

Mathematics 131, section 1 – Calculus for Physical and Life Sciences  
Discussion 1 – Derivative Functions  
September 29, 2004

*Working in a Group*

Since this is the first of the discussion class of the semester, a few words about this way of working are probably in order. In the discussion meetings of this class, we will be aiming for *collaborative learning* – that is, for an integrated group effort in analyzing and attacking the discussion questions. The ideal is for everyone in each of the groups to be fully involved in the process. By actively participating in the class through talking about the ideas yourself in your own words, you can come to a better first understanding of what is going on than if you simply listen to someone else (even me!) talk about it.

However, to get the most out of this kind of work, some of you may have to adjust some of your preconceptions. In particular:

- This is *not a competition*. You and your fellow group members are working as a team, and the goal is to have everyone understand what the group does fully.
- At different times, it is inevitable that different people within the group will have a more complete grasp of what you are working on and others will have a less complete grasp. Dealing with this a group setting is excellent preparation for real work in a team; it also offers opportunities for significant educational experiences.
- If you feel totally “clueless” at some point and everyone else seems to be “getting it,” your job will be to ask questions and even pester your fellow group members until the point has been explained to your full satisfaction. (Don’t forget, the others may be jumping to unwarranted conclusions, and your questions may save the group from pursuing an erroneous train of thought!)
- On the other hand, when you think you do see something, you need to be willing to explain it patiently to others. (Don’t forget, the absolutely best way to make sure you really understand something is to try to explain it to someone else. If you are skipping over an important point in your thinking, it can become very apparent when you set out to convey your ideas to a team member.)

In short, *everyone has something to contribute, and everyone will contribute in different ways at different times.*

*Discussion Work*

The goal today is to generate reasonably accurate sketches of the graphs of the *derivative functions*  $y = f'(x)$  for the functions  $y = f(x)$  given in problems 2,3,5,7 from Section 2.4 in the text book. “Reasonably accurate” here means you should be aiming for *more than* just a qualitative picture of  $y = f'(x)$  along the lines of what we did in class yesterday.

How can you improve on that? Well, note that the graphs are printed *on a grid*. The small squares in the grid are *one unit on a side* in each case. If you draw in an approximate tangent line to the graph (“eyeball it”, but carefully), at an integer  $x$  value, then you can estimate the slope of that tangent line using the grid. That slope will become the  $y$ -value for the derivative function!

Turn in your group's four graphs of the derivative functions on sheet(s) of graph paper provided.

*Suggestions:*

- Don't mark the additional sheet until you have worked out what the graph  $y = f'(x)$  should be to the satisfaction of all group members and you can make a "clean" graph without erasing, redrawing, etc.
- Since you may need to redraw in any case, use a pencil for this work, not a pen(!)

*Assignment*

Group graph sheets due *at the end of class*.