

Math 10A  
Midterm Exam 1  
October 20, 2011  
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Version A

Instructions

1. No calculators or other electronic devices are allowed during this exam.
  2. You may use one page of notes, but no books or other assistance during this exam.
  3. Write your *Name*, *PID*, and *Section* on the front of your Blue Book.
  4. Write the *Version* of your exam at the top of the page on the front of your Blue Book.
  5. Write your solutions clearly in your Blue Book
    - (a) Carefully indicate the number and letter of each question and question part.
    - (b) Present your answers in the same order they appear in the exam.
    - (c) Start each question on a new side of a page.
  6. Read each question carefully, and answer each question completely.
  7. Show all of your work; no credit will be given for unsupported answers.
0. (1 point) Carefully read and complete the instructions at the top of this exam sheet and any additional instructions written on the chalkboard during the exam.

1. (12 points) Let  $f(x) = \frac{x}{x+2}$  and  $g(x) = x - 5$ . Find:

- (a)  $f(g(6)) =$
- (b)  $f(f(1)) =$
- (c)  $f(g^{-1}(5)) =$
- (d)  $f(g(x)) =$

2. (8 points) Let

$$f(x) = \begin{cases} 1 - x & \text{if } x < 0 \\ 3x & \text{if } 0 \leq x < 1 \\ 2x - 1 & \text{if } x \geq 1 \end{cases}$$

Evaluate the following limits. If the limit does not exist, write “does not exist”. You do not need to justify your answers.

- (a)  $\lim_{x \rightarrow 2} f(x)$
- (b)  $\lim_{x \rightarrow 1^+} f(x)$
- (c)  $\lim_{x \rightarrow 1^-} f(x)$
- (d)  $\lim_{x \rightarrow 1} f(x)$ .

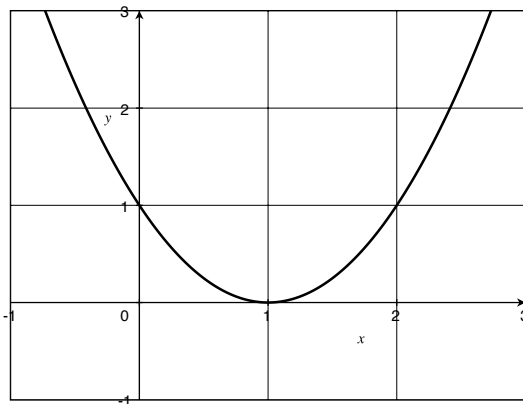
3. (10 points) The fraction of a lake's surface covered by algae was initially 0.48 and was halved (cut in half) each year since the passage of anti-pollution laws. How long after the passage of anti-pollution laws was only 0.03 of the lake's surface covered with algae?

4. (4 points) The function  $g(x)$  satisfies the following two conditions

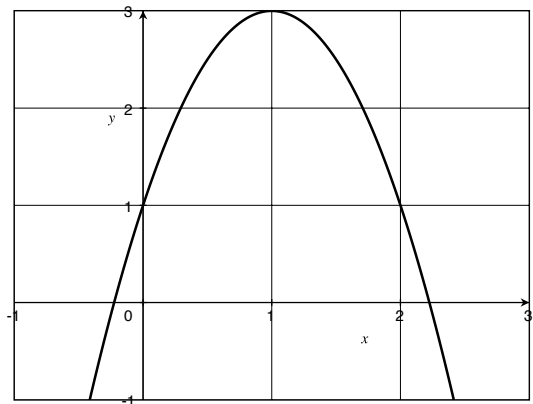
(i)  $g(1) = 0$ , and

(ii)  $\lim_{x \rightarrow 1} \frac{g(x) - g(1)}{x - 1} = 3$ .

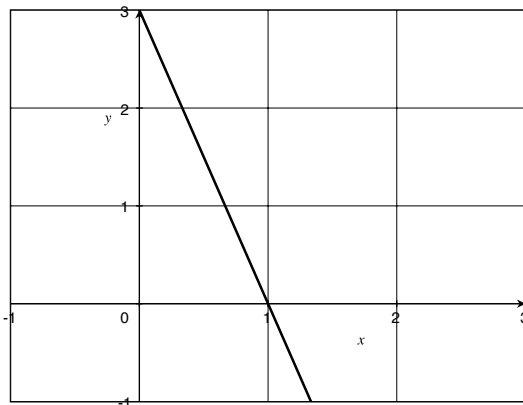
Which of the following is a possible graph of  $g(x)$ ? Clearly write the letter corresponding to your choice in your Blue Book. You do not need to justify your answer.



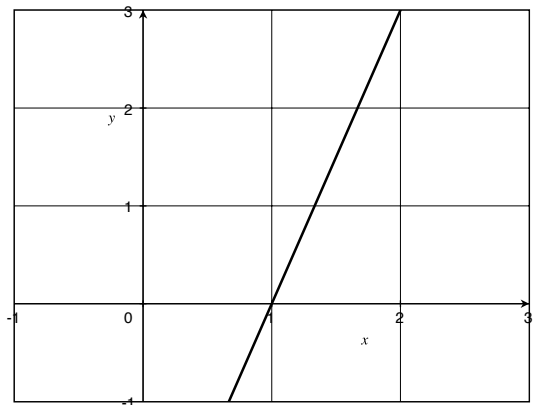
(A)



(B)



(C)



(D)