STAPLE YOUR WORK

QUIZ 9 MATH 251

LAST NAME______________________ FIRST NAME_______________ Row______

On my honor, as an Aggie, I certify that the solution submitted by me on 18th of November 2011 is my own work. I had neither given nor received unauthorized aid on this work.

Signature: ____

Due FRIDAY 11/18/2011 at the beginning of class.

- If turned in later than 10 minutes into class, 5 points off. No papers will be accepted after class.
- If you turn it in to my office (Milner 324), place it in my mailbox (Milner 130) or e-mail a PDF-version to me, make sure you do it before 10:45 am, FRIDAY 11/18/2011.
- Your work must be neat, easy to follow.
- You may use notes and textbook, but not the help of anything else.
- BOX YOUR FINAL ANSWERS.

1. Convert the integral $\iiint_E z\sqrt{x^2+y^2}\mathrm{d}V$ to cylindrical coordinates where E is the solid that lies inside the cylinder $x^2+y^2=4$, above the cone $z=\sqrt{3x^2+3y^2}$ and below the plane $z=9$. (*Attention: You don't need to evaluate the integral, just set up an iterated integral in cylindrical coordinates*)

2. Compute $\int_C \nabla f \cdot \mathrm{d}\mathbf{r}$ for $f(x,y,z)=\sin(\frac{\pi xy}{4}) - z\sin\frac{\pi}{y}$ and C is given by $\mathbf{r}(t)=\left\langle t^2, 2e^{t^2-t}, 3+t\right\rangle$, $0\le t\le 1$.

3. Find the mass of a solid $E = \{(x, y, z)|x^2 + y^2 + z^2 \leq a^2, y \geq 0\}$ with density $\rho(x, y, z) = 2ze^{(x^2+y^2+z^2)^2}$.

4. Sketch the solid whose volume is given by the integral $\displaystyle\int_{\pi/2}^{\pi}\int_{0}^{2\pi}\int_{0}^{4} \rho^2 \sin\phi \, \mathrm{d}\rho \mathrm{d}\theta \mathrm{d}\phi$.

5. Given the line integral

$$I = \int_C (x^{12} - x^2 y + 12\sin x + 12)\,\mathrm{d}x + (12\sec y^3 - y^{12})\,\mathrm{d}y$$

where C consists of the line segment from $(0,0)$ to $(2,-2)$, the line segment from $(2,-2)$ to $(2,4)$, and the part of the curve $x = \sqrt{y}$ from $(2,4)$ to $(0,0)$. Use Green's theorem to **evaluate** the given integral and **sketch** the curve C indicating the *positive direction.*

Sketch C here: