Math Tutorial II (Calculus)

Quiz 2

Name: _____

Explain your solution process clearly.
Write legible.

1. (3 points) Compute all partial derivatives for the function $f(x, y, z) = e^{x^2+y}z$

   (a) $f_x(x, y, z) =$ $2x \cdot e^{x^2+y} \cdot z$

   (b) $f_y(x, y, z) =$ $e^{x^2+y} \cdot z$

   (c) $f_z(x, y, z) =$ e^{x^2+y}

2. (3 points) Compute all partial derivatives for the function $g(x, y, z) = xz - y$

   (a) $g_x(x, y, z) =$ z

   (b) $g_y(x, y, z) =$ -1

   (c) $g_z(x, y, z) =$ x

3. (4 points) Compute the derivative matrix DF for the mapping F defined by

$$F(x, y, z) = \Big((g(x, y, z), f(x, y, z)\Big)$$

for f and g given as in problem 1 and 2, respectively. $\vec{x} = (x, y, z)$

$$DF(\vec{x}) = \begin{pmatrix} \nabla g(\vec{x}) \\ \nabla f(\vec{x}) \end{pmatrix}$$

$$= \begin{pmatrix} z & -1 & x \\ 2xe^{x^2+y}z & e^{x^2+y} \cdot z & e^{x^2+y} \end{pmatrix}$$