Name: _____ Sort #: _____

Worksheet 5

Linear Transformations MATH 2250, Fall 2018

1. Let

$$A = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$$

and define $T : \mathbb{R}^2 \to \mathbb{R}^2$ by $T(\mathbf{x}) = A\mathbf{x}$. Find the images under T of

$$\mathbf{u} = \begin{bmatrix} 1 \\ -3 \end{bmatrix} \qquad \text{and} \qquad \mathbf{v} = \begin{bmatrix} a \\ b \end{bmatrix}$$

2. Given the linear transformation $T : \mathbb{R}^2 \to \mathbb{R}^4$ and

$$T(\mathbf{e}_1) = (3, 1, 3, 1)$$
$$T(\mathbf{e}_2) = (-5, 2, 0, 0)$$

where

$$\mathbf{e}_1 = (1, 0) \qquad \text{and} \qquad \mathbf{e}_2 = (0, 1)$$

find the standard matrix of T.