

Names: \_\_\_\_\_

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$$\left[ \begin{array}{c|c} I_{a \times a} & A_{a \times b} \\ \hline 0_{b \times a} & B_{b \times b} \end{array} \right] \longrightarrow \left[ \begin{array}{c|c} I_{a \times a} & A_{a \times b}(I - B)_{b \times b}^{-1} \\ \hline 0_{b \times a} & 0_{b \times b} \end{array} \right]$$

Not covered on this review but you should know: Gauss elimination, systems of equations that have no solutions, properties of matrices including addition, subtraction, matrix transpose and scalar multiplication.

1. A high fiber meal takes 9 servings of vegetables and 1 unit of protein. A high protein meal takes 3 servings of vegetables to 4 servings of protein. A normal meal takes 7 servings of vegetables to two servings of protein. The dietician has 51 servings of vegetables and 24 servings of protein to split into meals.

Write this problem as a system of equations.

Find the solution as a set of parametric equations with restrictions. Think carefully.

2. Jane has \$5.85 made up of dimes and quarters. She has twice as many dimes as quarters. Write this problem as a system of equations.

Find how many dimes and how many quarters she has.

3. The first table below has information about three types of flower arrangements and the number of roses, daisies and carnations in each. The second table has information about three flower suppliers and the price charged for each type of bloom. Put these two tables into matrices so that you can multiply them and get a meaningful result. Multiply them, and interpret your result.

	Roses	Carnations	Daisies
Arrangement A	6	8	0
Arrangement B	12	0	0
Arrangement C	3	10	5

	Roses	Carnations	Daisies
Supplier 1	1	0.50	0.60
Supplier 2	1.05	0.45	0.65
Supplier 3	0.90	0.55	0.70

4. If Cookie Monster eats an Oreo, there is a 10% chance his next cookie will be an Oreo, a 20% chance his next cookie will be an oatmeal raisin, and a 70% chance his next cookie will be a chocolate chip. If he eats an oatmeal raisin, there is a 10% chance he'll have an Oreo next, and a 15% chance his next cookie will be a chocolate chip. If he has a chocolate chip cookie, there is a 40% chance his next cookie will be an Oreo, and a 20% chance his next cookie will be an oatmeal raisin. If the first cookie he eats is an oatmeal raisin, what is the distribution for the fourth cookie he eats? Write down the transition matrix and the initial vector labeling the entries and include a "from" label and a "to" label. Indicate what you are calculating.

Write down the system of equations you would use to find the limiting distribution for this problem and find it.

5. If you are playing a game in which you have a 40% chance of winning or losing \$1 and a 20% chance of breaking even. You quit if either you go broke or end up with \$3. What is the long term behavior if you start with \$1 or \$2? Write down the transition matrix for this process, indicating the absorbing states. Label the transition matrix and identify the absorbing states. Identify  $A$  and  $(I - B)$  in determining the long term behavior. What is the probability of going broke if you start with \$1?