

Exam II Essay

Instructions:

Exam II will be scored out of a total of 120 points: 90 points are possible on the in-class portion of this exam, 40 points are possible with the selection one of the following essays. All essays will be due on exam day *without exception*. The essay portion will be graded on the following:

- Good exposition: this means an introduction, thesis, supporting arguments, and conclusion.
- Organization and clarity: this is critical in being able to communicate your points.
- No grammatical *or* mathematical errors.
- Typewritten and printed on a word processor.

In particular, you are to answer *one* of the following questions:

1. In class we discussed how you can use information from the first and second derivatives to graph a function $f(x)$. How would you describe the process one should use when graphing a function $f(x)$ by hand? What do the first and second derivatives tell us about a function? It may help to work through a simple example as well.
2. We discussed how you can minimize average cost, but one thing we never discussed was the *inventory-cost* model (page 783 in Harshbarger & Reynolds). Read the pages that discuss this. Describe the basic assumptions of this model and describe how you would set up a problem that minimizes the total cost of production and storage (it may help to work through an example). Note that a key assumption is that stock is withdrawn at a constant rate. What happens if stock is *not* withdrawn at a constant rate? How would this affect the setup of your problem?

Some helpful hints:

- You may assume that your reader knows how to take derivatives, and you may assert any mathematical facts as necessary.
- I am looking for an essay, not a lot of math with a few words. Use nouns, verbs, adjectives, adverbs, subjunctive tenses, etc. If you write a draft and there is more math and equations than there are words, you need to try again.
- Your essay should be no longer than two pages double spaced, no shorter than one page double-spaced.
- I do understand that it is difficult to format and write mathematical terms and figures—if you use Microsoft Word there is an Equation Editor add-in. However the purpose of this essay is to see how well you can write math, so if formatting is more of a headache, you are certainly welcome to leave a blank space and write what you wish in with a pencil or pen after you print, or in your text say:

“..A graph of $f(x)$ is given in Figure 1...”

and then include your figures at the end. Again, figures can be hand drawn as long as they are neat.

- ***Do not start working on this the night before it is due! Iterate through multiple drafts!*** Poor preparation will show in the essay. At the very least, a careful writing will help you prepare for the exam as well.
- The goal of this exercise is to see how well you communicate mathematical ideas and concepts. You have all the resources necessary in your book and your notes, so I anticipate the challenging part will be writing the math in words. Feel free to share drafts with classmates, and if you are unsure in how you say something, don't hesitate to ask, although I will *not* proofread drafts.