Math 32, Fall 2001, Tracy Hall
Midterm I, 2 March Name_____

TA_____Section_____

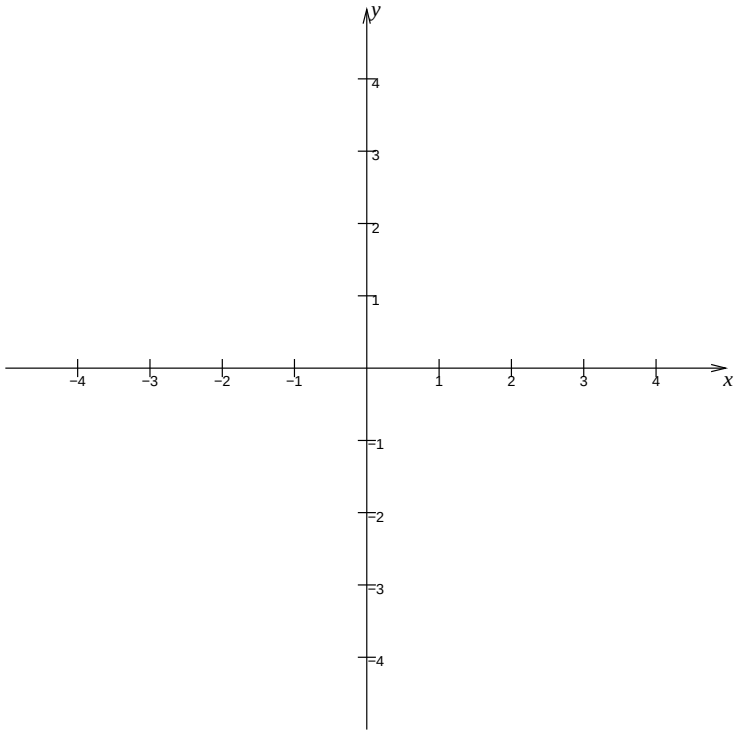
Page 1

For all the problems on this page, let $f(x)$ be defined as follows:

$$f(x) = \begin{cases} 3x - 3, & 0 \le x \le 1 \\ \frac{1}{2}(x-1), & 1 < x \le 3 \end{cases}$$

1a) (5 points) Compute $f(0)$, $f(1)$, $f(2)$, and $f(3)$.

1b) (5 points) Draw a graph of $y = f(x)$. Label the points you computed.



1c) (5 points) On the same axes, draw the graph of $y = f^{-1}(x)$.

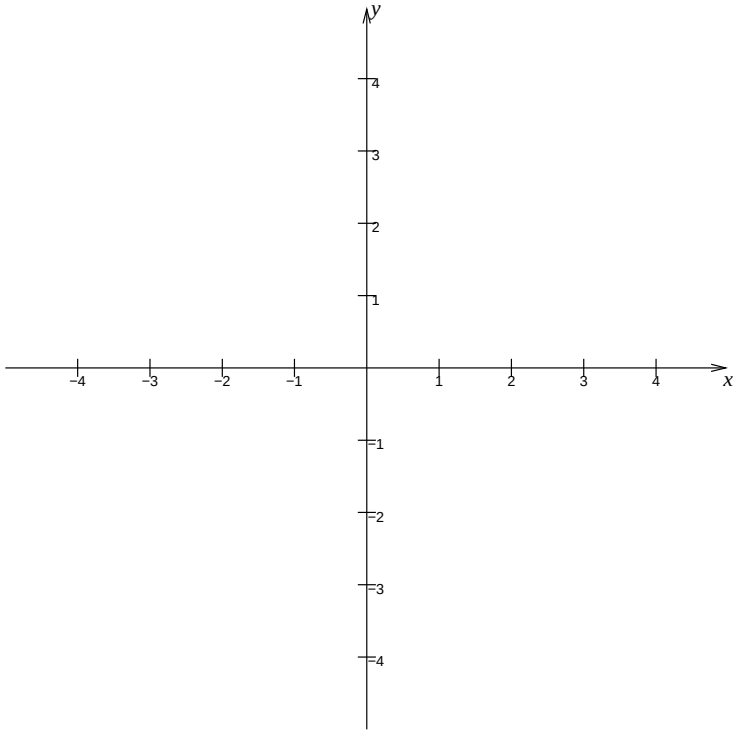
1d) (10 points) Fill in the blanks:

$$f^{-1}(x) = \begin{cases} \_\_\_\_\, x + \_\_\_\_\,, & \_\_\_\_ \le x \le \_\_\_\_ \\ \_\_\_\_\, x + \_\_\_\_\,, & \_\_\_\_ < x \le \_\_\_\_ \end{cases}$$

 Name_____

For all the problems on this page, let $f(x) = \sqrt{x-1} + 2$.

