Math 264: Advanced Calculus **Winter 2008**

Assignment 1 **due Thursday, January 17**

Every problem is worth 5 points. Due to time constraints, some problems may not be marked.

Problem 1 (Adams, §14.2 # 18). Sketch the domain of integration and compute the iterated integral: $\int_0^1 dx \int_x^{x^{1/3}} \sqrt{1-y^4}\, dy$.

Problem 2 (Adams, §14.3 # 11). Compute $\int\int_Q e^{-xy} dA$, where Q is the first quadrant in the xy-plane.

Problem 3 (Adams, §14.4 # 20). Evaluate $\int\int_C y\, dA$, where C is the upper half of the cardioid disk $r \leq 1 + \cos\theta$.

Problem 4 (Adams, §14.4 # 25). Find the volume of the region lying inside all three of the circular cylinders $x^2 + y^2 = a^2$, $x^2 + z^2 = a^2$ and $y^2 + z^2 = a^2$. Hint: make a good sketch of the first octant part of the region, and use symmetry whenever possible.

Problem 5 (Adams, §14.6 # 19). Find the volume of the region lying above the xy-plane, inside the cone $z = 2a - \sqrt{x^2 + y^2}$ and inside the cylinder $x^2 + y^2 = 2ay$.

Problem 6 (Adams, §14.6 # 20). Find the volume of the region lying above the xy-plane, under the paraboloid $z = 1 - x^2 - y^2$, and inside the wedge $-x \leq y \leq \sqrt{3}x$.