Quiz 4 (Sections 1.6, 2.1, 2.2)

You will have 30 minutes to complete the quiz.

Name:
Student Number:

Q1 For each of the following concepts, write their definitions (8 Points).

   (a) Subspace.

   (b) Basis.

   (c) Rank.

   (d) Nullity.

Q2 For each of the following statements, provide a sufficient condition to prove and disprove the statement (10 Points).

   (a) There exists a subspace $S \subseteq \mathbb{R}^n$ such that $\vec{0} \notin S$.

   (b) Every subspace $S \subseteq \mathbb{R}^n$ is unbounded.

   (c) Every subset of $\mathbb{R}^n$ containing the zero vector is dependent.

   (d) A $n \times n$ matrix A is invertible if and only if $\text{rank}(A) = n$

   (e) There may be a non-zero matrix A such that $\text{rank}(A) = 0$.

Q1

Q2