Math 2B Name: ______________________________

1. A matrix A is non- singular if

… it is the matrix of coefficients of a homogeneous system of linear equations with a unique solution.

2. A linear equation is homogeneous if it can be written

… $a_1x_1 + a_2x_2 + \ldots + a_nx_n = 0$

3. V is a vector subspace of W if

… it is a subset of *W* and is a vector space itself under the (inherited) operations from *W*.

4. The set of vectors $u_1, u_2, \ldots, u_n$, spans the space V if

… all vectors in *V* are linear combinations of $u_1, u_2, \ldots, u_n$

5. The set of vectors $u_1, u_2, \ldots, u_n$, is a basis for vector space V if

… it is linearly independent and spans *V*.

6. The set of vectors $u_1, u_2, \ldots, u_n$ is linearly independent if

… $a_1u_1 + a_2u_2 + \ldots + a_nu_n = 0$ **implies that all** a_i **are equal to 0.**

7. The set of vectors $u_1, u_2, \ldots, u_n$ is linearly dependent if

… one can be written as a linear combination of the others, or if there are non-zero solutions to $a_1u_1 + a_2u_2 + \ldots + a_nu_n = 0$ **such that at least some** a_i **are not equal to 0.**

8. The vector w is a linear combination of $u_1, u_2, \ldots, u_n$ if

$w = a_1u_1 + a_2u_2 + \ldots + a_nu_n$

9. Function f from space V to W is an onto mapping if

… for every vector *w* in *W* there is a vector *v* in *V* such that $f(v) = w$

10. Function f from space V to W is a 1 to 1 mapping if

$f(v) = w$ **and** $f(u) = w$ **implies that** $u = v$

11. The rank of a matrix is

… the dimension of the row space

12. The dimension of a vector space is

… the number of vectors in a basis

13. Function f from space V to W is an isomorphism if

… it is one to one and onto and $f(rv + sw) = f(rv) + f(sw)$ **for all scalars *r* and *s* and all vectors *v* and *w* in V.**

14. Function f from space V to W is a homomorphism if

… $f(rv + sw) = f(rv) + f(sw)$ **for all scalars *r* and *s* and all vectors *v* and *w* in V.**

15. The null space of a linear mapping from V to W is
… the set of vectors *v* in *V* such that *v* is mapped onto the zero vector of *W*.