MAC 1140, Spring 2018

Exam #1, ver A

January 30, 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 consist of two parts. Part I contains five multiple choice questions worth 5 points each. Part II contains 7 open ended questions worth 12 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. If $f(x) = \frac{2}{x+3}$ and $g(x) = \frac{4}{x}$, then $(f \circ g)(x)$ is

   (a) $2x + 6$

   (b) $\dfrac{2}{3x+4}$

   (c) $\dfrac{2x}{3x+4}$

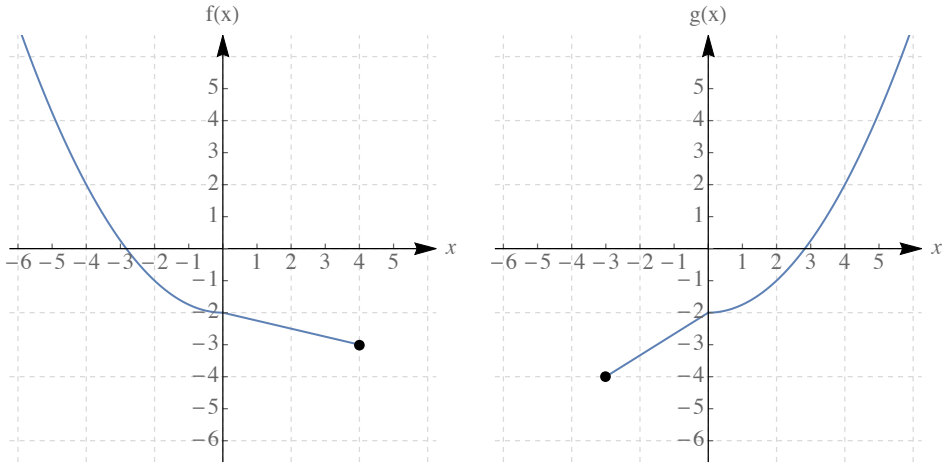
   (d) $\dfrac{2x}{x+3}$

   (e) None of the above

   The domain of $f \circ g$ is

   (a) $(0, \infty)$
   (b) $(-\infty, \infty)$
   (c) $(-\infty, -3) \cup (-3, \infty)$
   (d) $(-\infty, -4/3) \cup (-4/3, 0) \cup (0, \infty)$
   (e) None of the above.

2. The graphs of $f(x)$ and $g(x)$ are given below. The value of $(\frac{f}{g})(-3)$ is

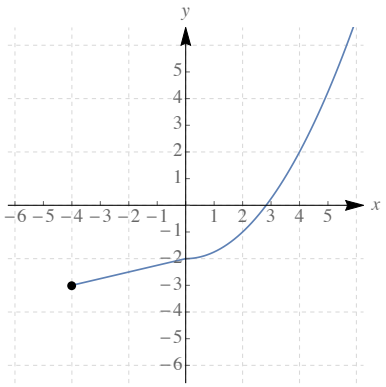


   (a) 0
   (b) -1
   (c) -3
   (d) -4
   (e) None of the above.

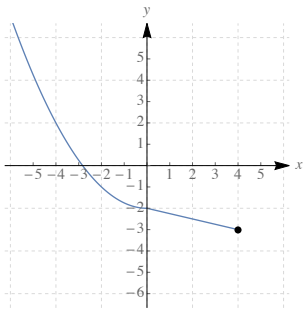
3. If f is one-to-one and $f(-2) = 7$, then which of the following statements are true? (Select all true statements.)

   (a) $f^{-1}(7) = 2$
   (b) f is even
   (c) $(-2, 7)$ is on the graph of the graph of f
   (d) $(1, 7)$ is on the graph of $y = f(-2x)$
   (e) None of the above.

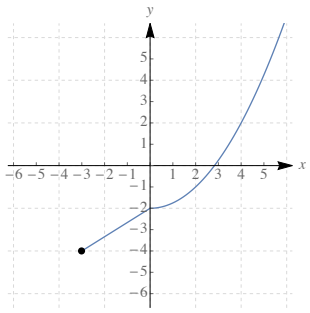
4. The graph of a one-to-one function f is given below. Which of the following is the graph of its inverse?



