Math 142, Exam 2, Fall 2013

Write everything on the blank paper provided. **You should KEEP this piece of paper.** If possible: return the problems in order (use as much paper as necessary), use only one side of each piece of paper, and leave 1 square inch in the upper left hand corner for the staple. If you forget some of these requests, don't worry about it – I will still grade your exam.

The exam is worth 50 points. Your work must be coherent, complete, and correct. $\boxed{CIRCLE}$ your answer.

No Calculators or Cell phones.

1. (9 points) Find the area bounded by $x + y^2 = 0$ and $2y = x + 3$. You must draw a meaningful picture.

2. (9 points) Consider a solid S. The base of S is the triangular region in the xy plane with vertices $(0,0)$, $(1,0)$, and $(0,1)$. The cross-sections of S perpendicular to the x-axis are squares. Find the volume of S. You must draw a meaningful picture.

3. (8 points) Consider the series $\sum_{n=2}^{\infty} \ln \frac{n}{n+2}$.

(a) Find a closed formula for the partial sum $s_N = \sum_{n=2}^{N} \ln \frac{n}{n+2}$. (Recall that a closed formula is a formula which does not have any summation signs or any dots.)

(b) Find the sum of the series $\sum_{n=2}^{\infty} \ln \frac{n}{n+2}$. **Justify your answer. Write in complete sentences.**

4. (8 points) Approximate $\sum_{n=1}^{\infty} \frac{1}{n^6}$ with an error of at most $\frac{5}{10^5}$. **Justify your answer. Write in complete sentences.**

5. (8 points) Does the series $\sum_{n=1}^{\infty} \frac{2n^2+n}{n^3}$ converge? **Justify your answer. Write in complete sentences.**

6. (8 points) Does the series $\sum_{n=1}^{\infty} \frac{10^n}{(n+1)4^{2n+1}}$ converge? **Justify your answer. Write in complete sentences.**