

## Quiz #4 for Calculus 3 (MATH-UA.0123-001)

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**NOTE:** In Problems 1 and 2, let  $f(x, y, z) = \tan(x)\sqrt{y+z}$ .

**Problem 1.** Find the domain of  $f$  and evaluate  $f(\pi/4, -1, 2)$ . [2 points]

**Problem 2.** Compute  $f_x(x, y, z)$  and  $f_{xy}(x, y, z)$ . [2 points]

**Problem 3.** Let  $g(x, y) = \sqrt{x+y}$ . Sketch some level curves of  $g$  and clearly indicate the domain of  $g$ . [2 points]

**Problem 4.** Let  $f(x, y) = x^4 \sin(\frac{1}{x^2+|y|})$ . Use the Squeeze Theorem to show that  $f(x, y) \rightarrow 0$  as  $(x, y) \rightarrow (0, 0)$ . [2 points]

**Problem 5.** Let  $x^2 + y^2 = 1$ . Use implicit differentiation to find  $\partial y / \partial x$ . Draw the curve satisfying  $x^2 + y^2 = 1$  in  $\mathbb{R}^2$  and draw an example of the tangent corresponding to  $\partial y / \partial x$  (at any point on this curve, but clearly labeled). When is  $\partial y / \partial x$  undefined? [2 points]