Math. 2673 Sample Material for exam III Fall. 12/01/2005

1. If Ω =the triangle whose vertices are:$(0,0).(1,0),(1,1)$ and γ the boundary of Ω.

   Set $M(x,y) = -ye^x$ and $N(x,y) = xe^y$

   Verify Green's Theorem

2. Find $f(x,y)$ such that $\nabla f = F$ for each of the following:

a.) $F(x,y,z) = (yz, xz, xy)$

b.) $F(x,y,z) = ((\sec(x))^2, z, y+2z)$

3.) For $F(x,y,z) = y\sin(z)\imath + x\sin(z)\jmath + xy\cos(z)k$

a.) Find $\nabla \cdot F$

b.) Find $\nabla \times F$

4.) Evaluate $\int_C (x-y)dx + (x+y)dy$ where C is the unit square with a vertices at $(0,0),(0,1),(1,0),(1,1)$

5.) Find the area of a fence whose base is $y = x\sqrt{(x)}$ from $(0,0)$ to $(1,1)$ and whose height is given by the curve $x^3 - y^2 + 27$.

6.) For $F = (3y-2x)i + (x^2+y)j$, find the value of $\int_C F \cdot dr$ where C is the portion of the parabola $y = x^2$, directed from $(-1,1)$ to the origin.

7a.) Let C be the portion of $x^{\frac{2}{3}} + y^{\frac{2}{3}} = 1$ from $(1, 0)$ to $(0, 1)$, which can parameterized by

$x = (\cos(t))^3$ and $y = (\sin(t))^3$

as t increases form 0 to $\pi/2$.

Evaluate $\int_C (y\cos(xy) - 1)dx + (1 + x\cos(xy))dy$.

7b.) Let C be the curve which can parameterized by $x = (te^(1 - t)$ and $y = (\arcsin(t))$

as t increases form 0 to 1.

Evaluate $\int_C e^x(\sin(y)dx + \cos(y)dy)$

8.) Let C be the triangle with vertices $\{(0, 0), (2, 0), (2, 2)\}$.

Evaluate $\int_C (e^{2x} - y)dx + (2x + y\sqrt{(}y))dy$

9.) p. 1132 ex 1 and 5