

Math 120 D - Autumn 2007
Mid-Term Exam Number Two
November 15, 2007

Name: _____ Student ID no. : _____

Signature: _____ Section: _____

1	10	
2	10	
3	10	
4	10	
Total	40	

- Complete all questions.
- You may use a calculator during this examination. Other electronic devices are not allowed, and should be turned off for the duration of the exam.
- If you use a trial-and-error or guess-and-check method, or read a numerical solution from a graph on your calculator when an algebraic method is available, you will not receive full credit.
- You may use one hand-written 8.5 by 11 inch page of notes.
- Show all work for full credit.
- You have 50 minutes to complete the exam.

1. The more Jean studies, the better she will do on her English exam. If she doesn't study at all, she'll get a score of 40 points. If she studies for 10 hours, she'll get a score of 55 points. If she studies for 20 hours, she'll get a score of 60 points. Her score on the exam is a linear-to-linear rational function of the number of hours that she studies.

If Jean decides that she needs a score of 66 points on the exam, how much should she study?

2. Let

$$f(x) = x^2 - |x|$$

and

$$g(x) = |x - 2|.$$

(a) Write the multipart rule for the function $h(x) = f(x) + g(x)$.

(b) Does $f(x)$ have an inverse? If so, find the multipart rule for it. If not, explain why not.

- Oleg is running around a circular track. He runs at 3 meters per second and it takes him 73 seconds to complete each lap of the track. He starts running from the northernmost point of the track, and runs clockwise for 5 minutes. When he stops, how far (in a straight line) from the westernmost point of the track is he?

4. The weight of a vole (a small rodent) is a sinusoidal function of time. Today, the vole weighs 30 grams, its maximum possible weight. The vole's weight will decrease until it reaches its minimum, 27 grams, 13 days from today.
How much will the vole weigh 15 days from today?