Test 2 - Calculus II (Spring 2015)

INSTRUCTIONS: Complete each of the following problems in your Bluebook. Each problem is worth a maximum of 12 points. Points will be awarded for both completeness and clarity of solutions. Partial credit will be awarded for partial solutions. Please recall that **cell phones and graphing calculators are not allowed on this exam.**

1. Find the centroid of the region bounded above by the graph of $y = \sqrt{x^2 + 1}$, below by the x-axis, and lying between the lines $x = -5$ and $x = 5$.

2. Find the area of the region bounded by the graphs of $y = 8 - \sqrt{x}$, $y = \sqrt{x}$, and $x = 0$.

3. Let R be the region bounded below the graph of $y = \frac{1}{x}$ on the interval $[1, \infty]$. Use an improper integral to compute the volume of the three-dimensional solid given by revolving R about the x-axis.

4. Compute $\displaystyle\sum_{n=2}^{\infty} \frac{7 \cdot (-3)^n}{5^n}$.

5. Compute the arc length of the graph of $y = \frac{1}{3}x^{3/2} - x^{1/2}$ along the interval $[9, 16]$.

BONUS. (+5 points) Compute the sum $\frac{1}{1 \cdot 3} + \frac{1}{3 \cdot 5} + \frac{1}{5 \cdot 7} + ...$ (You may assume the pattern continues forever in the apparent way.)