

Ungraded Quiz 2 + Questionnaire 2

Your name: _____

April 7, 2014

1. Is the system

$$2000293x + 9323909y + 2014z = 0$$

$$323123x - 407y + 2187z = 0$$

consistent?

Yes. It is a homogeneous system, and homogeneous systems are always consistent (the zero vector is a solution).

2. A non-trivial solution to a homogeneous system $A\mathbf{x} = \mathbf{0}$ is a vector \mathbf{v} such that $A\mathbf{v} = \mathbf{0}$ and $\mathbf{v} \neq \mathbf{0}$.

3. True or false: if $\{\mathbf{v}_1, \mathbf{v}_2, \mathbf{v}_3\}$ is a linearly *dependent* set in \mathbb{R}^3 , then one of the vectors is scalar multiple of one of the other vectors.

False. We saw in class that this need not be the case $(1, 0, 0), (0, 1, 0), (1, 1, 0)$ is a linearly dependent set in \mathbb{R}^3 no element of which is a scalar multiple of another element.

4. Is the following set of vectors **linearly dependent** or linearly independent? Why? Let A have these vectors as columns. Then A has fewer rows than columns, so that not every column of A contains a pivot position. Thus the solution to $A\mathbf{x} = \mathbf{0}$ always has a free variable.

$$\left\{ \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}, \begin{bmatrix} 35 \\ 0 \\ 1000 \end{bmatrix}, \begin{bmatrix} -20455 \\ 9384 \\ 10 \end{bmatrix}, \begin{bmatrix} 1432 \\ 20 \\ 1111 \end{bmatrix} \right\}$$