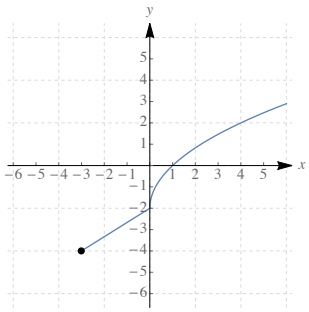
(a)



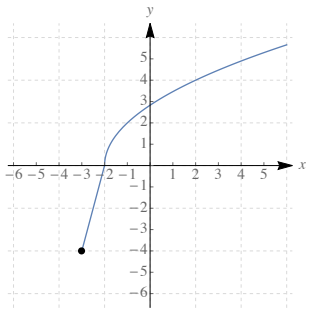
(b)



(c)



(d)



(e) None of the above.

5. If the graph of the function $y = x^2$ is vertically stretched by a factor of 2 and then shifted to the right by 5 then the resulting function has the equation

   (a) $y = 2(x + 5)^2$

   (b) $y = 2(x - 5)^2$

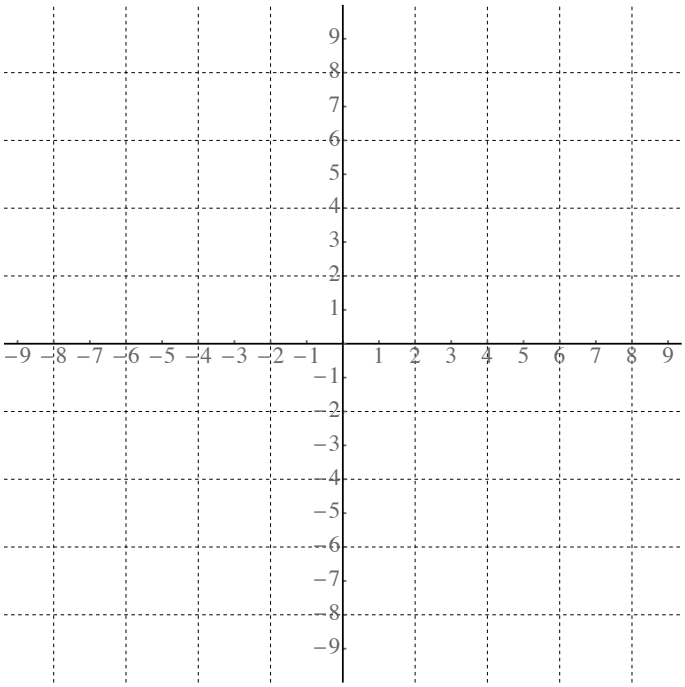
   (c) $y = 2x^2 + 5$

   (d) $y = 2x^2 - 5$

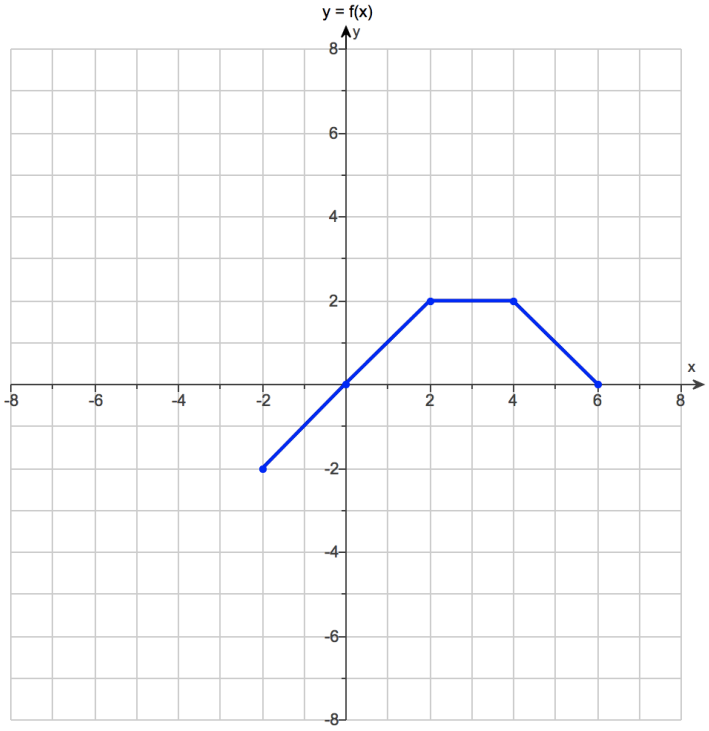
   (e) None of the above.

