Math 120 A - Spring 2008
Mid-Term Exam Number One
April 24, 2008

Name: _____   Student ID no. : _____

Signature: _____   Section: _____

1	10	
2	10	
3	10	
4	10	
Total	40	

- Complete all four questions.

- You may use a scientific calculator during this examination. Graphic calculators are not allowed. Also, other electronic devices are not allowed, and should be turned off and put away 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. Write your name on your notesheet and turn it in with your exam.

- Show all work for full credit.

- You have 50 minutes to complete the exam.

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1. You are sailing your boat near a radar antenna. The radar will detect anything within 10 km in any direction. You start sailing from a point 12 km East and 8 km North of the radar. You will sail directly to a point 8 km West and 14 km South of the radar.

   You sail at a constant speed of 6 km per hour. For what length of time will your sailboat be detectable by the radar?

2. You decide to take a walk. You start walking due North at 5 feet per second. After walking 200 feet, you turn and walk due West at 4 feet per second for 30 seconds. You then turn and walk due South at 3 feet per second for 100 seconds.

   Express the (straight-line) distance from your starting point as a multipart function of t, the number of seconds since you started walking.

3. You will use 100 feet of fencing to make two enclosures. One will be a square, and one will be a rectangle that is twice as long as it is wide.

What is the *minimum* possible combined area of the two enclosures?

4. Let $f(x) = 2x - |x + 2|$ and $g(x) = 1 - x$.

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

(b) Find all solutions to the equation

$$f(g(x)) = -\frac{1}{2}x$$