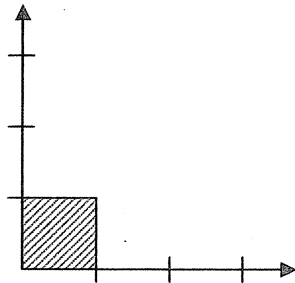
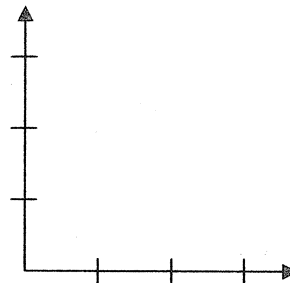


Quiz 5

1. (3 points) Find the image of $(3, -5, 1)$ under the transformation $T: \mathbb{R}^3 \rightarrow \mathbb{R}^2$ where T is defined by $T(x_1, x_2, x_3) = (4x_1 - 7x_2, x_3 - 3)$
2. (4 points) Find the standard matrix of the linear transformation $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$ given that $T(e_1) = (-1, 4, -7)$, $T(e_2) = (0, 0, 3)$, and $T(e_3) = (5, 2, 3)$. Be careful of rows/columns.
3. (3 points) Find the image of the unit square after the following horizontal shear transformation has been applied to it: $Tx = Ax$, where $A = \begin{bmatrix} 1 & 3 \\ 0 & 1 \end{bmatrix}$ and $T: \mathbb{R}^2 \rightarrow \mathbb{R}^2$. Hint: the unit square is formed by using the standard vectors $e_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ and $e_2 = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$.



Unit Square



Shear Transformation