Math 120 A - Spring 2013
Mid-Term Exam Number One
April 25, 2013

Name: _____   Student ID no. : _____

Signature: _____   Section: _____

| 1	10	
2	10	
3	10	
4	10	
Total	40	

- Complete all four questions.

- Show all work for full credit.

- You may use a scientific calculator during this examination. Graphing 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 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.

- You have 50 minutes to complete the exam.

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1. Veeree is going for a walk from her house, which is 5 km east and 4 km north of Tom's house. Fred's house is 3 km south and 1 km west of Veeree's house.

   Veeree begins her walk by walking directly towards Tom's house. When she reaches the point on that path where she is closest to Fred's house, she changes direction and walks directly to Fred's house.

   How far did Veeree walk? Your answer should be correct to at least 4 decimal places.

2. You are working with a piece of sheet steel shaped as shown in the figure below. The dimensions are in centimeters.

3

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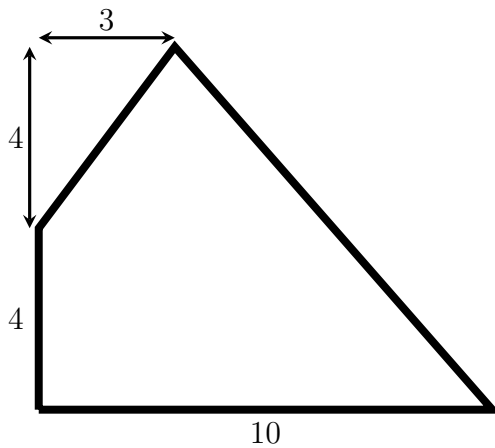
You want to make a vertical cut through the steel. The cut will be x cm from the left edge.

Express the area to the left of the cut as a multipart function of x. You do not have to simplify your expressions.

3. Jebby is going to go for a swim in Circular Lake, which has the shape of a perfect circle with a radius of 4 km. Starting from a point 5 km north and 1 km west of the northernmost point of the lake, she walks due south until reaching the lake. From there, she swims due south for 3 km, then turns and swims west until she reaches the lake edge, at which point she ends her swim.

For what distance did Jebby swim? Your answer should be correct to at least 4 decimal places.

4. Albert and Betsy are moving in the xy-plane. They each move along straight lines at constant speeds. They start moving at the same time. Albert starts at the point $(0, 5)$ and reaches the point $(10, 6)$ 4 seconds later.

   Betsy starts at $(-3, 4)$, and moves along the line $y = -\frac{1}{3}x + 3$. She crosses the x-axis after 2 seconds.

   (a) What are Albert's parametric equations of motion?

   (b) What are Betsy's parametric equations of motion?

   (c) When will Albert and Betsy be closest together? Your answer should be correct to at least 4 decimal places.