

1. Let $\mathbb{R}^2 \xrightarrow{T} \mathbb{R}^2$ be defined by $T \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 5x - y \\ 2x + y \end{pmatrix}$, let $v = \begin{pmatrix} 1 \\ 5 \end{pmatrix}$, and let $B = \left\{ \begin{pmatrix} 1 \\ 4 \end{pmatrix}, \begin{pmatrix} 2 \\ 7 \end{pmatrix} \right\}$.
- (a) Find $[v]_B$ (i.e., the co-ordinates of v with respect to B).

- (b) Find $[T]_{B,B}$ (i.e., the matrix that represents T with respect to B).

(c) Find $[T(v)]_B$. [Hint: there are at least two ways to do this!]