Minitest 1 Review, Calculus I

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•Minitest 1 covers the material from Section 2.2 to 2.7. There will be 5 or 6 questions on the test, and you will have half of the period (approximately 35 minutes) to work on it.

•To study, you should read over your notes, try to re-work old WebAssign and quiz problems, and work on practice problems out of the textbook. You can look at the questions at the end of Chapter 2 and you can also try to work the recommended practice problems listed on each section of class notes. You can also use the material on my website, but not all of the questions match. Here are the matching questions:

- Fall 2015: all of Minitest 1 (this is on our blackboard site, I have not yet posted it to my website)
- Spring 2014: all of Minitest 1
- Spring 2013: all of Minitest 1
- Fall 2011: the only questions from Test 1 that fit are numbers 1, 3, 5, 6, and 7.

•It can be helpful to rewatch the video lectures, and/or look at a copy of the blank notes and try to work the examples and exercises. I also post the old Written Assignments, as well as answer keys for them.

•You can use a calculator on some questions and not on others. Using the calculator might be useful for confirming an answer is correct, but you will still need to show your work to get full credit. There will be at least one question where you cannot use a calculator.

•Below are some problems to work on to practice for the test. Be forewarned, though, that THE QUESTIONS ON THE TEST WILL NOT NECESSARILY BE THE SAME AS THE ONES BELOW! There are a variety of questions that I can ask, and the ones below are just a sample. If you just work the problems below that does <u>not</u> mean that you are completely prepared for the test. If you get stuck on any of the problems below, that probably indicates an area where you should study some more.

1. Calculate the limit, if it exists. If it does not exist, explain why and label it as ∞, $-\infty$, or just DNE.
   (a) $\lim_{x\to 7} \dfrac{\left(\dfrac{1}{2} - \dfrac{1}{x-5}\right)}{x-7}$.
   (b) $\lim_{x\to 4^-} \dfrac{4-x}{16-8x+x^2}$
   (c) $\lim_{x\to\infty} \dfrac{2x^8 - 4x}{7x^8 + 4}$

2. True or False: If true, explain why it is true, if false give a counterexample or explain why it is false.

   (i) If $x = 2$ is a vertical asymptote of $y = f(x)$, then $\lim_{x \to 2^+} f(x) = \infty$.

   (ii)

$$\lim_{x \to 1} \frac{x^2 + 6x - 7}{x^2 + 5x - 6} = \frac{\lim_{x \to 1} x^2 + 6x - 7}{\lim_{x \to 1} x^2 + 5x - 6} = \frac{0}{0} = DNE$$

3. Use the definition of continuity to explain what values of k and j will make the function continuous at $x = -3$:

$$f(x) = \begin{cases} k & \text{if } x < -3 \\ x^2 + j & \text{if } x = -3 \\ \dfrac{2x^2 + x - 15}{x^2 + 4x + 3} & \text{if } x > -3 \end{cases}$$

4. Use the limit definition of the derivative to calculate $f'(x)$ if $f(x) = (\sqrt{x - 7})$, then calculate $f'(11)$.

5. (a) Find a value for c such that the limit exists:

$$\lim_{x \to 3} \frac{x^2 - 7x + c}{x - 3}$$

   (b) For that value of c, what is the limit?