Test Review Stations

Unit 2 Matrices & Game Theory

Test Review: Station A Matrix Mult Appls Practice

A local designer clothes manufacturer tries to keep up with her sales in Target, Old Navy, and Kohl's. The inventories of her most popular items in all three **stores** are recorded in the table.

	T-shirts	Jackets	Cardigans
Target	15	20	23
Old Navy	18	23	21
Kohl's	17	26	19

Label your rows and columns in your work and your answer.

1. The designer makes the T-shirts for $10, the jackets for $13, and the cardigans for $17. Use **one matrix operation** to calculate the manufacturer's cost of making these popular items for each store. Call the resulting cost matrix C.

2. The designer sells the T-shirts to the stores for $13, the jackets for $18, and the cardigans for $16. Use matrices to calculate the income, I, that the designer makes from selling these popular items to the stores.

3. Use matrices to calculate the profit that the designer makes on her sales to each store.

Test Review: Station B System of Equations

Annette, Barb, and Carlita work in a clothing shop. One day the three had combined sales of \$1480. Annette sold \$120 more than Barb. Barb and Carlita combined sold \$280 more than Annette. How much did each person sell?

1. Create a system of equations for the problem.

2. Write a matrix equation to represent the scenario.

3. Use matrices to solve the problem.

Review Part C: NOT Strictly Determine Games

Suppose that Sol and Tina change their game. If Sol displays heads and Tina shows tails, Sol wins 3 cents. If Sol shows tails and Tina displays heads, then Sol wins 2 cents. If they both show heads, then Tina wins 1 cent. If they both show tails, then Tina wins 4 cents.

1. What is the payoff matrix for this game with Sol as the row player?
2. Is the game strictly determined? Explain.
3. Use the row matrix $\begin{bmatrix} p & 1-p \end{bmatrix}$ to find Sol's best strategy for this game.
4. Use the column matrix $\begin{bmatrix} q \\ 1-q \end{bmatrix}$ to find Tina's best strategy for this game.
5. What is Sol's expected **payoff matrix equation** for this game?
6. Solve problem 5 and interpret the results.

Test Review: Station D Strictly Determined Games

1. Each of the following matrices represents a payoff matrix for a game. Determine if the game is strictly determined or not. If it is, find the best strategies for the row and column players, and the saddle point of the game.

d. $\begin{bmatrix} 0 & 1 & 2 \\ 3 & -2 & 0 \end{bmatrix}$

e. $\begin{bmatrix} 0 & -6 & 1 \\ -4 & 8 & 2 \\ 6 & 5 & 4 \end{bmatrix}$

f. $\begin{bmatrix} 0 & 3 & 1 \\ -3 & 0 & 2 \\ -1 & -4 & 0 \end{bmatrix}$

2. Use the concept of dominance to solve each of the following games. Give the best row and column strategies and the saddle point of each game.

a.

	E	F	G
A	3	1	7
B	0	1	3
C	4	3	4
D	1	3	6

b.

	E	F	G
A	4	−1	−2
B	0	1	1
C	0	−2	5
D	3	2	4

Test Review: Station E: Markov Chains

There are 30 students in the Math Club and every week they bring snacks to their meeting. This week 13 brought chips, 9 brought drinks and 8 brought dessert. 16% of those who brought chips to the first meeting brought chips again and 38% brought drinks. Of those that brought drinks, 30% brought drinks again and the rest brought dessert to the next meeting. And of those that brought dessert to the first meeting, 24% brought dessert again and 40% brought chips.

1. What is the initial distribution matrix for the math club?

2. What is the transition matrix for the math club?

3. Approximately how many students will bring desserts to the 4^{th} meeting??

4. In the long run, how many of these students will bring each item to a meeting?

Test Review: Station F More System of Equations

Last Tuesday, Regal Cinemas sold a total of 8500 movie tickets. Proceeds totaled $64,600. Tickets can be bought in one of 3 ways: a matinee admission costs $5, student admission is $6 all day, and regular admissions are $8.50. How many of each type of ticket was sold if twice as many student tickets were sold as matinee tickets?

1. Create a system of equations for the problem.

2. Write a matrix equation to represent the scenario.

3. Use matrices to solve the problem.