Math 233 - Homework 4

October 28, 2021

Name _____

Score _____

The following problems are from the suggested homework. Show all work to receive full credit. Supply explanations when necessary. This assignment is due November 4.

1. (1 point) Let $z = xe^y$. Use differentials to approximate Δz as (x, y) changes from $(1, 2)$ to $(1.05, 2.1)$.

2. (1 point) Find the linearization of $f(x, y, z) = \sqrt{x^2 + y^2 + z^2}$ at the point $(3, 2, 6)$.

3. (2 points) Let $w = xy \cos z$, where $x = t$, $y = t^2$, and $z = \sin^{-1} t$. Use the appropriate chain rule to find $\dfrac{dw}{dt}$.

4. (2 points) Use partial derivatives to find $\dfrac{dy}{dx}$: $\quad x^2 - 2xy + y^4 = 4$

5. (2 points) Find the directional derivative of $f(x, y, z) = y^2 + xz$ at $(1, 2, 2)$ in the direction of $\vec{v} = 2\hat{i} - \hat{j} + 2\hat{k}$.

6. (2 points) Find an equation of the plane tangent to the surface described by $xy + xz + yz = 11$ at the point $(1, 2, 3)$.