HW MATH227/2 Solutions

1.

(a) $tr(B - 3C) = -25$

(b) $-3(B + 2C) = \begin{bmatrix} -39 & -21 & -24 \\ 9 & -6 & -15 \\ -33 & -12 & -30 \end{bmatrix}$

(c) trace undefined since A is not a square matrix

2.

(a) $\begin{bmatrix} 67 & 41 & 41 \end{bmatrix}$

(b) $\begin{bmatrix} 63 & 67 & 57 \end{bmatrix}$

(c) $\begin{bmatrix} 41 \\ 21 \\ 67 \end{bmatrix}$

3.

(a) $A = \begin{bmatrix} 2 & -3 & 5 \\ 9 & -1 & 1 \\ 1 & 5 & 4 \end{bmatrix}$ $b = \begin{bmatrix} 7 \\ -1 \\ 0 \end{bmatrix}$

(b) $A = \begin{bmatrix} 4 & 0 & -3 & 1 \\ 5 & 1 & 0 & -8 \\ 2 & -5 & 9 & -1 \\ 0 & 3 & -1 & 7 \end{bmatrix}$ $b = \begin{bmatrix} 1 \\ 3 \\ 0 \\ 2 \end{bmatrix}$

4.

(a) $AB = \left[\begin{array}{cc|c} -1 & 20 & -10 \\ 37 & -13 & 8 \\ \hline 29 & 23 & 41 \end{array}\right]$

(b) $AB = \left[\begin{array}{cc|c} 1 & 23 & -10 \\ \hline 37 & -13 & 8 \\ 29 & 23 & 41 \end{array}\right]$

5.

$$A^{-1} = \begin{bmatrix} 2 & -1 \\ -5 & 3 \end{bmatrix} \qquad B^{-1} = \begin{bmatrix} \frac{1}{5} & \frac{3}{20} \\ -\frac{1}{5} & \frac{1}{10} \end{bmatrix}$$

$$C^{-1} = \begin{bmatrix} -\frac{1}{2} & -2 \\ 1 & 3 \end{bmatrix} \qquad D^{-1} = \begin{bmatrix} \frac{1}{2} & 0 \\ 0 & \frac{1}{3} \end{bmatrix}$$

6.

$$(a) \quad A = \begin{bmatrix} \frac{5}{13} & \frac{1}{13} \\ -\frac{3}{13} & \frac{2}{13} \end{bmatrix}$$

$$(b) \quad A = \begin{bmatrix} -\frac{9}{13} & \frac{1}{13} \\ \frac{2}{13} & -\frac{6}{13} \end{bmatrix}$$

7.

$$(a) \quad \begin{bmatrix} 1 & 1 \\ 2 & -1 \end{bmatrix}$$

$$(b) \quad \begin{bmatrix} 20 & 7 \\ 14 & 6 \end{bmatrix}$$

$$(c) \quad \begin{bmatrix} 39 & 13 \\ 26 & 13 \end{bmatrix}$$

8. $$A^3 = \begin{bmatrix} 8 & 0 \\ 28 & 1 \end{bmatrix}; \quad A^{-3} = \begin{bmatrix} 0.125 & 0 \\ -3.5 & 1 \end{bmatrix}; \quad A^2 - 2A + I = \begin{bmatrix} 1 & 0 \\ 4 & 0 \end{bmatrix}$$