Math 110 Fall 2000

Report on Exam 2

Ron Buckmire
Alan Knoerr

Point Distribution (N=69) For (Raw Score / 0.9)

Range	93+	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	60-66	below 60	
Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F	
Frequency	15	0	6	5	3	4	2	7	4	8	14	

Comments

Overall

#1 Rules of Differentiation. Very straightforward application of rules of differentiation. Some people forgot that π^2 is just a number, so its instantaneous rate of change (derivative) is exactly zero. On another problem, there was some confusion about the difference between 2^r and $2r$.

#2 Local Linearity, Continuity and Differentiability Almost everyone does seem to understand the three concepts involved. Local Linearity and Differentiability are intimately related and involve whether one can obtain a derivative at a point. Continuity is about whether a function has an output value at a point which is identical to the value of the limit of the function as the input values approach that same point. Besides defining the terms in a correct and understandable way, you also needed to discuss the students' understanding of the concept. The way the statements were written, one really can NOT just say "Morgan's first statement is false," etc. Each statement usually says more than one thing, one part which is true, and one part which is not true.

#3 Limits and the Definition of the Derivative. This problem gave many people a lot of trouble. In fact, it was clear that many of you did not fully understand the information provided in the problem and hence were unable to apply it in part a). (If you understand this information, the problem is a simple one.) Because this information was presented in a somewhat more abstract form than many of the problems we had looked at in this unit, we decided to make part a) extra credit. (This is why your grade is to be calculated as your raw score divided by 0.90.) Despite the difficulty in part a), there was more than enough information provided to correctly identify the "mystery function" as $F(x) = e^x$. Many people did this, but some got confused and thought it was the natural logarithm function instead. If you find yourself uncertain about properties of the natural log and exponential functions, we recommend you review the relevant sections in the text. There is also a Gateway Test on this material. Although it is not required for the course, feel free to go to the Gateway sessions and request a review sheet and/or test for logarithms.

#4 Tangent Line and Microscope Approximation. This problem was almost identical with one of our quizzes on which most people had done well. Nonetheless, quite a few people made some mistakes here. Perhaps the most common mistake was not evaluating $f'(x) = \cos(x)$ at the point $\pi/4$ prior to using it in the equation for the tangent line. Easy points were also lost due to sloppy graphing or not putting your calculator into radian mode rather than degree mode. Finally, some people were not clear about how to use the equation for the tangent line to approximate $\sin(x)$ at $\pi/5$. (Just evaluate your tangent line at $x = \pi/5$.)

#5 Implicit Differentiation. This was the problem we had intended to be more challenging. Part a) required recognizing that any point on the y-axis has an x coordinate of 0. Part b) required recognizing that the "slope of a curve at a point" is an interpretation of the derivative for a function whose graph is that curve. Finally, you needed to be able to find a formula for the derivative y' by implicit differentiation, then evaluate it at the point $(x, y) = (0, 1)$ from part a). Some people had a very good idea here. After implicit differentiation, rather than first solving for y', then evaluating at $(x, y) = (0, 1)$, they did the evaluation first. This simplified things a great deal and made it much easier to solve for y' at this point.

Interpreting Your Grade .

Nearly everyone did less well on this exam than on the first one. If you did do well on this exam, you can feel pretty confident about your mastery of this unit.

There was a lot of new material covered, with both conceptual and performance components. Reflecting the time we devoted to these in class and lab, the exam was about evenly balanced between these two aspects. Many people, however, seemed to have focused more on performance (i.e. derivative rules). We also know that there was a lot of competition for your study time from exams in other courses. Perhaps, having done well on the first exam in this course, you hoped you could do so again without studying as much for it as you would have liked to. You may also simply be finding that this course is different in some ways from you high school mathematics courses and that it's taking time for you to figure out how to learn mathematics in new ways.

Although it can be discouraging not to do well on an exam, we would encourage you not to be unduly worried about a poor performance on this exam. In our experience, the second exam for this course is often the one on which people do the least well. Because the third unit is primarily devoted to applying concepts and techniques from the second unit, you have some time now to really master what was still uncertain for you on this recent exam. Also, remember that the first two midterms only represent 30% of the course grade. Even if you only got 50% of each of these exams, a top grade of 85% (B) for the course is theoretically possible.

If you have been working hard but have not been as successful as you had hoped, please come see us for advice on using your time more effectively. As we mentioned, there is a lot that's new in this course and some new learning strategies may be needed to succeed. If you haven't been giving this course the time it needs, you still have some time to make up for this! Again, see us at office hours to help you focus on the most important topics if you're trying to catch up.