Math 142, Exam 2, Spring 2014

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. $\boxed{CIRCLE}$ your answer.

No Calculators or Cell phones.

1. (9 points) Rotate the region between $y = 5 - x^2$ and $y = x^2 - 3$ about the line $x = -6$. Find the volume of the resulting solid. **You must draw a meaningful picture. Write in complete sentences. Your work must be coherent, complete, and correct.**

2. (9 points) Let $S = \sum\limits_{k=2}^{27} 3^k$. Find a closed formula for S. **Write in complete sentences. Your work must be coherent, complete, and correct.** (Answer the question that I asked. Keep in mind that a closed formula does not have any summation signs or any dots.)

3. (8 points) Approximate $\sum\limits_{k=1}^{\infty} \frac{1}{k^8}$ with an error at most $\frac{1}{7 \cdot 10^7}$. **Write in complete sentences. Your work must be coherent, complete, and correct.**

4. (8 points) Does $\sum\limits_{k=1}^{\infty} \frac{1}{k + k\cos^2 k}$ converge? Justify your answer. **Write in complete sentences. Your work must be coherent, complete, and correct.**

5. (8 points) Does $\sum\limits_{k=1}^{\infty} k(\frac{2}{3})^k$ converge? Justify your answer. **Write in complete sentences. Your work must be coherent, complete, and correct.**

6. (8 points) Does $\sum\limits_{k=1}^{\infty} \frac{2+(-1)^k}{k\sqrt{k}}$ converge? Justify your answer. **Write in complete sentences. Your work must be coherent, complete, and correct.**