Required Problems

1. (1 point) Suppose $f(x)$ is a function with the following values:

x	1	2	3	4	5
$f(x)$	7	-2	6	-1	9

   (a) Based on the table, does $f(x)$ have an inverse? Why or why not?

   (b) If $f(x)$ does have an inverse, what is $f^{-1}(6)$?

   (c) If $f(x)$ does have an inverse, what is the domain of $f^{-1}(x)$? Is it the same as the domain of $f(x)$? Can we evaluate $f^{-1}(3)$?

2. (1 point) Calculate $f^{-1}(x)$ if

$$f(x) = \frac{6}{3-x} + 2$$

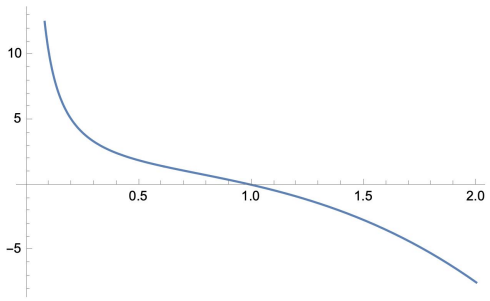
   Verify that your answer is correct (your TA needn't check this work; just show that you did it).

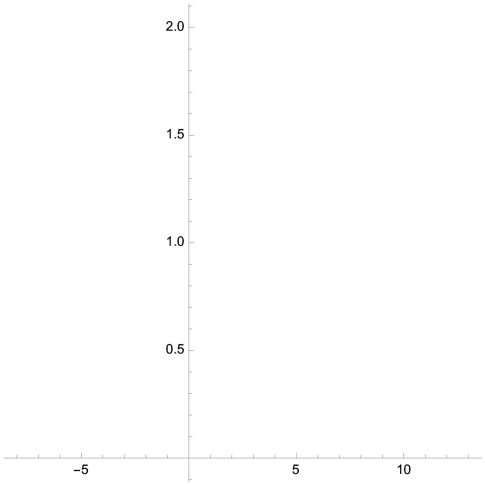
3. (1 point) Calculate the inverse of the function

$$f(x) = \frac{x-2}{2x+4}$$

   You do not need to verify that your answer is the correct inverse.

4. (1 point) Consider the graph of $f(x)$ given below:





   (a) Does $f(x)$ have an inverse? Why or why not?

   (b) If $f(x)$ does have an inverse, sketch the graph of $f^{-1}(x)$ in the empty coordinates plane.

Optional Problems

If you have questions about the optional problems, please save them for after recitation. If there is no time, please direct them to Dr. Hockensmith or stop by office hours. Hints or answers are included.

5. Suppose $f(x)$ is a function whose domain is the whole real line.

   (a) If $f(x)$ is even, does $f(x)$ have an inverse? Why or why not?

   (b) If $f(x)$ is constant, does $f(x)$ have an inverse? Why or why not?

   (c) If $f(x)$ is linear and not constant, does $f(x)$ have an inverse? Why or why not?

   Hint: For a and b, think about whether or not there are multiple inputs going to the same output. For c, any linear function has the form $f(x) = mx + b$. Can you find the inverse based on this formula?

6. Calculate the inverse of the function:

$$f(x) = \sqrt{2x - 5}$$

   What is the domain of the inverse function?

   Answer: $f^{-1}(x) = \dfrac{x^2 + 5}{2}$. To identify the correct domqin, think about the range of $f(x)$; can f output any negative numbers?

7. Calculate the inverse of the function:

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

   Verify your answer is correct.

   Answer: $f^{-1}(x) = \dfrac{1}{2 - y^2}$.

8. Calculate the inverse of the function:

$$f(x) = \frac{1 + x^2}{3 - x^2} \quad x < 0$$

   You do NOT need to verify that your answer is correct.

   Answer: $f^{-1}(x) = -\sqrt{\dfrac{3x - 1}{x + 1}}$