

No books, notes or calculators are allowed. To receive full credit you must show all of your work. You have 15 minutes to complete the quiz.

Name (Last, First) and UID: _____

1. Each of the following equations defines a subspace of \mathbb{R}^3 . For each, determine whether the subspace is a surface near 0, i.e., has no “singularity” at 0 and is the graph of a function $\mathbb{R}^2 \rightarrow \mathbb{R}$ near 0. If it is, compute the derivative of the function $z = f(x, y)$ whose graph is the subspace.

1. $x^2 + x \cos(y) + z \cos(x) = 0$

2. $x^2 + y^2 - z^2 = 0$

3. $(x - 1)^2 + y^2 - z^2 - 1 = 0$

4. $(x - 1)^2 + y^2 - z^2 = 0$

2. Each of the following system of two equations defines a subspace of \mathbb{R}^3 . For each, determine whether the subspace is a curve near 0, i.e., has no “singularity” and is the graph of a function $\mathbb{R} \rightarrow \mathbb{R}^2$ near 0. If it is, compute the tangent vector to the curve at 0.

1. $\sin(x - y)^2 - z = 0, \sin(x + y)^2 + z = 0$

2. $(x - y - 1)^2 - z - 1 = 0, (x + y - 1)^2 + z - 1 = 0$