

# Homework 8 MATH 304 Section 3

**Assigned:** Wednesday, October 8.

**Potentially Collected:** Wednesday, October 15.

1. Find the standard basis matrix for the linear transformation  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$  that maps a point  $(x_1, x_2)$  into
  - (a) its reflection about the line  $x_2 = -x_1$ .
  - (b) its projection on the  $x_1$ -axis.
  - (c) its projection on the  $x_2$ -axis.
  - (d) its rotation clockwise through an angle of  $\theta$ .
2. For each of the matrices below, use standard basis vectors to visualize how the domain is mapped to the codomain.

(a)  $\begin{bmatrix} 1 & 2 \\ -1 & 4 \end{bmatrix}$

(b)  $\begin{bmatrix} 3 \\ -2 \\ -6 \end{bmatrix}$

(c)  $\begin{bmatrix} -1 & 2 \end{bmatrix}$

(d)  $\begin{bmatrix} -1 & 1 \\ 0 & 1 \\ 1 & 2 \end{bmatrix}$

(e)  $\begin{bmatrix} -1 & 2 \\ 2 & -4 \end{bmatrix}$