MTH 314-002 In Class Problems March 1, 2017

Name: Key **Section:**

Please work together to solve the problems.

1. True or False.

F (a) There is a vector space consisting of exactly two distinct vectors.

F (b) The set of polynomials of degree one is a vector space under the operations defined in 3.1.

T (c) Every subspace of a vector space is itself a vector space.

F (d) The solution set of the a consistent linear system $A\mathbf{x} = \mathbf{b}$ of m equations in n unknowns is a subspace of $\mathbb{R}^n$.

T (e) The set of upper triangular $n \times n$ matrices is a subspace of the vector space of all $n \times n$ matrices.

F (f) The union of any two subspaces of a vector space V is a subspace of V.

F (g) Every subset of a vector space V that contains the zero vector in V is a subspace of V.

T (h) A set containing a single vector is linearly independent.

F (i) Every linearly dependent set contains the zero vector.

T (j) If the set of vectors $\vec{v_1}, \vec{v_2}, \vec{v_3}$ is linearly independent, then $k\vec{v_1}, k\vec{v_2}, k\vec{v_3}$ is also linearly independent for every nonzero scalar k.

F (k) Every linearly independent subset of a vector space V is a basis for V.

F (l) If $V =$Span$(\vec{v_1}, \vec{v_2}, ...\vec{v_n})$, then $\vec{v_1}, \vec{v_2}, ...\vec{v_n}$ is a basis for V.

T (m) The zero vector space has dimension zero.

F (n) There is a set of 11 vectors that span $\mathbb{R}^{17}$.

T (o) Every linearly independent set of 5 vectors in $\mathbb{R}^5$ is a basis for $\mathbb{R}^5$.

T (p) Every set of 5 vectors that spans $\mathbb{R}^5$ is a basis for $\mathbb{R}^5$.

F (q) The column space of a matrix is the set of solution to $A\mathbf{x} = \mathbf{b}$.

F (r) If R is the reduced row echelon form of A, then those column vectors or R that contain the leading 1's ~~for~~ form a basis form the column space of A.

T (s) The system $A\mathbf{x} = \mathbf{b}$ is inconsistent if and only if $\mathbf{b}$ is not in the column space of A.