You may use your class notes during the quiz. No other sources are permitted

Name: _____

1. Let $U = GL(2, \mathbb{R})$ be the subset of nonsingular matrices of the set of real 2×2-matrices thought of as $\mathbb{R}^4$. Let the coordinates on U be $x_{11}, x_{12}, x_{21}, x_{22}$.

   (a) Let $f : U \to \mathbb{R}$ be the determinant function $f(A) := \det(A)$, for $A \in U$. Calculate the total derivative $df(A)$.

   (b) Let $g : \mathbb{R} \to U$ be a differentiable function. Calculate the derivative of the function $f \circ g : \mathbb{R} \to \mathbb{R}$.

   (c) Try to guess a formula for the derivative of $f \circ g$ when U is $GL(3, \mathbb{R})$.