3. Thm. 2 says there will be one linearly independent price vector for the matrix E if some positive power of E is positive. Since E is not positive, try E^2:

1.5pt.

$$E^2 = \begin{bmatrix} .2 & .34 & .1 \\ .2 & .54 & .6 \\ .6 & .12 & .3 \end{bmatrix} > 0$$

4. The exchange matrix for this arrangement (using A, B, and C in order) is

1.5pt

$$\begin{bmatrix} 1/2 & 1/3 & 1/4 \\ 1/3 & 1/3 & 1/4 \\ 1/6 & 1/3 & 1/2 \end{bmatrix}$$

at equilibrium $(I-E)p=0$.

$$\begin{bmatrix} 1/2 & -1/3 & -1/4 \\ -1/3 & 2/3 & -1/4 \\ -1/6 & -1/3 & 1/2 \end{bmatrix} \begin{bmatrix} p_1 \\ p_2 \\ p_3 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

$$p = \begin{bmatrix} 18/16 \\ 15/16 \\ 1 \end{bmatrix} s \quad \text{set } s = \frac{1600}{15} \quad p = \begin{bmatrix} 120 \\ 100 \\ 106.67 \end{bmatrix}$$

so tomatoes cost \$120, corn \$100, lettuce \$106.67

5.

$$C = \begin{bmatrix} 0 & .2 & .3 \\ .1 & 0 & .4 \\ .3 & .4 & 0 \end{bmatrix}$$

solve: $(I-C)x=d$ where d is the demand vector.

1.5pt

$$x = \begin{bmatrix} 1256.48 \\ 1448.12 \\ 1556.19 \end{bmatrix}$$