Math 3202 **Due Thur March 24** **Assignment #7**

1. Evaluate the line integral along given curve by two methods: (a) directly (b) using Green's Therem

   (a) $\oint_C xy^2\,dx + x^3\,dy$, where C is a rectangle with vertices $(0,0)$ $(2,0)$ $(2,3)$ $(0,3)$.

   (b) $\oint_C x\,dx + y\,dy$, where C consists of the line segments from $(0,1)$ to $(0,0)$ from $(0,0)$ to $(1,0)$and the parabola $y = 1 - x^2$ from $(1,0)$ to $(0,1)$.

   (c) $\oint_C e^y\,dx + 2xe^y\,dy$, where C is square with sides $x = 0$ $x = 1$ $y = 0$ $y = 1$.

   (d) $\oint_C x^2y^2\,dx + 4xy^3\,dy$, where C is a triangle with vertices $(0,0)$ $(1,3)$ $(0,3)$.

2. Evaluate the line integral using Green's Theorem.

   (a) $\oint_C \sin y\,dx + x\cos y\,dy$, where C is the ellipse $x^2 + xy + y^2 = 1$.

   (b) $\oint_C e^x + x^2y\,dx + e^y - xy^2\,dy$, where C is the circle $x^2 + y^2 = 25$, oriented cklockwise.

3. Find the work done by the force $\vec{F} = (x(x+y), xy^2)$ in moving a particle from the origin along the line segment to $(1,0)$ then along the line segment to $(0,1)$ and then back to the origin along the y-axis.

4. Find the curl of vector field

$$\vec{F} = \left(\frac{x}{x^2+y^2+z^2}, \frac{y}{x^2+y^2+z^2}, \frac{z}{x^2+y^2+z^2}\right)$$