

Math 120 A - Spring 2006
Mid-Term Exam Number Two
May 18, 2006

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.

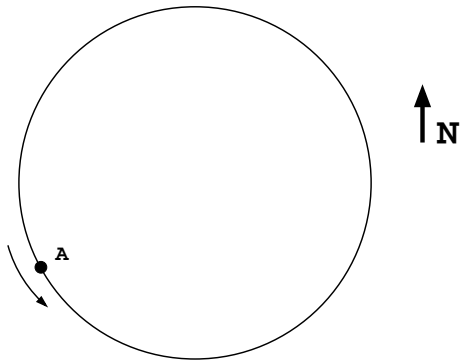
1. The population on the island of Blim is a linear-to-linear rational function of time. The population is always increasing, but it never exceeds 10,000. In 1980 ($t = 0$), there were 4,000 people on the island. In 1990 ($t = 10$), there were 5,000 people on the island.
In what year will there be 7,000 people on the island?

2. Maria is bicycling on a circular track.

She starts at point A and rides in the direction shown in the figure at a constant 25 m/sec.

She passes the southernmost point of the track 8.1 seconds after leaving point A.

She passes the northernmost point of the track 34.2 second after leaving point A.



How far east or west of point A will she be 15 minutes after leaving point A?

3. An interplanetary probe has determined that the temperature on the surface of a certain planet is a sinusoidal function of time. When the probe landed on the planet, the temperature was rising and it reached a maximum of 190 degrees Celsius 3.6 hours later. The temperature then decreased until it reached a minimum of 80 degrees Celsius when the probe had been on the planet for 7.9 hours.

How many hours during each period is the temperature below 100 degrees Celsius?

4. Let $f(x)$ be defined like this:

$$f(x) = \begin{cases} -7 - x & \text{if } x \leq -2 \\ 3x + 1 & \text{if } x > -2 \end{cases}$$

(a) Write the multipart rule for the function $g(x) = f(x) + 2|x - 1|$.

(b) Find all solutions to the equation $g(x) = 3$.