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

Full name: Key **GT ID:** _____ **Sec:** ____

Quiz 4 Version A

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

1. (2 points) If a function $f(x, y)$ is defined and has continuous partial derivatives $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$ at a point $(x, y) = (x_0, y_0)$, then f is continuous at (x_0, y_0). [A]

   ○ **TRUE** ● **FALSE**

2. (8 points) **[Partial Derivatives]**
   Find all the partial derivatives of each of the components of $f(s,t) = \langle x(s,t), y(s,t), z(s,t)\rangle$, and then give the total derivative Df for the function $f(s,t)$ below. [AJN]

$$f(s,t) = \left\langle s\cos(2t), \frac{t^2}{s}, e^{st} \right\rangle$$

$\begin{cases} x = s\cos 2t \\ y = t^2/s \\ z = e^{st} \end{cases}$ So $x_s = \cos 2t$ $x_t = -2s\sin 2t$

$y_s = -\frac{t^2}{s^2}$ $y_t = \frac{2t}{s}$

$z_s = te^{st}$ $z_t = se^{st}$

So

$$Df = \begin{bmatrix} \cos 2t & -2s\sin 2t \\ -\frac{t^2}{s^2} & \frac{2t}{s} \\ te^{st} & se^{st} \end{bmatrix}$$