Math 233 - Quiz 7

October 27, 2022

Name _____

Score _____

Show all work to receive full credit. Supply explanations when necessary. This quiz is due November 1.

1. (3 points) Use the ϵ_1-ϵ_2 definition of differentiable to show that $f(x,y) = 2x^2 - 5xy + 4y^2$ is differentiable everywhere.

2. (2 points) Let $f(x, y) = x^2 \sin(2y)$. Find an equation of the plane tangent to the graph of f at the point $(2, \pi/6)$.

3. (2 points) Find the linearization of $g(x, y) = \tan^{-1}(xy^2)$ at the point $(1, 1)$. Then use your linearization to estimate $g(1.02, 0.97)$.

4. (3 points) Suppose that $w = 3xy + yz$ and that x, y, and z are functions of u and v such that
$$x = \ln u + \cos v, \qquad y = 1 + u \sin v, \qquad z = uv.$$
Use the appropriate chain rule to find $\partial w / \partial u$ at $(u, v) = (1, \pi)$.