Quiz 7

Name:

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1. Let $T\colon V \longrightarrow W$ be a homomorphism.

(a) Define the *range space* and *rank* of T.

(b) Define the *null space* and *nullity* of T.

(c) State the Rank–Nullity Theorem.

2. Consider the specific homomorphism $T\colon \mathcal{M}_{2\times 2} \longrightarrow \mathbb{R}^2$ defined by

$$T\begin{pmatrix} a & b \\ c & d \end{pmatrix} = \begin{bmatrix} a \\ d \end{bmatrix}.$$

(a) Determine the range space and rank of T.

(b) Determine the null space and nullity of T.