Advice for Exam 1

First of all, it is a good idea to review 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).

6.2: Make sure you can find volume as the integral of cross-sectional area. For this, it is important to be able to find a formula for the cross-sectional area, and the limits of integration.

Learn the formula for the average value of a function.

The density and flow rate parts of this chapter will not be included on the exam.

6.3 & 6.4: Learn all the methods of finding a volume of revolution. Depending on the problem, certain methods are much easier to use than others! It is really important to be able to tell which to use. Try practicing some of the problems from the text book.

6.5: From this chapter, you should know the formulas for calculating total work done. Also, you should be able to identify cases where it is appropriate to integrate force on with respect to distance, and cases where you need to integrate the work done on each layer of an extended object. Make sure you know how to find the appropriate function to integrate in each case. To find the work done on each layer, you need to find the cross-sectional area of each layer and multiply this by the density, the acceleration due to gravity, and the distance that the layer needs to be moved.

7.1: Essentially all of the formulas needed for this chapter are given in the formula sheet. You should make sure you understand all parts of the formulas and how to use them.

7.2: Learn the integration by parts formula. Also learn how to pick u and v' appropriately. Take a look at all the example problems.

7.3: You do **not** need to learn all the reduction formulas given in this chapter! However, you should know how to integrate $\sin^m(x)\cos^n(x)$ when either m or n is odd, even when the other one is 0. You should also be able to integrate $\sin^2(x)$ and $\cos^2(x)$ using trig identities. Similarly, you should be able to integrate $\tan^m(x)\sec^n(x)$ when m is odd or when n is even. Note that all the trig identities you need for these problems are given in the formula sheet.

7.4: Learn to identify which trig substitution is appropriate for which integrals, and how to make the substitution. The chapter summary is quite helpful here.

7.6: Learn to recognize proper and improper rational functions, and how to convert improper rational functions to the sum of a polynomial and a proper rational function using long

division. Then make sure you know how to indentify which terms appear in the partial fractions decomposition by looking at the denominator, and how to solve for all the constants. Finally, make sure you know how to integrate each term in the decomposition.

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