Math 233 - Homework 4

Name _____

April 1, 2021

Score _____

The following problems are from the suggested homework. Show all work to receive full credit. Supply explanations when necessary. This assignment is due April 8.

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1. (2 points) Find the directional derivative of f at P in the direction of $\vec{v}$.

$$f(x, y, z) = y^2 + xz, \quad P\,(1, 2, 2), \quad \vec{v} = \langle 2, -1, 2 \rangle$$

2. (2 points) Find an equation of the plane tangent to the graph of $z = x^2 - 2xy + y^2$ at the point $P\,(1, 2, 1)$.

Turn over.

3. (2 points) Let $z = f(x, y) = x^2 + 3xy - y^2$. Use differentials to approximate Δz as x changes from 2.00 to 2.05 and y changes from 3.00 to 2.96.

4. (2 points) Find the critical points of $f(x, y) = 15x^3 - 3xy + 15y^3$.

5. (2 points) Find and classify the critical points of $f(x, y) = 9 - x^4y^4$.