Part II

6. Graph the function $f(x) = \begin{cases} \sqrt{3-x} & , x < -1 \\ x+2 & , -1 \leq x \leq 2 \\ x^2 & x > 2 \end{cases}$

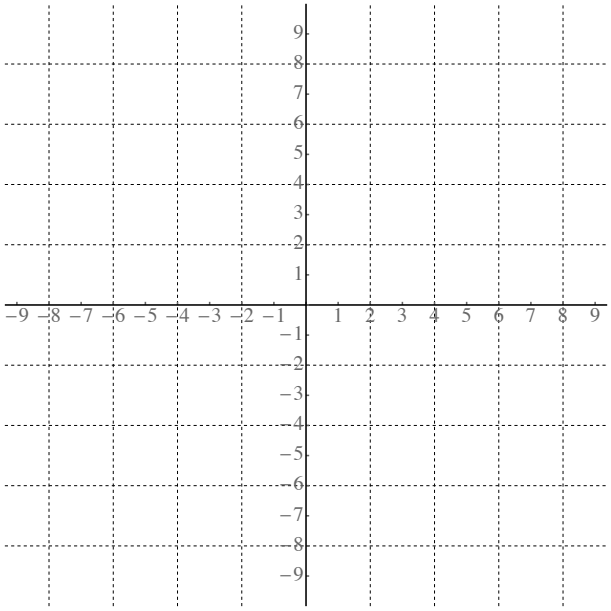


7. Given the graph of $f(x)$, use transformations to graph $y = -3f(-x+2)$. Do one transformation at a time. Name the transformation and write the equation of the resulting function.



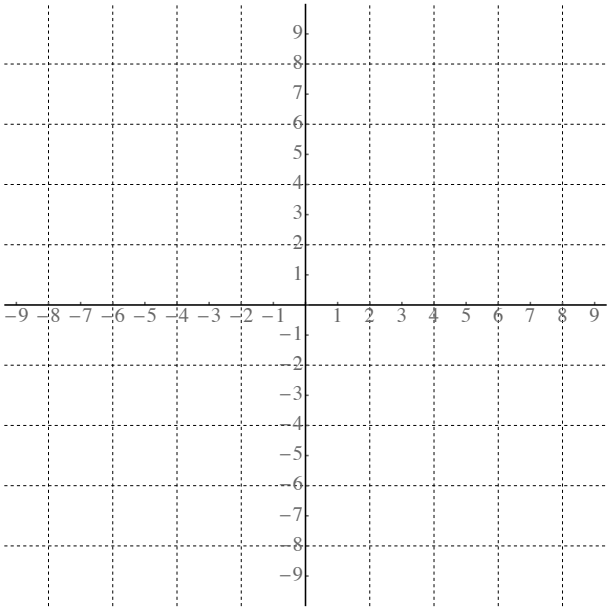
(i) transformation:

