Math 1220, Problem Set #1 **Name:**

Due: Friday, January 21st. *Show all work for partial credit! (No work, no credit).*

1. Use u-substitution to find the following indefinite integrals:

   (a) $\int 6y\sqrt{4+y^2}dy$

   (b) $\int \frac{x}{x^2+4}dx$

2. Compute the value of the following definite integrals:

   (a) $\int_0^{\pi/3} \frac{\tan z}{\cos^2 z}dz$

   (b) $\int_1^4 \left(2x + \frac{1}{x}\right)dx$

3. Find the area of the region in the first quadrant bounded by the curves $y = 4 - x^2$ and $y = 2 - x$.

4. Integrate with respect to y to find the area of the region bounded by $y = x^3$, $x = 0$, and $y = 8$.

5. Compute the volume of the solid generated by revolving the region under the curve $y = \sqrt{x} + 1$ for x in $[0, 4]$ around the x-axis.