Math 120 - Summer 2006
Final Exam Part One
August 17th, 2006

Name: ______________________ Section: __________

1	10	
2	10	
3	10	
4	10	
5	10	
Total	50	

- You may use a scientific 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 your calculator when an algebraic method is available, you will not receive full credit.
- You may use two hand-written 8.5 by 11 inch page of notes.
- Show all work for full credit.
- You have 60 minutes to complete the exam.

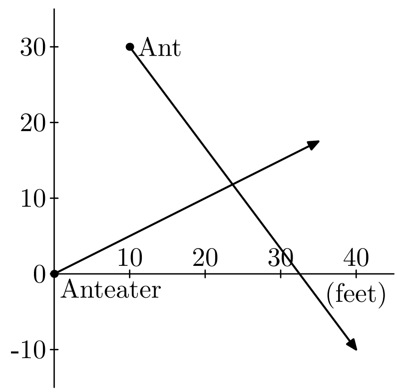
1. A tree is located 50 meters north of the center of a circular track of radius 10 meters. Jeff starts at the western most point of the track and runs 5 meters per second counter-clockwise around the track.

   (a) Impose a coordinate system with the origin at the center of the track. What are the coordinates of Jeff after t seconds?

   (b) How far from the tree is Jeff after 76 seconds?

2. There is a circular shaped plot of endangered wildlife of radius 20 meters. You wish to rope off a circular wedge shaped portion of it for preservation. If the area you wish to rope off is 100 square meters, how much rope do you need?

3. (a) An ant and an anteater cross paths, as shown in the diagram below (units are in feet). The ant starts at (10,30) and is walking towards the point (40,-10) at 4 feet per minute. Find the coordinates $x(t)$ and $y(t)$ of the ant at time t minutes.



(b) The anteater's position is given by: $x(t) = 4.4t, y(t) = 2.3t$. Find a formula $d(t)$ for the distance between the ant and the anteater in terms of time. **Do not simplify your answer!**

4. The number of black bears on a small island begins to decrease after a housing development begins. The number of bears on the island t years after the development begins is given by a linear to linear function $B(t)$. There are 1000 bears on the island when the development starts, 700 bears after 5 years, and due to conservation efforts the number of bears decreases but always remains above 100.

   (a) Find $B(t)$.

   (b) Graph $B(t)$. Label all asymptotes and zeros of $B(t)$ on the graph.

5. An oil field is put into production in 1980. Production of this field after t years is given by a quadratic function $p(t)$. Production starts at 0 barrels per day in 1980 and reaches a maximum of $100,000$ barrels per day in 2006.

   (a) Find $p(t)$.

   (b) When does production stop?