# MATH 200:921, Quiz 3

First Name: _____ Last Name: _____

Student-No: _____

| Grade: |
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- 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

$$\frac{\partial f(u,v)}{\partial u} \Big|_{(1,2)}, \frac{\partial f(u,v)}{\partial v} \Big|_{(1,2)} .$$

## 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 $x = 1.1, y = 1.05$.

Name: _____ Student-No: _____