

**Problem Set 5**  
**MA104, Spring 2006**  
**DUE: March 8, 2006**  
**Value: 40 points**

Instructor: Dr. Leigh Noble, Assigned: March 2, 2006

Recall that this graded assignment must be accompanied by appropriate documentation as per the USMA *Documentation of Written Work*. The assignment is considered late if not turned in by the beginning of class on the due date.

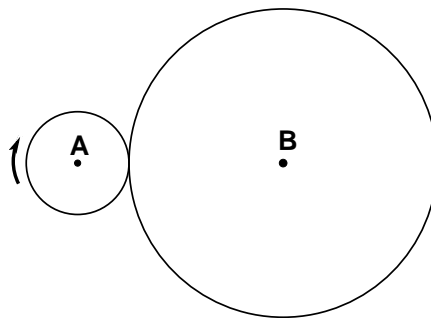
1. (30 points) Please write a solution to each problem on the Technology portion of Written Partial Review 1 to turn in along with your original WPR. (Please try not to write on your original WPR with the same color pen that you used to take the WPR.) Just as in the WPR, use of your textbook and any material already on your computer (not on the web), would not need to be documented.

Please do not spend days preparing fancy graphs. Instead, spend time determining where you lost your way, reflecting on your studying process, and re-learning material you didn't understand the first time. Once you've done that, tackle each problem using some systematic method such as Polya's method of understanding the problem, devising a plan, carrying out the plan, and checking (reflecting on) your solution. At this point, if you really don't have any idea how to go forward with a problem, *ask someone* (and document as necessary).

Write your solution (i.e. all the steps necessary to convince a calculus teacher of your answer) neatly on a new sheet of paper. (You may also submit a print out your Mathematica commands to support your argument.) The original exam was only 55 minutes; use some personal judgment about how much time to spend on each problem. After you've completed any "re-learning", I expect the neat writeup of each problem to take *no more than* 30 minutes apiece.

I know each and every one of you are capable of solving these problems. Let's all encourage one another to reach our full potential.

2. (10 points) The question below appeared on a college entrance examination many years ago. None of the choices offered with the question was correct. What is the correct answer?



In the figure above, the radius of circle  $A$  is  $1/3$  the radius of circle  $B$ . Starting from the position shown in the figure, circle  $A$  rolls around circle  $B$ . At the end of how many revolutions of circle  $A$  will the center of circle  $A$  first reach its starting point?

- (A)  $3/2$  (B) 3 (C) 6 (D)  $9/2$  (E) 9