

Math 120 A, B - Winter 2007
Mid-Term Exam Number One
January 25, 2007

Name: _____

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.

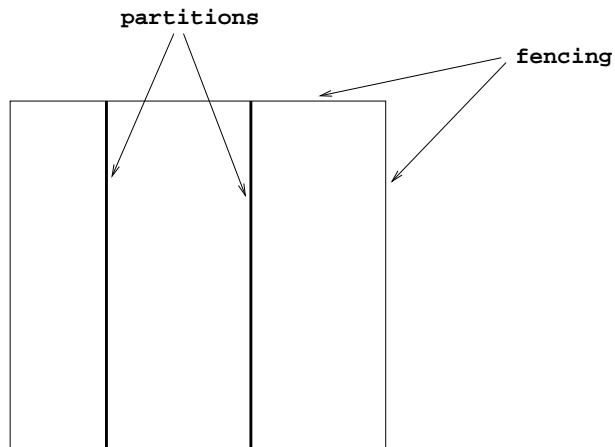
1. Mario and Inga are golfing. Inga's ball is located 30 feet south and 20 feet west of the hole. The hole is in the center of the green. The green is a perfect circle with a radius of 15 feet. Mario is standing 8 feet south and 2 feet west of the hole.

(a) Inga hits her ball so that it travels in a straight line to the hole. Where does it enter the green? Describe the location relative to the hole.

(b) On its way to the hole, how close does the ball come to Mario?

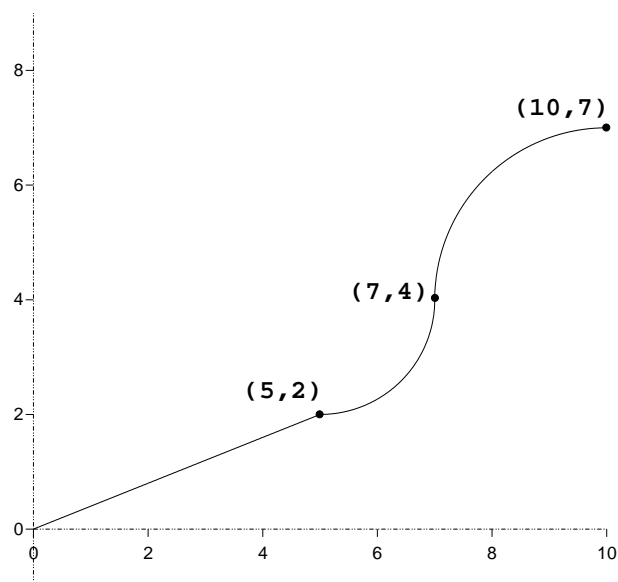
2. Sadie is using fencing to make a rectangular enclosure to contain three kinds of animals. She wants to put two partitions in the enclosure parallel to one side of the enclosure. The fencing costs \$2.40 per foot, and the material for the partitions costs \$3.70 per foot. Sadie has \$1000 to spend on the enclosure.

Here is an example of what the enclosure might look like:



What dimensions should the enclosure have to make the area as large as possible? Give the overall length and width.

3. Below is the graph of a multipart function, $f(x)$, which has domain $0 \leq x \leq 10$.



The graph consists of a line segment and two quarter-circles.

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

(b) Find all solutions to the equation $f(x) = 5$.

4. On a certain island, there are goats and kangaroos. You visit the island for the first time and find 150 goats and 260 kangaroos on the island. Ten years later, you return and find 280 goats and 300 kangaroos.

Suppose the number of goats is a linear function of t , the number of years since your first visit.

Also, suppose the number of kangaroos is a linear function of t .

When will the number of goats be twice the number of kangaroos? Give your answer in years since your first visit.