Section 1.9 Theorems Related to the Matrix of a Linear Transformation.

Theorem 10:
Let T: $R^n \to R^k$ be a linear transformation. Then there is a unique matrix A so that T(**x**) = A**x** for all **x** in R^n.

Theorem 11:
Let T: $R^n \to R^k$ be a linear transformation.. Then T is one to one if and only if the equations T(**x**) - **0** has only the trivial solution.

Theorem 12:
Let T: $R^n \to R^k$ be a linear transformation and let A denote the standard matrix for T (as in Theorem 10). Then:
a. T is onto if and only if the columns of A span R^k.
B. T is one to one if and only if the columns of A are linearly independent.