MATH 2551-GT-E– Multivariable Calculus **Summer 2025**

Full name: _____ **GT ID:**_____ **Sec:**___

Quiz 4 Version B

You have 15 minutes to take the quiz. No phones, notes, or use aids of any kind is permitted.

1. (3 points) If $F(x, y, z) = c$ is an equation used to implicitly define z as a function of x and y, then: *Fill in the blanks for the missing formula* [AN]

$$\frac{\partial z}{\partial x} = \boxed{} \qquad \frac{\partial z}{\partial y} = \boxed{}$$

2. (7 points) **[Chain Rule]**
Suppose that $W(s,t) = F(\mathbf{u}(s,t), \mathbf{v}(s,t))$, where $\mathbf{u}, \mathbf{v}, F$ are differentiable functions and we know the following information.

$$\begin{aligned} u(2,1) &= 4 & v(2,1) &= 5 \\ u_s(1,0) &= 3 & v_s(1,0) &= -2 \\ u_t(1,0) &= -1 & v_t(1,0) &= 4 \\ F_u(4,5) &= 7 & F_v(4,5) &= -6 \end{aligned}$$

First express DW, the total derivative of W, symbolically as the product of the two matrices DF and Dg. Then, evaluate $DW|_{(s,t)=(2,1)}$ and identify $W_s(2,1)$ and $W_t(2,1)$.