"QUIZ" for Lecture 20

NAME: (print!) Andrew King 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

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

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

$r(t) = \langle v^2, u+v, u^2 \rangle$ $\quad r_u = \langle 0, 1, 2u \rangle$

$r_v = \langle 2v, 1, 0 \rangle$

1 point $\quad r_u = \langle 0,1,2 \rangle \quad r_v = \langle 2,1,0 \rangle \quad n = \langle 0,1,2 \rangle \times \langle 2,1,0 \rangle = \langle -2, 4, -2 \rangle$

$(-2)(x-1) + 4(y-2) + (-2)(z-1) = 0$

$x - 2y + z = -2$

2. Evaluate the surface integral

$$\int\int_S z\, dS \quad ,$$

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

$x+y+z=2 \quad z = 2-x-y \quad \iint_S f(x,y,z)\,dS = \iint_D f(x,y,g(x,y))\sqrt{1+g_x^2+g_y^2}\,dA$

$g(x,y) = 2-x-y, \; g_x = -1, \; g_y = -1 \quad \sqrt{1+g_x^2+g_y^2} = \sqrt{3}$

$\int_0^2 \int_0^{2-x} = 2\sqrt{3}$

"QUIZ" for Lecture 22

NAME: (print!) Andrew King **Section:** 23

E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q22FirstLast.pdf) ASAP BUT NO LATER THAN Nov. 16, 8:00pm

Evaluate the surface integral $\int\int_S \mathbf{F} \cdot d\mathbf{S}$ for the given vector field $\mathbf{F}$ and oriented surface S.

$$\mathbf{F}(x,y,z) = \langle xy\,,\, yz\,,\, zx \rangle \quad ,$$

and S is the part of the paraboloid $z = 1 - x^2 - y^2$ that lies above the square $0 \le x \le 1\,,\, 0 \le y \le 1$ and has upward orientation.

$$\iint_S F \cdot dS = \iint_D \left(-P\frac{\partial z}{\partial x} - Q\frac{\partial z}{\partial y} + R\right) dA$$

$$\iint_D \left(-xy(-2x) - yz(-2y) + xz\right) dA = \iint_D \left(2x^2y + 2y^2z + xz\right) dA$$

$$\int_0^1 \int_0^1 \left(2x^2y + 2y^2 - 2y^2x^2 - 2y^4 + x - x^3 - xy^2\right) dx\, dy$$

$$= \frac{83}{180}$$