Math 124 – Fall 04
Additional Practice Problems for the Final Exam.

1. Practice problem from Exam 1.

2. Practice problem from Exam 2.

3. Practice problem from Exam 3.

4. Let $F(x, y, z) = 2y\mathbf{i} + 3x\mathbf{j} + (x^3/3 + xy)\mathbf{k}$. Compute

$$\oint_C F \cdot ds,$$

where $C$ is the curve of intersection of the cylinder $x^2 + y^2 = 1$ and the plane $z + y = 2$ oriented counterclockwise when viewed from above.

5. Compute the flux of the vector field $F(x, y, z) = (2x, 2y, 2z)$ across all the sides of the cube $0 \leq x \leq 1, 0 \leq y \leq 1, 0 \leq z \leq 1$.

6. Let $S$ be the parametric surface given by

$$X(x, z) = (x, x^3 + z, z),$$

for $0 \leq x \leq 2$ and $0 \leq z \leq 3$.

(a) Find the equation of the normal line to surface $S$ at the point (1,2,1).

(b) Set up an integral to compute the area of the parametric surface $S$. DO NOT COMPUTE THE INTEGRAL.