"QUIZ" for Lecture 20

NAME: (print!) Niharika Kompella **Section:** 23

E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q20FirstLast.pdf) ASAP BUT NO LATER THAN Nov. 16, 8:00pm

1. Find an equation for the tangent plane to the parametric surface

$$x = v^2, \qquad y = u + v \quad , \qquad z = u^2,$$

at the point (1,2,1). Simplify as much as you can!

$r(u,v) = (v^2)i + (u+v)j + (u^3)k$

$\frac{\partial r}{\partial v} = 0 + 1j + 3u^2k$

$\frac{\partial r}{\partial v} = 2vi + 1j + 0k$

$r_u \times r_v = \langle -3u^2, 6u^2v, -2v \rangle$

$1 = v^2$ $\quad -3(1)^2, 6(1)^2(1), -2(1)$

$v = 1$ $\quad = -3, 6, -2$

$2 = 1+v \rightarrow v = 1$

$(x-1)-3 + (y-2)(6) + (z-1)(-2) = 0$

$\boxed{-3x + 6y - 2z - 7 = 0}$

2. Evaluate the surface integral

$$\iint_S z \, dS,$$

where S is the triangular region with vertices (2,0,0),(0,2,0),(0,0,2).

$\frac{x}{2} + \frac{y}{2} + \frac{z}{2} = 1$

$x + y + z = 2$

$z = 2 - y - x \rightarrow \sqrt{(-1)^2 + (-1)^2 + 1}\, dA \rightarrow \sqrt{3} \iint z \, dA$

$\frac{z}{2} + \frac{y}{2} = 1$ $\quad z + y = 2 \rightarrow y = 2 - z$ $\quad \int_0^1 \int_0^{2-z} z \, dA \rightarrow \int_0^1 (2-z)z \rightarrow \boxed{\frac{2}{3}}$