EE 320 Introductory Mathematical Economics

Semester 2/2012

Problem Set 4 – Suggested Answers

Matrix Algebra and Applications

1. & 2. Direct verification

3. b) $\begin{bmatrix} 2 & -3 & 1 \\ 1 & 1 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$

4. $a = 2$.

5. Direct verification

6. a. -2 b. -2 c. *adf* d. *e(ad-bc)*

7. $AB = \begin{bmatrix} -1 & -1 & -1 \\ 7 & 13 & 13 \\ 5 & 9 & 10 \end{bmatrix}$, |A| = -2, |B| = 3, |AB| = |A|·|B| = -6

8. Prove by multiplying both matrices to each other and obtain a 3x3 identity matrix.

9. a) $x_1 = 1,\ x_2 = 2,\ x_3 = 3$

   b) $x_1 = x_2 = x_3 = 0$

10. $Y = \frac{a-bd+A_0}{1-b(1-t)}$; $C = \frac{a-bd+A_0 b(1-t)}{1-b(1-t)}$; $T = \frac{t(a+A_0)+(1-b)d}{1-b(1-t)}$

11. There is a unique solution provided that $a(b-2) \neq 0$.

12. a) Suppose x is the production in A, and y is the production in I.

$$x = \frac{1}{6}x + \frac{1}{4}y + 60$$

$$y = \frac{1}{4}x + \frac{1}{4}y + 60$$

b) x = 320/3; y = 1040/9

13. $\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 7 \\ 4 \\ 6 \end{bmatrix}$

14. Y = 800, r = 0.12.