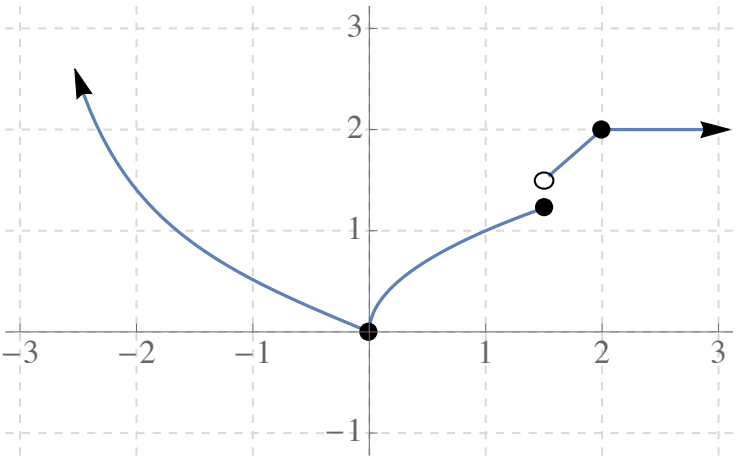
Part II

5. Find the domain of the function.

   (a) $f(x) = \dfrac{x-2}{x+1} - \dfrac{2}{x-4}$

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

6. (15 points) Consider the following function.



(a) Find the domain and range of the graph of the function.

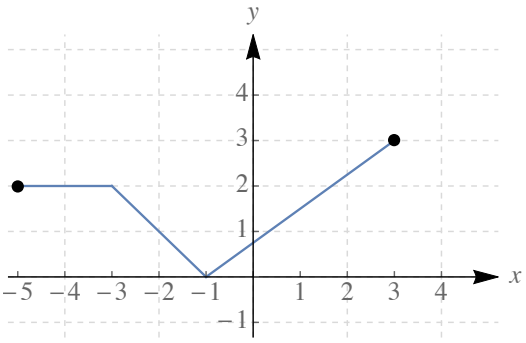
(b) Is f odd, even, or neither?

(c) Determine the intervals on which f is decreasing.

(d) Determine the intervals on which f is increasing.

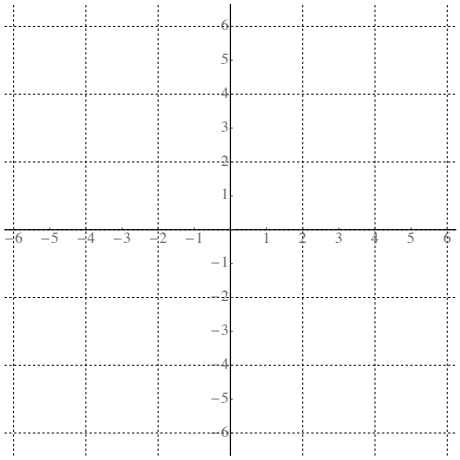
(e) Find relative maxima or minima.

7. (15 points) The graph of a function $y = f(x)$ is given below. Use transformations to graph $y = 2f(-x+1)-2$. List the transformations needed (use proper names!) and graph each intermediate graph on the grid provided. Be accurate!



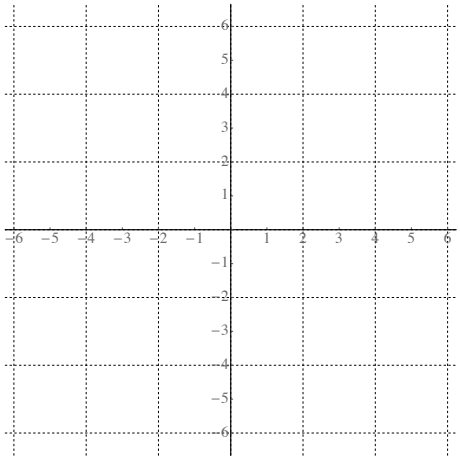
(i) transformation:

y=



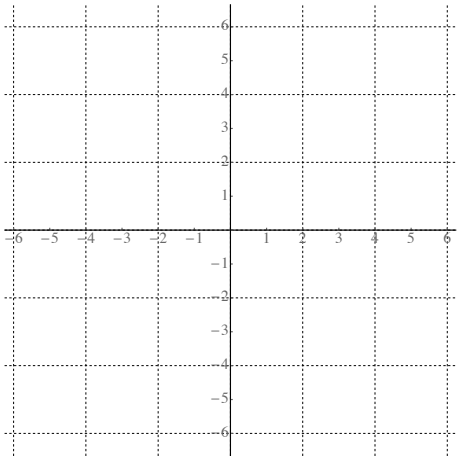
(ii) transformation:

y=



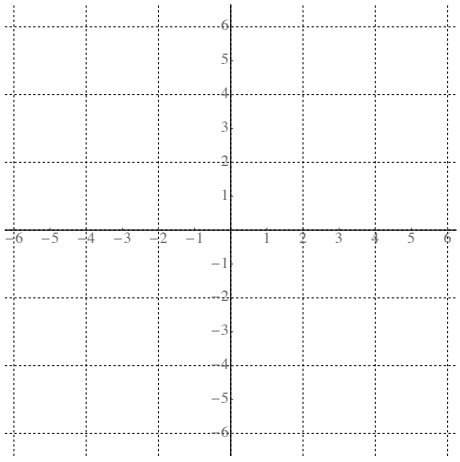
(iii) transformation:

y=



(iv) transformation:

y=



8. A point $(4, -1)$ is on the graph of a function $y = f(x)$. What point will be on the graph of $y = -f(x+1) + 1$?

9. Let $f(x) = x^2 - 2x$ and $g(x) = 3x$. Find and simplify the following.

   (a) $(f+g)(x)$

   (b) $\left(\frac{f}{g}\right)(x)$

10. Determine if the following function is odd, even, or neither.

$$f(x) = \frac{x^3}{x^2 - 1}$$

11. (15 points) Graph the function $f(x) = \begin{cases} 2-x & , \text{ if } x < 2 \\ 0 & , \text{ if } 2 \le x \le 3 \\ (x-2)^2 & , \text{ if } x > 3 \end{cases}$