

Name: _____

Pid: _____

1. Let us consider y defined implicitly by the equation $xe^y = 1$.

- (a) (5 points) Find the tangent lines of the curve at $\langle 1, 0 \rangle$ and $\langle \frac{1}{e}, 1 \rangle$.

Solution:

- (b) (5 points) Find the angle between these lines.

Solution:

2. Let $z = uv + v^2$, where $u = x + y$ and $v = xy$.

(a) (5 points) Find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$.

Solution:

(b) (5 points) Find the maximal value of $D_u(1, 1)$ and the direction where it reaches.

Solution:

3. Let $f(x, y) = \cos(x) + \sin(y)$.

- (a) (5 points) Find the tangent planes at $\langle \pi, \pi, -1 \rangle$ and $\langle \frac{\pi}{2}, \frac{\pi}{2}, 1 \rangle$.

Solution:

- (b) (5 points) Find the angle between the planes.

Solution: