MAC 1105, Spring 2018

Exam #2, ver B

February 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 three multiple choice questions worth 10 points each. Part II contains six open ended questions worth 20 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. The graph of an equation is symmetric with respect to x-axis if substituting _____ in the original equation results in an equivalent equation.

   (a) $-x$ for x
   (b) $-x$ for y
   (c) $-y$ for y
   (d) $-x$ for x and $-y$ for y
   (e) None of the above

2. What transformation do we have to perform on $f(x)$ to get the graph of $f(\frac{x}{3})$?

   (a) Vertical stretch by factor of 3
   (b) Vertical shrink by factor of 3
   (c) Horizontal stretch by factor of 3
   (d) Horizontal shrink by factor of 3
   (e) None of the above

3. Select the correct transformations in the correct order to graph $-f(x-2)+2$ using the graph of $f(x)$.

   I. reflection about the x-axis
   II. reflection about the y-axis
   III. horizontal shift left by 2
   IV. horizontal shift right by 2
   V. vertical shift up by 2
   VI. vertical shift down by 2

   (a) I, III, V
   (b) V, I, IV
   (c) II, III, VI
   (d) IV, II, V
   (e) None of the above.

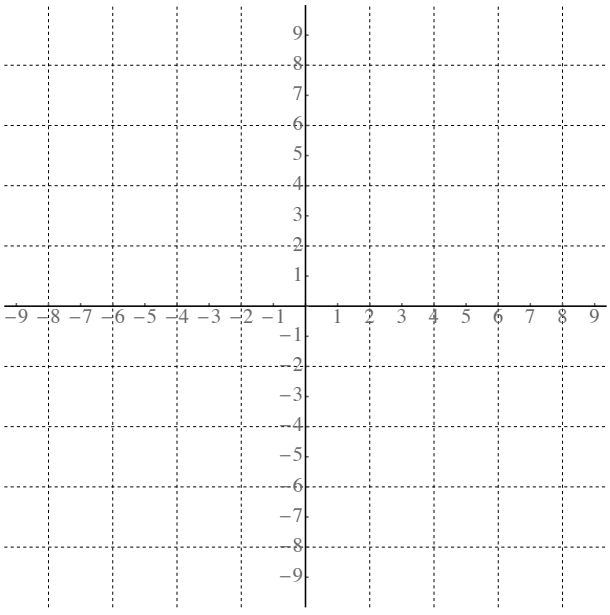
Part II

4. Find and simplify the difference quotient $\frac{f(x+h)-f(x)}{h}$ for the function below

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

5. Graph the function below, find its range and relative maximum or minimum.

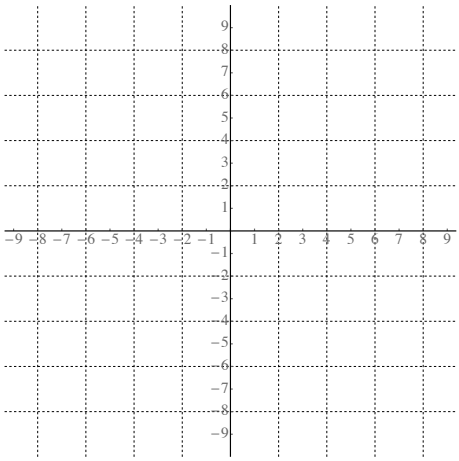
$$f(x) = \begin{cases} x+6, & \text{if } x < -5 \\ (x+3)^2 - 3, & \text{if } -5 \leq x \leq -1 \\ -3, & \text{if } x > -1 \end{cases}$$



6. Use transformations to graph $y = 3\sqrt{-x+2}$. List the transformations needed (use proper names!) and graph each intermediate graph on the grid provided. Use at least **4 points** when sketching the graph.

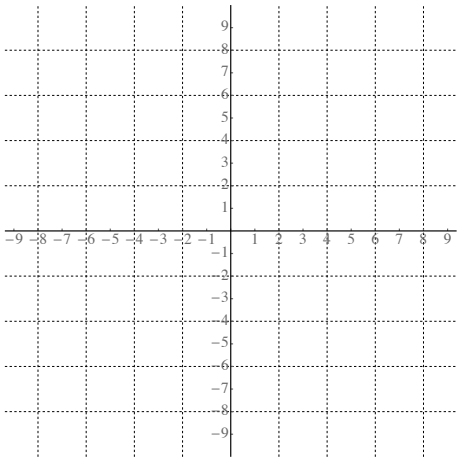
(i) parent function:

y=



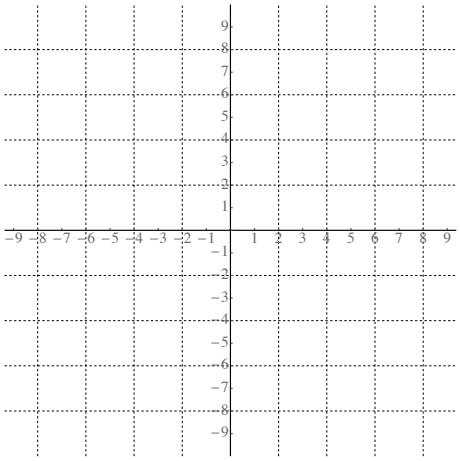
(ii) transformation:

y=



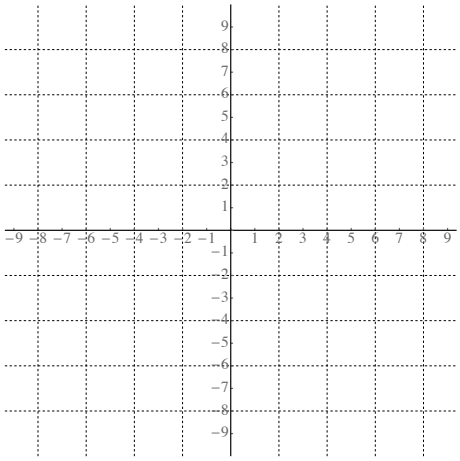
(iii) transformation:

y=



(iv) transformation:

y=



7. (5 extra pts) Find the average rate of change between $x = 1$ and $x = 3$ if $y = x^2 - x$.

8. (5 extra pts) Give an example and explain **why** is the order of transformations important when plotting $y = (-x + 4)^3$. [Hint: You should make two rough sketches and write a few sentences for full credit.]

9. (0 pts) How many hours in total did you study for this exam since Friday?

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