Math 53: Quiz #7

April 4

GSI: M. Lindsey

20 points, 20 minutes

Name: _____

Please give neat and organized answers. Whenever applicable (especially for computational questions), make it clear what strategy you are using. Points may be deducted for poor exposition.

Problem 1

(10 points.) Let $f(x, y, z) = x + z$. Consider the integral

$$\iiint_D f(x, y, z)\, dV,$$

where $D = \{(x, y, z) \,|\, 0 \leq z \leq 1, \sqrt{x^2 + y^2} \leq z, x \geq 0\}$. Set up the integral in SPHERICAL coordinates and evaluate. (6 points for correctly setting up the integral, 4 points for correct answer (given correct setup). Box both the integral that you set up and your answer.)

Hint: D is half of a cone.

(See back for next problem!)

Problem 2

Part (a). (5 points.) Consider a function $f(x, y)$ and a curve given by parametrization $\mathbf{r}(t) = (x(t), y(t))$, $t \in [a, b]$. Write down the formula for $\int_C f(x, y)\, ds$.

Part (b). (5 points.) True or false: the value of $\int_C f(x, y)\, ds$ depends on the choice of parametrization used in the formula in part (a). (For the purposes of this problem, consider only parametrizations that traverse the curve exactly once.)

(Optional: if true, give an example. If false, try to prove this.)