MAT 266 TEST 2 Review

6.6 Know how to calculate **improper integrals** for (i) **infinite intervals** and (ii) for **unbounded integrands**. Remember, that first we always find the definite integral in terms of a variable and then we take the limit at the end. The improper integral **converges** if the limit is a finite number, and **diverges** if the limit is infinite or undefined. Read examples 1-7 in this section from the textbook.

7.1 **Area calculations** for regions bounded by several functions. Always start with a nice graph. If needed, split up the region into such sub intervals that one function is larger than or equal to the other. Remember that sometimes expressing all variables in terms of y makes the problem easier. Read all examples in this section from the textbook.

7.2 **Volume** calculations for solids of revolution using **disk and washer method** by **slicing** in the direction that is **perpendicular to the axis of rotation.** Make sure that you show the details of your slicing on a graph and clearly label the variables. If the axis of rotation is **not** the *x*-axis or the y-axis, remember how to adjust the radii in the disk and washer methods. Also know **volume** calculations for solids that are not obtained by revolution using the slicing technique. Read all examples in this section from the textbook.

7.3 **Volume** calculations for solids of revolution using **cylindrical shell method** by **slicing** in the direction **parallel to the axis of rotation**. Make sure that you show the details of your slicing on a graph and clearly label the variables. If the axis of rotation is **not** the *x*-axis or the y-axis, remember how to adjust the radii in the shell method. Read all examples in this section from the textbook.

7.4 Know how to find the **arc length** of a smooth function (derivative has to exist and be continuous). Sometimes expressing all variables in terms of y makes the problem easier or helps to avoid a discontinuous derivative. Be able to do the integrals which turn out to be a complete square under the square root by hand. Read all examples in this section from the textbook.

7.5 Calculating **work**: Be familiar with the **spring problems** and Hook's law F=k x. For all other problems, the work to lift the ith layer is **(weight of layer · distance moved)**. Remember that a **correct picture** and **consistent use of your variables** are especially crucial in these problems. Be careful with the geometry; when you work with cones or pyramids you will need to work with similar triangles. Work with the measurements thoroughly. Read examples 1-3 in this section from the textbook.