

## Chapter 5 Homework Solutions

Compiled by Joe Kahlig

1. (a)  $\begin{bmatrix} -1 & 4 \\ -1 & -2 \\ -5 & 3 \end{bmatrix}$

(b) not possible

(c)  $\begin{bmatrix} 9 & -14 & 8 \\ -11 & 25 & 12 \end{bmatrix}$

(d) not possible

(e)  $\begin{bmatrix} 1 & -4 & -6 \\ -3 & 5 & 4 \end{bmatrix}$

2. (a)  $\begin{bmatrix} 11a & -21 & 7 \\ 0 & 7 & 26 \end{bmatrix}$

(b) not possible

(c) not possible

(d)  $\begin{bmatrix} 6+a & b \\ -6+c & 9+e \end{bmatrix}$

(e)  $\begin{bmatrix} 0 & 8 & 2j-5-b \\ 4 & k & 9 \end{bmatrix}$

3. (a)  $y = 14$ ,  $z = -5$ ,  $u = -3.5$ , and  $x = 26/6$

(b)  $x = \frac{-147}{74}$  and  $y = \frac{104}{37}$

(c)  $x = 3$  and  $y = 5.5$

(d)  $x = -8$ ,  $y = -2$ , and  $z = 1$

4. (a)  $3x1$

(b)  $5x3$

(c) not possible

(d)  $4x4$

(e) not possible

(f)  $3x5$

5. (a) False

(b) True

(c) False

6. (a) not possible

(b)  $\begin{bmatrix} 13 & -7 \\ 4 & 3 \end{bmatrix}$

(c) not possible

(d)  $\begin{bmatrix} 2 & -2 & 4 \\ -2 & 7 & 6 \end{bmatrix}$

(e)  $\begin{bmatrix} 17 & 20 \\ 7 & 6 \end{bmatrix}$

(f)  $\begin{bmatrix} a-2c & b-2d \\ 2c & 2d \\ 4a-c & 4b-d \end{bmatrix}$

(g)  $\begin{bmatrix} a & -a+2b & 3a+b \\ c & -c+2d & 3c+d \end{bmatrix}$

7.  $\begin{bmatrix} 2 & 6 & -4 \\ 10 & 16 & -8 \\ -12 & 20 & 10 \end{bmatrix}$

8.  $AB = \begin{bmatrix} x+5 & 2 \\ y+5 & 2 \end{bmatrix}$

$$BA = \begin{bmatrix} x & 1 \\ 5x+2y & 7 \end{bmatrix}$$

9. (a)  $C_{1,3} = 0 + 9 + 20 = 29$

(b)  $D_{3,1} = 0 + 0 + 50 + 4 = 54$

10.  $x = 3$ ,  $y = 4$ , and  $z = 13$

11. (a)  $[2910 \quad 8970]$

There is no meaning for these numbers.

(b)  $\begin{bmatrix} 7200 \\ 2700 \end{bmatrix}$

The 7200 is the amount of vitamin A and the 2700 is the amount of vitamin C that is consumed at lunch.

(c)  $[6840 \quad 21480]$

There is no meaning for these numbers.

(d)  $\begin{bmatrix} 11200 \\ 4040 \end{bmatrix}$

The 11200 is the amount of vitamin A and the 4040 is the amount of vitamin C that is consumed together at breakfast and lunch.

12. (a)  $\begin{bmatrix} 2 & 3 & 4 \\ 0 & 1 & -3 \\ 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 6 \\ 7 \\ 10 \end{bmatrix}$

also acceptable is

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2 & 3 & 4 \\ 0 & 1 & -3 \\ 1 & 1 & 1 \end{bmatrix}^{-1} \begin{bmatrix} 6 \\ 7 \\ 10 \end{bmatrix}$$

(b)  $\begin{bmatrix} 1 & 0 & 8 \\ 1 & -1 & 2 \\ 3 & 2 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 4 \\ 15 \\ 2 \end{bmatrix}$

also acceptable is

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 & 0 & 8 \\ 1 & -1 & 2 \\ 3 & 2 & 1 \end{bmatrix}^{-1} \begin{bmatrix} 4 \\ 15 \\ 2 \end{bmatrix}$$

13. (a)  $\begin{bmatrix} -35/32 & 25/32 & -33/32 \\ 3/8 & -1/8 & 1/8 \\ 7/32 & -5/32 & 13/32 \end{bmatrix}$

(b) not possible.

14. (a)  $\begin{bmatrix} 3 & 2 & 1 \\ -3 & 3 & 4 \\ 2 & 2 & 1 \end{bmatrix}$

(b)  $\begin{bmatrix} 1 & 0 & -1 \\ -2.2 & -.2 & 3 \\ 2.4 & .4 & -3 \end{bmatrix}$

$$15. A^{-1} = \begin{bmatrix} 0.5 & -3 & -4 \\ -0.5 & 2 & 3 \\ -1 & 1 & 2 \end{bmatrix}$$

$$16. (a) M = A^{-1}(C + 3B)$$

$$M = \begin{bmatrix} 11.5 & 25 & 26.1 \\ -2.55 & -10.4 & -3.11 \\ 5.2 & 3.6 & 9.04 \end{bmatrix}$$

$$(b) K = B * (A + C)^{-1}$$

$$K = \begin{bmatrix} \frac{427}{141} & \frac{-643}{141} & \frac{10}{47} \\ \frac{-2507}{1692} & \frac{4217}{1692} & \frac{-181}{564} \\ \frac{-169}{846} & \frac{-11}{846} & \frac{-23}{282} \end{bmatrix}$$

$$(c) J = (3I + C)^{-1} * 3A^T$$

$$J = \begin{bmatrix} \frac{-3741}{7937} & \frac{6639}{7937} & \frac{-26169}{7937} \\ \frac{795}{7937} & \frac{174}{7937} & \frac{14001}{7937} \\ \frac{1581}{7937} & \frac{975}{7937} & \frac{2505}{7937} \end{bmatrix}$$