Define $T \in L(\mathbb{R}^2)$ by

$$T \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2x - y \\ x + y \end{pmatrix}.$$ 

(a) Find the matrix that represents $T$ relative to the standard basis $E$. Clearly indicate your method.

(b) Find the matrix that represents $T$ relative to the basis

$$F = \left\{ \begin{pmatrix} 1 \\ 2 \end{pmatrix}, \begin{pmatrix} 1 \\ 1 \end{pmatrix} \right\}.$$ 

You may use any valid method we have discussed. Be clear about what method you are using, and show all the steps.