Study guide for Final Exam

1. Section 6.1: Practice on how to find $A(x)$ in the formula $\int_a^b A(x)dx$. Read the examples in section 6.1 and try a few in Exercise 6.1. Also think about how to choose the best direction of slicing in these examples.

2. Section 6.1, Section 6.2: Study the method of disks and method of cylindrical shells for both volume of revolution around $x-$ and $y-$ axis.

3. Section 6.3: Study the formula of arclength for curves of the form $y = f(x)$ and $x = g(y)$.

4. Section 6.4: Study the formula of area of surfaces of revolution around the $a-$ axis with the generating curves of the form $r = f(a)$ and $a = g(r)$.

5. Skip the exponential change part. Study the meaning of 'separable differential equations' and the procedure of solving them.

6. Section 9.2: Understand the meaning of 'First-order linear equations' and study the method to solve it (multiplying a suitable factor on both sides of the equation).

7. Section 7.3: Memorize the definitions of the six hyperbolic functions. Study the graph of sinh, cosh and tanh. Derive and memorize the derivatives of the six hyperbolic functions.

8. Section 7.4: Study the meaning of 'little o' and 'Big O'. Write a few examples for both. Memorize the standard examples such as logarithm functions, polynomials and exponential functions and the relative growth rates among them (ie. which one grows fastest, which one slowest).

9. Chapter 8: List all techniques of integrations (don't forget the 'half-angle' substitution $z = \tan(x/2)$), create a few examples for each of them and then solve. Then go through problems 69-115 of Practice Exercises as a final review.