MATH 200:921, Quiz 3

First Name: ___________________________  Last Name: ___________________________

Student-No: ___________________________

Grade: ___________________________

• Do not turn the page until instructed to do so.
• This test is closed book. No calculators or formula sheet allowed.
• You have 20 minutes to write this quiz.
• There are three questions in this quiz, worth a total of 20 points.
Long answer question—you must show your work

1. [6 marks] 1. Find the domain of the function \( f(x, y) = \log(y) - \sqrt{y - 1 - x^2} \) and sketch it.
2. Find a vector parametric equation for the tangent line to the trace of the graph of \( f(x, y) \) on the plane \( x = 0 \) at the point \((0, 1, 0)\).
Long answer question—you must show your work

2.  [6 marks] Let \( f(x, y, z) = e^y x + e^z y \) and let \( x(u, v) = u^2, y(u, v) = uv, z(u, v) = v^2 \).

Compute the partial derivatives

\[
\left. \frac{\partial f(u, v)}{\partial u} \right|_{(1,2)}, \left. \frac{\partial f(u, v)}{\partial v} \right|_{(1,2)}.
\]
Long answer question—you must show your work

3. [8 marks] Consider the surface \( S \) defined by \( e^y x + e^z y = 1 \). The point \( P = (0, 1, 0) \) lies on \( S \).

- Find \( \frac{\partial z}{\partial x} \) and \( \frac{\partial z}{\partial y} \) at \( P \).
- Use linear approximation to estimate the value of \( z \) when \( x = 1.1, y = 1.05 \).