Practice worksheet | Matrix models

Long-term behaviour and steady states

Name: _____ Date: _____

6 questions | 19 marks

1. For rows $\begin{pmatrix} 0.8 & 0.3 \\ 0.2 & 0.7 \end{pmatrix}$, find steady proportions. [3 marks]

2. Use the same model for 350 members. Find steady counts. [3 marks]

3. For rows $\begin{pmatrix} 0.9 & 0.4 \\ 0.1 & 0.6 \end{pmatrix}$, find steady proportions. [3 marks]

4. For the swap matrix, find steady proportions and explain the behaviour from $(1, 0)$. [3 marks]

5. Find steady proportions for rows $\begin{pmatrix} 0.5 & 0.25 & 0 \\ 0.5 & 0.5 & 0.5 \\ 0 & 0.25 & 0.5 \end{pmatrix}$. [3 marks]

6. A closed model has steady counts $(80, 120)$ out of 200. [4 marks]

(a) State the steady proportions. [1 mark]

(b) Predict steady counts if the total doubles and the transition rule is unchanged. [2 marks]

(c) Give one reason observed long-run counts might differ. [1 mark]