Math 263B **Guide for Test 3**

Here are some sample questions from sections 6.5, 6.6, 7.1. Some topics that we covered are not represented by these questions, but are still fair game.

1. Consider the integral
$$\int_0^1 \cos(3x^2+1)dx\,.$$
   (a) Compute an approximation to the integral using the Trapezoid rule with $n = 6$ subintervals.
   (b) Determine what n is needed to assure the error using the trapezoid rule is at most 0.0001.
   (c) Determine what n is needed to assure the error using Simpson's rule is at most 0.0001.

2. Compute the value of the following integrals, or determine that they are divergent.
   (a) $\displaystyle\int_1^\infty x^{-5/2}\,dx$
   (b) $\displaystyle\int_0^\infty \frac{e^x}{e^{2x}+3}\,dx$
   (c) $\displaystyle\int_0^1 \frac{\ln(x)}{\sqrt{x}}\,dx$

3. Determine if the following integrals are convergent or divergent, but do not try to compute their values.
   (a) $\displaystyle\int_1^\infty \frac{2+e^{-x}}{x}\,dx$
   (b) $\displaystyle\int_0^1 \frac{1}{x^2+\sqrt{x}}\,dx$

4. Compute the area of the region enclosed by the curves $y = (x-1)^2$ and $y = x+1$.

5. Compute the area of the region with $x > 0$ and enclosed by the curves $y = 1/x$, $y = x$, and $y = 4x$.