Quiz 11
Math 253

Name: Key

11/22

1. A surface S is parametrized by

$$\mathbf{r}(u,v) = < u^2, uv, v >$$

where (u,v) are in the triangular region bounded by the u- and v-axes and the line $u + 2v = 4$.

Express

$$\iint_S (x - y^2)\, dS$$

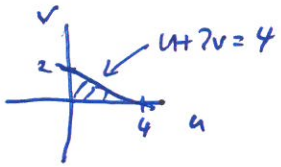
as an iterated integral that would have made sense to you at the time of your last midterm exam. **DO NOT EVALUATE** the integral.

$\vec{r}_u = < 2u, v, 0 >$

$\vec{r}_v = < 0, u, 1 >$

$\vec{r}_u \times \vec{r}_v = < v, -2u, 2u^2 >$

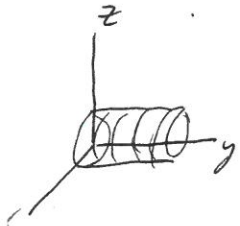
$\|\vec{r}_u \times \vec{r}_v\| = \sqrt{v^2 + 4u^2 + 4u^4}$



$$\iint_S (x - y^2)\, dS = \int_0^2 \int_0^{4-2v} (u^2 - u^2v^2)\sqrt{v^2 + 4u^2 + 4u^4}\, du\, dv$$

or

$$\int_0^4 \int_0^{2-\frac{u}{2}} (u^2 - u^2v^2)\sqrt{v^2 + 4u^2 + 4u^4}\, dv\, du$$



2. Give a parameterization of the cylindrical surface obtained by moving a circle of radius 2 in the xz-plane, centered at the origin, in the y-direction from $y = 0$ to $y = 4$. Be sure you both supply a formula for the parameterizing function, and indicate the values the parameters range over.

$\vec{r}(u,v) = < 2\cos u, v, 2\sin u >$

$u \in [0, 2\pi]$

$v \in [0, 4]$