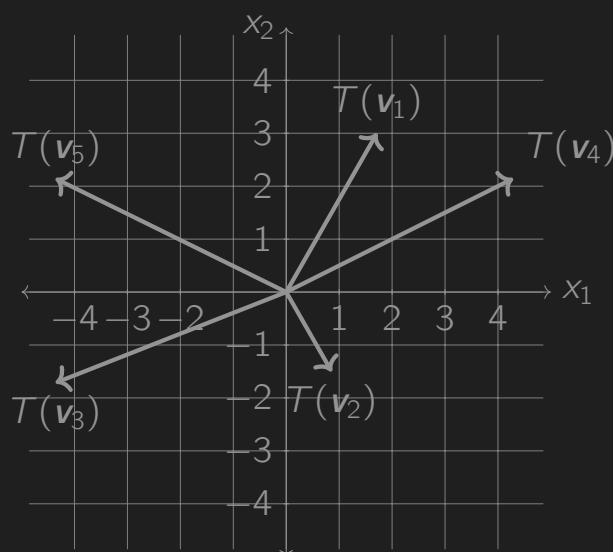
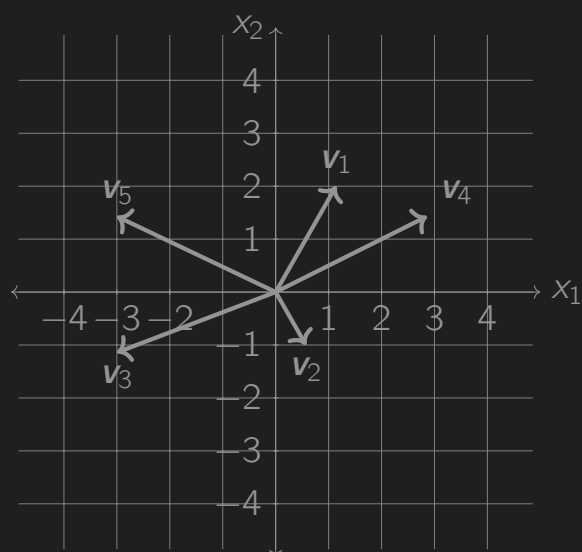


1. Let $A = \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$ and define a transformation $S : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ by $S(\mathbf{x}) = A\mathbf{x}$.

Describe in a sentence what S does.

- S is a transformation that takes any vector \mathbf{x} in \mathbb{R}^2 and scales it by -1 . Scaling by negative -1 simply inverts the direction, or in other words, S is a reflection through both the x and y axes.

2. Let $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ be the transformation that expands the plane by a factor of 1.5 in all directions (that is, all entries in the vector grow by a factor of 1.5; see below). Define a matrix B so that $T(\mathbf{x}) = B\mathbf{x}$.



$$B = 1.5I = \begin{bmatrix} 1.5 & 0 \\ 0 & 1.5 \end{bmatrix}$$