Quiz 3a **Calculus 3** **9/26/2006**

Each problem is worth 5 points. Clear and complete justification is required for full credit.

1. Find the first partial derivatives of $z = ye^{3xy}$.

$z = ye^{3xy}$ $\quad (f(x)\, ae^{ax} = a^2e^{ax})$

$f_x = 3y^2e^{3xy}$

Good

$z = ye^{3xy}$ $\quad (f'(y) = y \cdot e^{ay}$

$y \circ e^{ay}$

$f_y = e^{3xy} + y3xe^{3xy}$ $\quad (e^{ay}) + (y)ke^{ay})$

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2. Find an equation for the plane tangent to $z = x^2 + 3xy - y^3 - 5$ at the point (2, –1).

$z = (2)^2 + 3(2)(-1) - (-1)^3 - 5 = 4 - 6 + 1 - 5 = -6$

$f_x(x, y) = 2x + 3y$ $\qquad f_x(2, -1) = 1$

$f_y(x, y) = 3x - 3y^2$ $\qquad f_y(2, -1) = 3$

Excellent

using the normal vector and a point the general equation

is $z - z_0 = f_x(x_0, y_0)(x - x_0) + f_y(x_0, y_0)(y - y_0)$

plugging in the values from above we have

$(z + 6) = 1(x - 2) + 3(y + 1)$ $\qquad z = x + 3y - 5$

$+6 \quad -2 \quad +3 \quad -6$

-6