

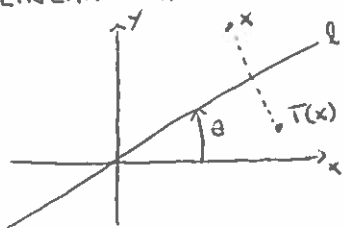
- I) FOR EACH OF THE FOLLOWING LESLIE MATRICES FOR A POPULATION WITH 2 AGE CLASSES,
- FIND THE EIGENVALUES FOR  $L$ .
  - FIND THE LONG-TERM GROWTH RATE OF THE POPULATION.
  - FIND THE LONG-TERM PERCENTAGE AGE DISTRIBUTION FOR THE 2 AGE CLASSES.

$$\textcircled{1} \quad L = \begin{bmatrix} 3/2 & 4 \\ 1/4 & 0 \end{bmatrix}$$

$$\textcircled{2} \quad L = \begin{bmatrix} 1/2 & 3/8 \\ 1/2 & 0 \end{bmatrix}$$

$$\textcircled{3} \quad L = \begin{bmatrix} 2/3 & 1 \\ 1/3 & 0 \end{bmatrix}$$

- II) ④ LET  $Q$  BE THE LINE THROUGH THE ORIGIN WHICH MAKES AN ANGLE OF  $\theta$  WITH THE POSITIVE  $x$ -AXIS, AND LET  $T: \mathbb{R}^2 \rightarrow \mathbb{R}^2$  BE THE LINEAR MAP WHICH MAPS EACH POINT TO ITS REFLECTION IN  $Q$ .



- FIND THE STANDARD MATRIX  $A$  FOR  $T$ , USING  $A = A_3 A_2 A_1$  WHERE
  - $A_1$  CORRESPONDS TO A ROTATION THROUGH THE ANGLE  $-\theta$
  - $A_2$  CORRESPONDS TO A REFLECTION THROUGH THE  $x$ -AXIS
  - $A_3$  CORRESPONDS TO A ROTATION THROUGH THE ANGLE  $\theta$ .
- USE THE ANSWER TO PART a) TO FIND THE STANDARD MATRIX  $A$  CORRESPONDING TO THE LINEAR TRANSFORMATION  $T: \mathbb{R}^2 \rightarrow \mathbb{R}^2$  WHICH REFLECTS EACH POINT IN THE LINE  $y = \frac{3}{4}x$ , GIVEN THAT  $\tan \theta = m = \frac{3}{4}$ .