

Math 182 Problems

Name: _____

Section: Polar

Due: 26 Apr 2018

Point values in boxes.

Submit your neatly written solutions, in order, on paper stapled to this sheet.

1. Consider bunnies (treat them as points) at the corners of a square of side length 2 dam^1 centered at the origin. The bunny starting at $(1, 1)$ always moves toward the bunny starting at $(-1, 1)$. The bunny starting at $(-1, 1)$ always moves toward the bunny starting at $(-1, -1)$. Similarly for the other two bunnies. The bunnies spiral in a counterclockwise direction at a constant speed until they meet at the origin.
 - (a) Find polar equations for the four bunny paths. Note, you will need to know that the solution to the differential equation $r' = -r$ is given by $r = Ce^{-\theta}$. You will also need the polar slope equation developed in class.
 - (b) Find the distance each bunny runs before they meet at the origin.
 - (c) Assuming they run at a constant speed of 4 m/s , how long does it take for them to meet at the origin?
 - (d) How dizzy are they?
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Random Thoughts on the final.

The final will be roughly composed of the following, for 100 points total:

1. 40-50 points - Chapter 11. Everything is fair. Expect polar curve sketching, polar areas, arc lengths, various parametric questions.
2. 20-30 points - Chapter 7. Integration by Parts, Trig Integrals, Trig Substitution, and Partial Fractions are all reasonable. Improper integrals are also reasonable.
3. 10ish points - Chapter 6. Applications of integration, specifically work (6.5). You will not be asked anything else from Chapter 6 or 8.
4. 10-30 points - Geometric and Power Series. Geometric Series are important. The Root and Ratio Test are important, as is the material regarding power series in general (think differentiation and integration) as well as Taylor series in particular.
5. 10ish points - reasonable interesting questions.

Sections in the text to review: 5.7, 5.8, 6.5, 7.1-3, 7.5-7, 10.2, 10.5-10.7, Chapter 11.

Given Information: See the given information for the second and fourth exams - available on the webpage.

More information will be available next week. Hopefully this will give you a start.

¹dam = dekameter = 10 meters