

# Math 309 Quiz 1

October 23, 2015

**Problem 1.** Write what it means for a collection of  $m$  vectors  $\vec{v}_1, \dots, \vec{v}_m$  to be linearly independent.

**Problem 2.** Let  $A$  be the matrix

$$A = \begin{pmatrix} 2 & 3 \\ 3 & -1 \end{pmatrix}$$

Determine the eigenvalues of  $A$ , and for each eigenvalue determine the corresponding eigenspace.

**Problem 3.** Find a fundamental set of solutions for the system

$$\begin{aligned} x' &= 2x + 3y \\ y' &= 3x - y \end{aligned}$$

**Problem 4.** Write the meaning of the phrase “superposition principle” in the context of systems of homogeneous first order linear ordinary differential equations.