Math 234 Discussion Worksheet - Oct 2

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

2. Suppose $y = y(x)$ is implicitly defined by the equation $y + e^y = x$ near the point $(1, 0)$. Compute $y'(1)$.

3. Suppose $z = z(x, y)$ is implicitly defined by the equation $x^2 + y^2 + z^2 + z^3 = 2$ near the point $(1, 1, -1)$. (a) Compute $z_x(1, 1)$ and $z_y(1, 1)$. (b) Find an equation for the plane tangent to the graph of $z(x, y)$ at the point $(1, 1, -1)$.

4. Compute the second derivatives of the function $f(x, y) = \sin(xy)$.

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

(2) $\frac{1}{2}$

(3) $(a) - 2, -2$

    $(b) z = -1 - 2(x - 1) - 2(y - 1)$

(3) $y^2 \sin(xy), \cos(xy) - xy \sin(xy), x^2 \sin(xy)$