Math 241 Group Quiz 2

Names: _____

1. Which points on $x^2 - 2xy + z^2 = 2$ have a tangent plane parallel to the plane $x + y + z = 1$?
Hint: When are the gradient vectors parallel?

2. Find the absolute maximum for the function $f(x, y) = xe^y - x^2 - e^y$ where x and y can take values in the triangular region with corners $(0, 0)$, $(2, 2)$, $(2, 0)$.

3. What is the minimum the distance from a point on the cone $z^2 = x^2 + y^2$ to the point $(1, 1, 1)$?

4 (Bonus, try only if all other exercises are correct!). Either give an example of a function $f(x, y)$ such that $\nabla f = \langle y, -x \rangle$ or say why this cannot happen.