

**QUIZ 9 MATH 251**

LAST NAME \_\_\_\_\_ FIRST NAME \_\_\_\_\_ ROW \_\_\_\_\_

On my honor, as an Aggie, I certify that the solution submitted by me on 7th of April 2011 is my own work. I had neither given nor received unauthorized aid on this work.

Signature: \_\_\_\_\_

**Due THURSDAY 4/7/2011 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 2:00 p.m., Thursday 4/7/2011.
- You **MUST** show **ALL** your work to get full credit. Just writing the answers down is not enough.
- 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. Use cylindrical coordinates to evaluate the integral  $\iiint_E z dV$  where  $E$  is the solid that lies inside the cylinder  $x^2 + y^2 = 9$ , above cone  $z = \sqrt{x^2 + y^2}$  and below the plane  $z = 15$ .

2. Sketch the solid whose volume is given by the integral  $\int_0^{\pi/2} \int_0^{\pi/2} \int_0^3 \rho^2 \sin \phi \, d\rho d\theta d\phi$ .

3. Find the mass of a solid  $E$  that lies between the spheres of radius 2 and 3 and is in the *first* octant with density  $\rho(x, y, z) = ze^{(x^2+y^2+z^2)^2}$ .

4. Given the function  $f(x, y, z) = x + y^2 + z$ , the vector field  $\mathbf{F}(x, y, z) = \langle z^2, -z, 2y \rangle$  and the curve  $C$  which is the line segment from  $(1, 0, 1)$  to  $(1, 3, 5)$ .

(a) Write down the vector function  $\mathbf{r}(t)$  for the curve  $C$ .

(b) Evaluate the line integral  $\int_C f(x, y, z) ds$ .

(c) Evaluate the line integral  $\int_C \mathbf{F}(x, y, z) \cdot d\mathbf{r}$ .