

Minitest 1A - MTH 1410

Dr. Graham-Squire, Spring 2013

Name: _____

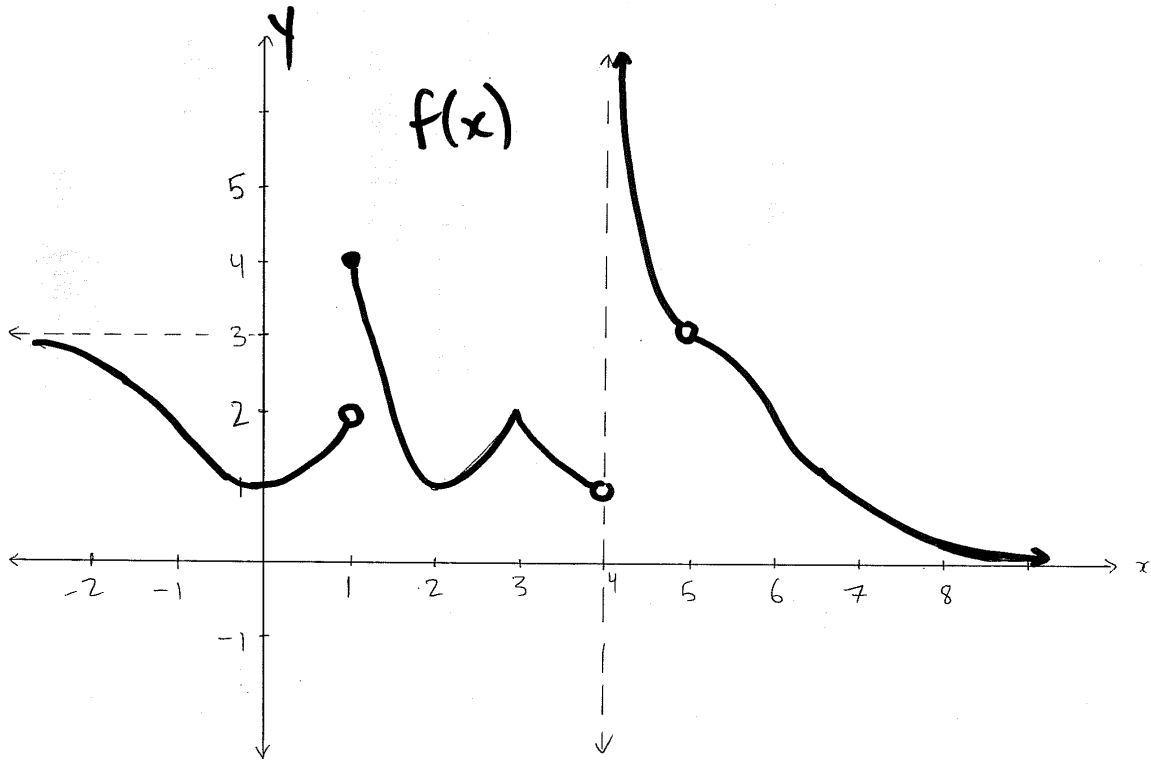
I pledge that I have neither given nor received any unauthorized assistance on this exam.

(signature)

DIRECTIONS

1. Show all of your work and use correct notation. A correct answer with insufficient work or incorrect notation will lose points.
2. Clearly indicate your answer by putting a box around it.
3. Cell phones and computers are not allowed on this test. Calculators are allowed on the first 3 questions of the test, however you should still show all of your work. No calculators are allowed on the last 2 questions of the test.
4. Give all answers in exact form, not decimal form (that is, put π instead of 3.1415, $\sqrt{2}$ instead of 1.414, etc) unless otherwise stated.
5. Make sure you sign the pledge.
6. Number of questions = 5. Total Points = 35.

1. (6 points) Use the following graph to evaluate the expressions below.



(a) $\lim_{x \rightarrow 1} f(x) =$

(b) $f(3) =$

(c) $\lim_{x \rightarrow 4^-} f(x) =$

(d) $\lim_{x \rightarrow 5^+} f(x) =$

(e) $f(5) =$

(f) $\lim_{x \rightarrow (-\infty)} f(x)$

2. (9 points) The following function $f(x)$ is discontinuous at 3 different values of x .

$$f(x) = \begin{cases} \frac{x-3}{x^2-9} & \text{if } x < 4 \\ 2 & \text{if } x = 4 \\ \frac{x}{28} & \text{if } x > 4 \end{cases}$$

- (a) What are the three x -values where f is discontinuous?
- (b) For each point of discontinuity, briefly explain why it is discontinuous. You must explain what part of the definition of continuity it fails in order to receive full points. A graph may help, but is not enough by itself.
- (c) At one of the x -values there is a vertical asymptote. Which one is it?

3. (4 points) Use a table of values to estimate each limit.

(a) $\lim_{x \rightarrow 0^-} \frac{\sin x}{x} =$

(b) $\lim_{x \rightarrow 0^+} \frac{\cos x}{x} =$

No Calculator

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4. (8 points) Calculate each limit. Explain your reasoning or show it mathematically. If the limit does not exist, explain (briefly) why.

(a) $\lim_{x \rightarrow (-2)^-} \frac{x^2 + 2x}{x^2 + 4x + 4} =$

(b) $\lim_{x \rightarrow \infty} \frac{3x^5 - 8}{x^2 - 13x^5} =$

5. (8 points) Use the definition of the derivative to calculate $f'(2)$ for $f(x) = \frac{1}{x}$.

Extra Credit(1 point) Calculate $\lim_{x \rightarrow 0} \sin \frac{\pi}{2}$.