

MATH 2802 N1-N3, WORKSHEET 3

JANUARY 26TH, 2018

Choose the correct answers below.

- (1) Every linear transformation from $\mathbb{R}^n \rightarrow \mathbb{R}^m$ is a matrix transformation.
 - (a) **True.** There exists a unique matrix A such that $T(x) = Ax$ for all $x \in \mathbb{R}^n$
 - (b) **True.** There exists a unique matrix A such that $T(x) = Ax$ for all $x \in \mathbb{R}^m$
 - (c) **True.** Every matrix transformation spans \mathbb{R}^m
- (2) A mapping $T : \mathbb{R}^n \rightarrow \mathbb{R}^m$ is one-to-one if each vector in \mathbb{R}^n maps onto a unique vector in \mathbb{R}^m .
 - (a) **False.** A mapping T is said to be one-to-one if each $b \in \mathbb{R}^m$ is the image of at most one $x \in \mathbb{R}^n$.
 - (b) **False.** A mapping T is said to be one-to-one if each $b \in \mathbb{R}^m$ is the image of at least one $x \in \mathbb{R}^n$.
 - (c) **True.** A mapping T is said to be one-to-one if each $b \in \mathbb{R}^m$ is the image of exactly one $x \in \mathbb{R}^n$.
 - (d) **True.** A mapping T is said to be one-to-one if each $x \in \mathbb{R}^n$ has at least one image for $b \in \mathbb{R}^m$.
- (3) The second little pig has decided to build his house out of sticks. The big bad wolf finds the pig's house and blows it down so that the house is rotated by an angle of 45° in a counterclockwise direction about the z -axis, and then projected onto the xy -plane. Find the matrix for this transformation.
- (4) Solve exercises 7 and 12 from Section 1.10