Math 002B Assignment 2.6 Last Name_______________1st_________

1. An economy is based on three sectors, agriculture, manufacturing, and energy. For each unit of output, agriculture requires inputs of 0.40 unit from agriculture, 0.40 unit from manufacturing, and 0.20 unit from energy. For each unit of output, manufacturing requires inputs of 0.30 unit from agriculture, 0.30 unit from manufacturing, and 0.30 unit from energy. For each unit of output, energy requires 0.20 unit from agriculture, 0.40 unit from manufacturing, and 0.30 unit from energy. Construct the consumption matrix for this economy, and determine what intermediate demands are created if agriculture plans to produce 100 units.

2. An economy is based on three sectors, agriculture, manufacturing, and services. For each unit of output, agriculture requires inputs of 0.30 unit from agriculture, 0.30 unit from manufacturing, and 0.20 unit from services. For each unit of output, manufacturing requires inputs of 0.20 unit from agriculture, 0.20 unit from manufacturing, and 0.30 unit from services. For each unit of output, services requires 0.30 unit from agriculture, 0.40 unit from manufacturing, and 0.30 unit from services. Determine the production levels needed to satisfy a final demand of 0 units for agriculture, 10 units from manufacturing, and 0 units for services.

3. Consider the production model $\mathbf{x} = \mathbf{Cx} + \mathbf{d}$ for an economy with two sectors, where

$$\mathbf{C} = \begin{bmatrix} 0.0 & 0.5 \\ 0.8 & 0.4 \end{bmatrix}, \ \mathbf{d} = \begin{bmatrix} 20 \\ 50 \end{bmatrix}$$

Use an inverse matrix to determine the production level necessary to satisfy the final demand.

4. The consumption matrix C for the a certain country's economy for a particular year has the property that every entry in the matrix $(\mathbf{I} - \mathbf{C})^{-1}$ is nonzero (and positive). What does that say about the effect of raising the demand for the output of just one sector of the? economy?

5. Let C be a consumption matrix such that $\mathbf{C}^m \to 0$ as $m \to \infty$, and for m = 1, 2, 3, ... Let $\mathbf{D}_m = 1 + \mathbf{C} + \mathbf{C}^2 \bullet \bullet \bullet \mathbf{C}^m$. Find a difference equation that relates $\mathbf{D}_m$ to $\mathbf{D}_{m+1}$ and thereby obtain an iterative procedure for computing

$$(\mathbf{1} - \mathbf{C})^{-1} = \mathbf{I} + \mathbf{C} + \mathbf{C2} + \mathbf{C3} + \bullet \bullet \bullet + \mathbf{C^m}$$

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