

Calculus 1000A — Fall 2015  
Written Assignment 1

Due Date: Sept. 21, 2015 (in class)

Name: \_\_\_\_\_

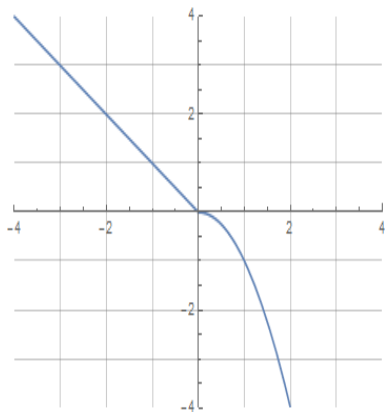
Section: 007

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- There are two problems in this assignment. Each problem can earn you a maximum of 10 points.
  - Attach extra sheets if necessary — illegible answers will adversely affect your grade.
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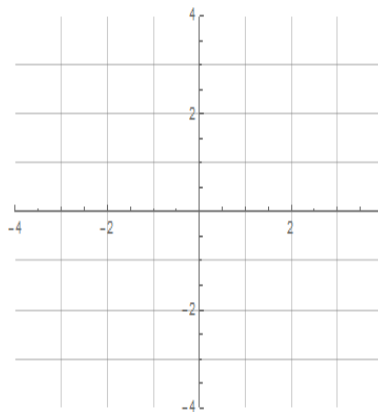
**Problem 1.** Given below is the graph of the function  $f(x)$ .  $f(x)$  has domain  $[-4, 2]$ . What is the domain of

$$g(x) = f^{-1}(2x + 1)?$$

In the grid provided below, carefully sketch the graph of  $g(x)$ .



graph of  $f(x)$



graph of  $g(x)$

Domain of  $g(x)$ :

(Useful tip: First, determine the domain and draw the graph of  $h(x) = f^{-1}(x)$ .)

**Problem 2.** (i) Use the addition and subtraction formulas for the sine and cosine functions to prove the identity

$$\sin(x) - \sin(y) = 2 \cos\left(\frac{x+y}{2}\right) \sin\left(\frac{x-y}{2}\right).$$

(ii) Using part (i), find all the pairs  $(x, y)$ ,  $0 \leq x, y < \frac{\pi}{2}$ , that satisfy **both** of the following equations:

$$2 \sin(x - y) = \sin(2x) - \sin(2y); \tag{1}$$

$$x = 4y. \tag{2}$$

(Useful tip: Simplify (1) before substituting (2) in (1).)