Math 208 Quiz 5

Name:______________________________ Score:________________

Instructions: You must show supporting work to receive full and partial credits. No text book, notes, formula sheets allowed.

1. (*4*) Set up an iterated integral in the spherical coordinate for the triple integral $\iiint_Q (x^2+y^2+z^2)^{3/2} dV$ where Q is the solid bound by $z=\sqrt{x^2+y^2}$ and $z=\sqrt{2-x^2-y^2}$. (Do not evaluate the integral.)

2. (*4*) Show that the vector field $\vec{F}(x,y) = \langle 2xy-3, x^2+4y^3+5\rangle$ is conservative by finding a potential function $f(x,y)$.

3. (*4*) Let $\vec{F}(x,y) = \nabla f(x,y)$ be a gradient vector field with a potential function $f(x,y) = xy$. Evaluate the line integral $\int_C \vec{F}\cdot d\vec{r}$ where C is the segment of the curve $y = 2\sin \pi x$ from $(0,0)$ to $(\frac{1}{2}, 2)$.

4. (*4*) Find the work done by the force $\vec{F}(x,y) = \langle y, -2x\rangle$ along the parabola $C: y = 2x^2$ from $(0,0)$ to $(1,2)$.

5. (*4*) Use Green's Theorem to evaluate the line integral $\oint_C (y^2-2x)dx + x^2 dy$ where C is the boundary of a rectangle with vertexes $(0,0), (1,0), (1,2), (0,2)$, going counterclockwise.

END