Math 3202 **Due Thur March 16** **Assignment #6**

1. Evaluate the line integral by two methods: directly and using Green's Th
   (a) $\int_C y\,dx - x\,dy$, where C is a circle of radius R.
   (b) $\int_C xy\,dx + x^2y^3\,dy$, where C is a triangle with vertices (0,0), (1,0), and (1,2).

2. Use Green's Th to evaluate the line integral along the given positively oriented curve.
   (a) $\int_C (y + e^{\sqrt{x}})\,dx + (2x + \cos y^2)\,dy$, where C is the boundary of the region enclosed by the parabolas $y = x^2$ and $x = y^2$.
   (b) $\int_C xe^{-2x}\,dx + (x^4 + 2x^2y^2)\,dy$, where C is the boundary of the region between two circles $x^2 + y^2 = 1$ and $x^2 + y^2 = 4$.
   (c) $\int_C y^2 \cos x\,dx + (x^2 + 2y \sin x)\,dy$, where C is the triangle from (0,0) to (2,6) to (2,0) to (0,0).

3. Find the work done by force field $\vec{F} = (\,x;\, x^3 + 3xy^2\,)$ moving an object from (-2,0) to (2,0) along x-axis and then along the semicircle $y = (4 - x^2)^{1/2}$ to the starting point. (Use Green's Th)

4. Find parametric representation for the surface.
   (a) The lower part of the ellipsoid $2x^2 + 4y^2 + z^2 = 1$
   (b) The part of the sphere $x^2 + y^2 + z^2 = 4$ that lies above the cone $z = (x^2 + y^2)^{1/2}$.
   (c) The part of the the cone $z^2 = x^2 + y^2$ that lies inside the sphere $x^2 + y^2 + z^2 = 4$.
   (d) The part of the cylinder $x^2 + y^2 = 16$ that lies between $z = 2$ and $z = -2$.

5. Find the area of the surface.
   (a) The part of the surface $y = 4x + z^2$ that lies between planes $x = 0$, $x = 1$, $z = 0$, $z = 1$.
   (b) The helicoid $\vec{r}(u, v) = (u \cos v, u \sin v, v)$, $0 \le u \le 1$, $0 \le v \le \pi$.