Math 233 - Quiz 8

Name _____

November 3, 2022

Score _____

Show all work to receive full credit. Supply explanations when necessary. This quiz is due November 8.

1. (3 points) Suppose that z is implicitly defined as a function of x and y by the equation

$$\frac{xyz}{yz + xz + xy} = 1.$$

Find $\partial z/\partial x$ and $\partial z/\partial y$.

2. (2 points) Find the directional derivative of $f(x, y) = \ln(x^2 + y^2)$ at $(1, 2)$ in the direction of $\vec{v} = -3\hat{\imath} + 4\hat{\jmath}$.

Turn over.

3. (2.5 points) Find an equation of the plane tangent to the graph of the equation $xe^y \cos(z) - z = 1$ at the point $(1, 0, 0)$.

4. (2.5 points) The electrical potential in a certain region of space is given by

$$V(x, y, z) = 5x^2 - 3xy + xyz.$$

Find the maximum value of the directional derivative of V at the point $(3, 4, 5)$.