

If

$$z = (x + y)e^y, \quad x = u^2 + v^2, \quad y = u^2 - v^2,$$

find the following partial derivatives using the chain rule. Enter your answers as functions of u and v .

$$\frac{\partial z}{\partial u} = \boxed{4ue^{u^2-v^2} + 4u^3e^{u^2-v^2}}$$

$$\frac{\partial z}{\partial v} = \boxed{-4u^2ve^{u^2-v^2}}$$