Math 120 A Winter 2017
Mid-Term Exam Number One
January 26, 2017

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.

- The only calculator you may use during this exam is a TI-30XIIs. All 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. Paula and Nikita are moving in the xy-plane. They both move along straight lines at constant speeds, and they both start at the same time.

   Paula starts from the point $(0, 3)$ and heads directly toward the point $(-5, -2)$, reaching that point in 5 seconds.

   Nikita starts from the point $(4, 0)$ and heads directly toward the point $(-10, 0)$, reaching it in 2 seconds.

   Let t be the time since they started moving.

   Find the values of t when Nikita and Paula are a distance of 5 units apart.

2. Sam is walking near the Circular Forest.

   The Circular Forest has the shape of a circle, with radius of 17 km.

   Sam begins walking from a point 12 km west and 13 km south of the center of the forest.

   Sam heads directly toward a point 5 km east of the easternmost point of the forest.

   (a) Where does Sam exit the forest? State how many kilometers east and how many kilometers south of the center of the forest the exit point is.

   (b) On Sam's walk, where is Sam when Sam is closest to the center of the Circular Forest? Give the location as so many kilometers east and so many kilometers south of the center of the forest.

3. You have a pizza shaped as shown in the figure below (dimensions are in centimeters). You are going to make a vertical cut through the pizza. The cut will be located a distance x centimeters from the left edge.

Express the area of the pizza to the left of the cut as a multipart function of x.

9

3

4

10
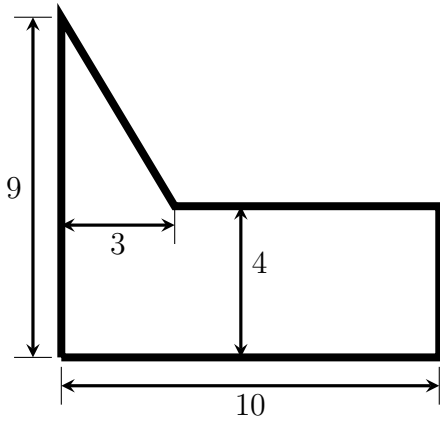
4. (a) Let $g(x) = 7x^2 + x$. Assume h is not zero, and simplify the following expression as much as possible.
$$\frac{g(x+h) - g(x)}{h}$$

(b) Find the center and radius of the circle defined by the following equation.
$$x^2 - \frac{4}{3}x + y^2 + 10y = \frac{95}{9}.$$