

WORKSHEET 2/2/23
MATH 2331, SPRING 2023

- (1) Let T be a linear transformation, \vec{v} a vector in $\text{im}(T)$ and \vec{w} a vector in $\text{ker}(T)$. How many entries do \vec{v} and \vec{w} have?
- (2) Let A be an $m \times n$ matrix.
 - (a) Suppose that $\text{ker}(A) = \{\vec{0}\}$. What can you say about the rank of A ?
 - (b) Suppose that $\text{im}(A) = \mathbb{R}^m$. What can you say about the rank of A ?
- (3) Think of an $m \times n$ matrix A with $\text{im}(A) = \mathbb{R}^m$ and $\text{ker}(A) \neq \{0\}$.
- (4) Think of an $m \times n$ matrix B with $\text{ker}(A) = \{0\}$ and $\text{im}(A) \neq \mathbb{R}^m$.