## 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 supdanet in 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  $-x \le y \le \sqrt{3}x.$