y=



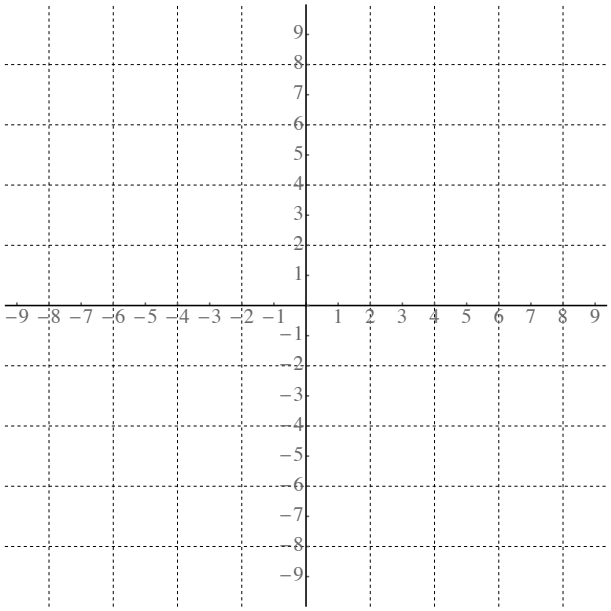
(ii) transformation:

y=



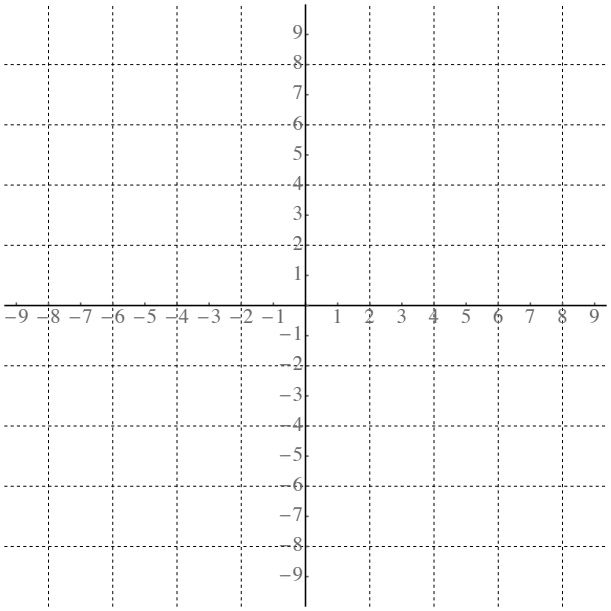
(iii) transformation:

y=



(iv) transformation:

y=

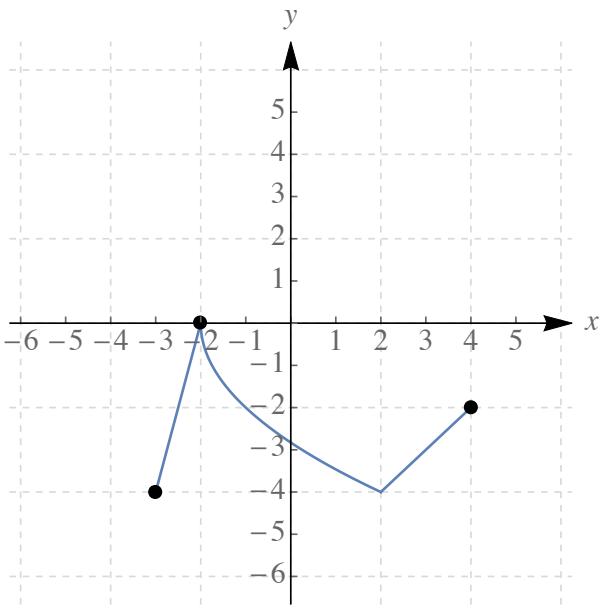


8. Find the difference quotient for $f(x) = \dfrac{3}{x-4}$.

9. Find the inverse of $f(x) = \frac{5}{x} + 1$

10. Find the domain of $f(x) = -12\sqrt{4x+3}$

11. Using the given graph of the function f, answer the parts (a)-(f) below.



(a) Find the domain of f. Express it in interval notation.

(b) Find the range of f. Express it in interval notation.

(c) Find the $x-$intercepts.

(d) Find the $y-$intercepts.

(e) Find the intervals on which f is increasing.

(f) Find the intervals on which f is decreasing.

12. (13 points) Find two functions $f(x)$ and $g(x)$ (neither of them identity) so that $h(x) = f(g(x))$, where

$$h(x) = \frac{7}{(3x-7)^3}$$