**Test 2 - Calculus II (Spring 2016)**

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 area of the region in the plane enclosed by the graphs of $y = 1 - x^2$ and $y = (x-1)^2 - 4$.

2. Find the volume of the three-dimensional solid whose base is the region enclosed by the graphs of $x = y^2$ and $x = 3$, and whose cross sections perpendicular to the $x$-axis are squares.

3. Let $R$ be the region enclosed by the graphs of $y = 6 - x$, $y = x^2$, and the $y$-axis. Find the volume of the solid generated when $R$ is revolved about the line $y = -1$.

4. Let $R$ be the region bounded below the graph of $f(x) = -\cos x$ and above the $x$-axis, between $x = \frac{\pi}{2}$ and $x = \frac{3\pi}{2}$. Find the volume of the solid generated when $R$ is revolved about the $y$-axis.

5. Compute the surface area of revolution obtained from revolving the graph of $y = x^3$, for $0 \leq x \leq 2$, about the $x$-axis.

**BONUS.** (+8 points) Compute the arc length of the graph of $y = x^2$ over the interval $[0, \frac{1}{4}]$.

*Hint:* Only attempt the bonus if you have completed and double-checked your work on the previous problems.