2a) (5 points) Draw the graph of $y = f(x)$.



2b) (10 points) Plot the point $(3, 2)$ on the same set of axes. Give the distance from $(x, f(x))$ to the point (3,2), as a function of x.

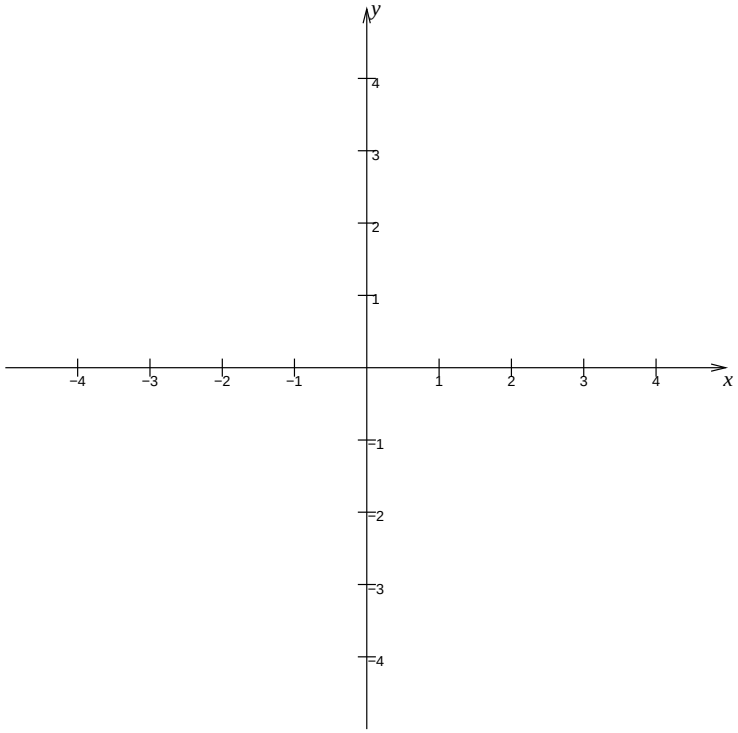
2c) (10 points) Find the point on the curve $y = f(x)$ which is closest to the point $(3, 2)$.

 Name_____

For all the problems on this page, let $f(x)$ be the rational function

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

3a) (15 points) Draw the graph of the equation $y = f(x)$. Include any vertical or horizontal asymptotes.



3b) (5 points) Does the function $f(x)$ have an inverse? Explain why or why not.

3c) (5 points) Let $g(x)$ be the function $g(x) = \sqrt{x}$. What is the domain of the function $(g \circ f)(x)$? Express your answer in interval notation.

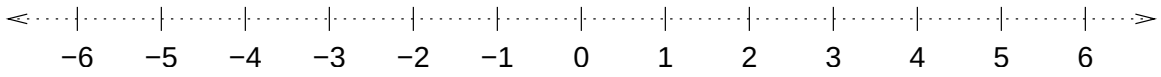
 Name_____

4a) (5 points) Simplify the following expression as much as possible, using the change-of-base formula and other properties of logarithms. (The simplified answer has only one logarithm in it.)

$$\ln(\log_5 e^3) + \ln(\log_2 5) + \ln(\ln(2))$$

4b) (10 points) Which values of x make the following inequality true? Graph your answer on the number line below. (Be careful not to include anything which is not in the domain of the function.)

$$\log_3(x^2 - 16) \leq 2$$



4c) (10 points + 5 point bonus) Solve for y in terms of x:

$$e^x = e^y + x + 1$$

Bonus: What is the domain of your answer?