1. Suppose an economy has three producing sectors: agriculture, meats, and processed foods. The open sector consists of people who just consume ("eat") all these foods. The four sectors are thus A, M, P and E, respectively. Suppose to produce one unit of output, A requires 0.22 units of its own output, and 0.13 units of M and 0.1 units of P. Making one unit of M requires 0.19, 0.11, and 0.08 units of A, M, and P, resp., and a unit of P consumes 0.1, 0.07 and 0.3 units of A, M, and P, resp. The final demand by the E sector is 40, 30, and 80 units of A, M, and P, resp.

1A. Find the consumption matrix C.

1B. Find $I - C$ and write it here; store it as $[B]$ in your calculator.

1C. Use your calculator to find $(I - C)^{-1}$ and write it here. (Just use $[B]$ and the "x^{-1}" key)

1D. Let $\mathbf{d}$ be the final demand vector. In terms of C and $\mathbf{d}$, what is the equation which we set up to find the production vector $\mathbf{x}$?

1E. Find the production vector $\mathbf{x}$. (Hint: put the final demand vector $\mathbf{d}$ into your calculator as a matrix (say $[D]$) and do an appropriate matrix multiplication.

1F. *BONUS!* It turns out that $(I_3 + C + C^2 + C^3 + C^4 + C^5)\,\mathbf{d}$ is $\begin{bmatrix} 81.154 \\ 55.618 \\ 131.592 \end{bmatrix}$. What is the connection between this fact and your work in (1A-1E)?

quiz continues other side

2. Let $A = \begin{bmatrix} 5 & 6 & -6 \\ 3 & 8 & -6 \\ 3 & 6 & -4 \end{bmatrix}$.

2A. It's a fact that $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$ is an eigenvector of A. What is the corresponding eigenvalue? (An easy calculation)

2B. It's also true that $\lambda = 2$ is an eigenvalue of A. If possible, find matrices P and D that show A is diagonalizable, or explain why A is not diagonalizable. Show all your work.