Advice for Exam 2

This is a noncumulative exam, focussing on chapters covered since the first midterm. However, it is still extremely essential to know the basics of differentiation and integration from Calculus I, especially the product rule, quotient rule and chain rule for derivatives, and the substitution method for integrals, and the Fundamental Theorem of Calculus. You should know how to differentiate and integrate elementary functions (polynomials, trig functions, exponentials and logarithms). You may also be required to use ideas covered in earlier chapters from lectures before the first midterm, including methods of integration, so it is a good idea to review these, even if there are no questions exclusively dealing with these sections.

7.7: Know the limit definition for improper integrals, and review L'Hôpital's rule. The methods of integration covered earlier in the semester are often needed to evaluate these improper integrals, especially integration by parts.

8.1: The arc length and surface area formulas are given in the formula sheet for this exam. Practice applying these formulas by solving problems. Note that trig integrals and trig substitutions are often needed to solve the integrals that come up in these problems.

11.1 & 11.2: Look over all the examples from Section 11.1 and make sure you can understand all the steps, especially for the ones involving finding a parametrization for a given curve. You should also know how to eliminate the paramenter, and how to find tangent lines without eliminating the parameter. Note that the formula sheet contains the formula for the arc length of a parametric curve, which you can use to find the speed at which the curve is traced.

11.3 & 11.4: You should understand how to identify points in terms of polar co-ordinates, and how to go back and forth between polar and rectangular co-ordinates. You should know how to plot the graphs for functions in polar form, especially for the examples given in this chapter. The formulas for area and arc length in terms of polar co-ordinates are given in the formula sheet. Practice applying these formulas, especially finding the correct limits of integration. Note that trig integrals often arise in problems relating to these sections.

9.1: You should know what it means for a differential equation to be separable, and how to solve it in this case. You should also understand what initial conditions are and how to use them.

9.2: The differential equation for Newton's Law of Cooling and the balance in an annuity are given in the formula sheet. You should be able to apply the methods of Section 9.1 to solve these differential equations and use the result to solve problems similar to the homework problems for this section.

9.3: You do not need to know how to draw slope fields, but you should know how slope fields correspond to differential equations, and how to find solution curves given a slope field and initial conditions. You do ***not*** need to know Euler's Method.

8.4: The formula for the n^{th} Taylor polynomial of a function is given in the formula sheet. Make sure you know how to use this formula, and remember that a Maclaurin polynomial is a Taylor polynomial centered at 0. You should know how to approximate the function value near the center using Taylor polynomials, and you should be able to find a bound for the error in the approximation using the error formula given in the formula sheet. Make sure you know how to find the Taylor polynomials of the elementary functions listed at the end of this section.

10.1: Know what it means for a sequence to converge or diverge, and how to determine which case holds for a given sequence. You should also know how to find the limit of a given sequence using the methods described in this chapter.

10.2: Make sure you understand what a series is, especially how it is different from a sequence. You should know what the sequence of partial sums is, and what it means for a series to converge or diverge. You should know how to find the sum of a series using the methods of this section, especially for a geometric series.

10.3: You should understand all the theorems of this section and how to apply them in order to show whether a series converges or diverges. Make sure you understand all of the examples in this section.

For each of these chapters, make sure you know how to do all of the homework problems!