

Quiz # 1 Review

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Hello, future crimefighters. Batman here to help you along with your study for the first quiz, coming soon. Below are my thoughts on the sections that the quiz will cover (the sections discussed below comprise those sections that will be covered on the quiz). Corey is a very busy person, but still he wants to make sure that each of you are well prepared for the upcoming quizzes and tests. So, about a week before each of these, Corey will have a document such as this made available on the course website to help you study. Really, he hopes that something of this sort will assist you in studying by pointing out the main mathematical ideas that Corey will likely focus on for these quizzes and exams. Should you want or need any practice problems, the homework list that Corey supplied with the syllabus provides excellent practice problems. I'm off to fight crime, but please enjoy these thoughts on the sections that the quiz will cover.

1. Section 1.1: A preview of Calculus. This section is just to introduce you to the idea that Calculus is something different from everything you've learned so far in mathematics. It's the study of *change*, rather than the study of equality, although Calculus is certainly interested in equality as well. To be honest, this section is really an introduction to Section 2.1, and Corey will be mentioning that when the time is right. But an understanding of the difference between a *secant line* and a *tangent line* will be very helpful for the quiz, in particular, being able to work through a problem such as number 7 from this section on your own would be of great help to you on the quiz and exam.
2. Section 1.2: Finding limits graphically and numerically. The most important concept from this section is that of a "limit". Being able to find a limit of a function will

be on the quiz: whether the function is given to you as a graph, or as a rule (i.e., $f(x) = \dots$), you should know how to find a limit, or determine if such a limit does not exist. I'm quite certain Corey will also ask you to rigorously prove that a limit exists using the $\epsilon - \delta$ definition, as in problems 37-48. Although, Corey really isn't a mean guy, so he wouldn't ask you anything unreasonable.

3. Section 1.3: Evaluating limits analytically. In this section we observe that there are several things that always seem to happen when we study limits. For instance, $\lim_{x \rightarrow 5} x^2 + 4 = 5^2 + 4 = 29$. The math gods have determined that there are certain situations in which the $\epsilon - \delta$ argument is not the easiest way to verify that a limit is what you think it is. This section is a summary of these special (but commonly occurring) situations. Corey will likely ask you questions that are similar to those from the homework from this section.
4. Section 1.4: Continuity and one-sided limits. I would know what a continuous function is for sure. This is a big concept, and you will see it later. Remember that there are a few basic functions that we know are continuous, and we have rules that extend the library of continuous functions that we know to many, many functions. Be able to tell which functions are continuous, and why. As far as one sided limits go, I would be able to figure out a one sided limit on a graph that Corey could give you, along with knowing whether or not these exist. The intermediate value theorem is an interesting theorem, and I would know it. It's not clear to me right now exactly if Corey would ask anything about it, but make sure you study the homework questions 83-86 from this section just in case.
5. Section 2.1: The derivative and tangent line problem. Corey will describe a basic process in class (known as "taking a derivative") and ask you to demonstrate this process on the quiz. Since he will be introducing this concept in class a week before the quiz, he will not ask you a difficult question in this area, but one which asks you to demonstrate a basic knowledge of this process. Of course, there is much more to this section, but as far as the quiz goes, this will be the only question asked.
6. General Suggestions: I suggest that you study for this quiz. That may be a no-brainer, but if you get some good studying in, and you understand the concepts, Corey seems to think that you'll do very well. Also, another no-brainer for you: *read the directions!* Some problems may ask you to do something very straightforward (like questions from section 1.3), while other questions may be more detailed (like the proofs from section 1.2). There's a lot of material to prepare for... the quiz itself will only be about 20 minutes at the beginning of class (before Corey collects the quizzes and lectures some more). So there's no way that Corey could ask about everything on this sheet--this doesn't mean that he wouldn't ask about it on the midterm. Lastly, don't freak out. So, good luck, and remember to take advantage of Corey's office hours in advance if you need help. Oh, and ROCK ON!