11. Mark each as true or false. If the statement is false, correct the statement so that it is true. 16 points

a. The columns of an 3 x 8 matrix are linearly ~~independent~~ dependent.

more vectors than entries = L.D.

False

b. Asking whether linear system corresponding to the augmented matrix [$\mathbf{a}_1$ $\mathbf{a}_2$ $\mathbf{a}_3$ **b**] has a solution amounts to asking whether **b** is in Span{ $\mathbf{a}_1$ $\mathbf{a}_2$ $\mathbf{a}_3$ }.

True

m x n

c. If *A* is a 5 x 3 matrix and *T* is a linear transformation defined by $T(\mathbf{x}) = A\mathbf{x}$, then the domain of *T* is R^5.

$\mathbb{R}^n \to \mathbb{R}^m$

$\mathbb{R}^3 \to \mathbb{R}^5$

False the domain is $\mathbb{R}^3$ and the codomain is $\mathbb{R}^5$.

d. The set Span{**u**, **v**} is always visualized as a plane through the origin for any vectors **u** and **v**, where vectors **u** and **v** are in R^3, and $\vec{u}$ and $\vec{v}$ are scalar multiples of each other.

False

e. If *A* is a 4 x 4 matrix, then the transformation $x \mapsto Ax$ maps R^4 onto R^4. and

False. if there are four pivots, one in each row.

f. If **x** and **y** are linearly independent, and if {**x**, **y**, **z**} is linearly dependent, then **z** is in the Span{**x**, **y**}.

True.

g. Every linear transformation is a matrix transformation.

False. Derivatives are LT.

Every matrix transformation is a linear transformation.

h. A linear transformation $T : R^n \to R^m$ always maps the origin of R^n to the origin of R^m.

True.