Honors Problem #5
due Friday, October 7, 2005

You and a partner must arrange a time to go driving. One of you will be the driver, and the other will be the data collector. You will collect data on the car's speed at given time intervals on both a highway and a regular street. When collecting data for the highway, I suggest that you begin timing when you are going down the on-ramp to get on the highway and then end timing when you are getting off of the highway. You will collect data every 5 seconds for at least a four-minute interval of time; you may do a longer period of time if you wish. I suggest that the passenger simply say "time" every five seconds, and the driver responds with the speed from the speedometer.

After collecting your data, organize it in tables with appropriate units (hours and miles/hour) and draw scatterplots of the two sets of data. Draw as smooth a curve as possible through the points. Since these graphs are representations of rate of change (miles per hour), these will be your f' graphs. Also draw graphs of f and f'' for both highway and street driving, and explain all characteristics that help you sketch these. Be sure to label each of your graphs with the appropriate units, and explain what the graphs of f and f'' represent.

For your highway data (your f' graph), connect your scatterplot data with straight lines from point to point, and connect your last point to the x-axis with a vertical line. Calculate the area bounded by the x-axis, the y-axis, the line plot and the vertical line mentioned above. What does this area represent, and why?

This honors problem will be worth 10 points since it will require more work and possibly two weeks to complete.