CALCULUS, Math 16C
Practice problems for Midterm 2

The best preparation for the midterm is to solve as many more exercises as you can from the textbook. Like with everything in life practice makes the master! I invite you to see me if you have trouble with these problems.

1. Use Lagrange multipliers to show that the maximum area of a rectangle with dimensions x,y and perimeter P is $\frac{1}{16}P^2$.

2. Use a double integral to find the area of the region bounded by (a) on the bottom by the graph of $y = x^2 - 2x - 2$, (b) on top by $y = -x$.

3. Use a double integral to find the volume of the solid bounded by the graphs of the equations: $z = x^2, z = 0, x = 0, x = 2, y = 4, y = 0$.

4. Which of the following sequences and series converge?

   (a) $a_n = (-1)^n + 2$.
   (b) $a_n = \frac{n}{\sqrt{n^2+1}}$
   (c) $\sum \frac{n^2+1}{n(n+1)}$
   (d) $\sum \frac{1}{4}(4)^n$
   (e) $\sum 3\frac{1}{n^e}$

5. (a) Find the radius of convergence for the power series $\sum \frac{(-1)^n(x-2)^n}{(n+1)^2}$.

   (b) Using Taylor's theorem find the first 7 non-zero terms of the power series representation of the function $f(x) = 1/\sqrt{x}$ centered at $c = 1$.