Math 120 A - Autumn 2013
Mid-Term Exam Number One
October 17, 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. You have a pizza shaped as shown below.
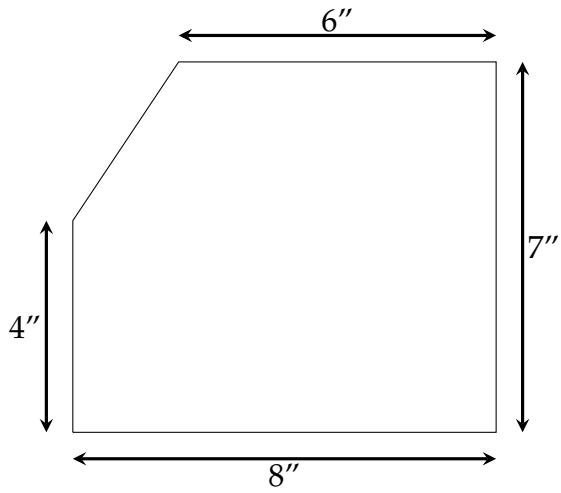
You are going to cut the pizza with a vertical cut x inches from the left edge. Express the area to the left of the cut as a multipart function of x.

2. Terry and Jim are at a campsite in a desert. At 6 AM, Terry leaves the campsite, cycling east at 20 km/hr. At 7 AM, Jim leaves the campsite, cycling north at 18 km/hr.

   (a) When Terry and Jim are 80 km apart, for what length of time has Jim been cycling?

   (b) There is a radio transmitter 50 km east and 20 km north of the campsite. Terry can pick up the signal from the transmitter when he is within 40 km of the transmitter. For what length of time will Terry be able to pick up the signal?

3. Malala lives inside the Circular Forest. The forest has the shape of a circle, with a radius of 20 km. Malala's house is 6 km due north of the center of the forest. One day, she decides to walk to Stewart's house, which is 22 km east and 9 km south of Malala's house.

   (a) Where is Malala when she is closest to the easternmost point of the forest? Give her location relative to the center of the forest.

   (b) Is the location you gave in part (a) inside or outside the forest? Be sure to show calculations supporting your answer.

4. (a) Let $f(x) = 3x - x^2$. Simplify the expression

$$\frac{f(x+h) - f(x-h)}{h}$$

far enough so that plugging in $h = 0$ would be allowed.

(b) Find the area of the triangle made by the y-axis, the line $y = 8 - x$ and the line $y = 3x$.