Math 109-003
Assignment 4

Covers: Sections 6.3-6.5, 7.1-7.2, 8.2-8.4
Due: Tuesday April 7 at 8:30am

INSTRUCTIONS:
This assignment will be marked for completion.
Solutions will be posted on the course website 24 hours after the deadline.
You may not copy the work of another person or AI.
Submit jpg or pdf files to the D2L Dropbox.

1. Find AB given:

$$A = \begin{bmatrix} 9 & 8 & 7 \\ 6 & 5 & 4 \\ 3 & 2 & 1 \end{bmatrix}$$

and

$$B = \begin{bmatrix} 7 & 5 & -1 \\ 4 & 6 & 2 \\ -6 & 4 & -2 \end{bmatrix}$$

2. Find A^{-1} and use it to solve the system:

$$\begin{aligned} 7x - 2y &= -719 \\ -3x + 8y &= 901 \end{aligned}$$

3. Find A^{-1} given:

$$A = \begin{bmatrix} 1 & 1 & 2 \\ 2 & 1 & 2 \\ 5 & 3 & 5 \end{bmatrix}$$

4. 84% of current SunPeak customers will buy their next bag of coffee from SunPeak and 16% will switch to another brand. Eight percent of non-SunPeak customers will switch to SunPeak when they buy their next bag of coffee.
a) Draw a transition diagram.
b) Find the transition matrix.
c) 4% of coffee customers currently buy SunPeak. What percentage of customers will select SunPeak for their next coffee purchase?

5. We are given the transition matrix $P = \begin{bmatrix} 0.5 & 0.5 \\ 0.6 & 0.4 \end{bmatrix}$.
a) Find the stationary matrix.
b) As k gets very large, what does S_k look like?

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6. An account has an interest rate of 3.6%, compounded monthly.
a) If you deposit $\$20,000$ today how much will you have in four years?
b) How much should you deposit today if you want to have $\$20,000$ in four years?

7. An account has an interest rate of 4.8%, compounded monthly.
a) What monthly deposit should you make in order to have $\$25,000$ in six years?
b) What monthly payment would you receive if the account currently has $\$25,000$ in it and the money is paid out over six years?