Chapter 9 / **Example 11**

Initial state vectors

Dockless bicycle company Mathbike open their business by distributing a number of bicycles in a city according to the initial state vector $S_0 = \begin{pmatrix} 110 \\ 80 \\ 50 \end{pmatrix}$.

a Calculate the likely number of bicycles in each zone of the city after 5 days using the transition matrix given in example 10.

b Find the likely steady state of Mathbikes.

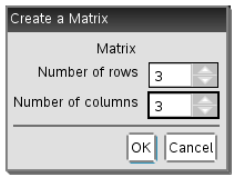
Enter the transition matrix $T = \begin{pmatrix} 0.50 & 0.30 & 0.10 \\ 0.30 & 0.35 & 0.30 \\ 0.20 & 0.35 & 0.60 \end{pmatrix}$.

Open a new document and add a Calculator page.

Press menu 7:Matrix & Vector | 1:Create | 1:Matrix.

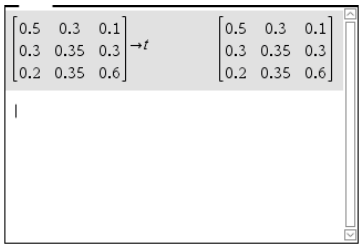
Change the number of rows and columns to 3.

Press enter.



Enter the values of the elements of the matrix ***T***, using tab to move through the matrix.

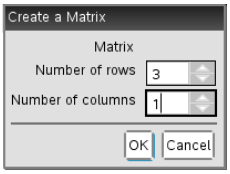
Press ctrl var sto→ T and press enter.



Press menu 7:Matrix & Vector | 1:Create | 1:Matrix.

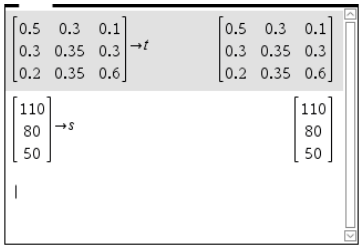
Change the number of rows to 3 and columns to 1.

Press enter.



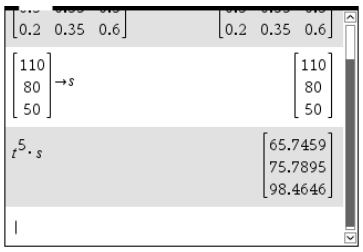
Enter the values of the elements of the matrix ***S***, using tab to move through the matrix.

Press ctrl var sto→ S and press enter.



Chapter 9 / **Example 11**

Initial state vectors

Type t ^ 5 × s and press enter. There would be approximately 66 Mathbikes in zone C, 76 in Zone I and 98 in Zone O.	
Repeat the calculation with some higher powers of the matrix. The system reaches an equilibrium at 65 bikes in C, 76 in I and 99 in O.