Assignment #4
Answers to textbook recommended questions.

Sec 2.4

(3) $AB + AC = A(B+C)$

(4) $A(BC) = (AB)C$

(6) $(A+B)^2 = A^2 + AB + BA + B^2$

(7) (a) True (b) False
(c) True (d) False

(13)

(14) $(B-A)^2$ $A(A-B) - B(A-B)$
$A^2 - AB - BA + B^2$

(15) (a) True (b) False
(c) True (d) False

$\begin{bmatrix} 3 & 1 \\ 4 & 3 \end{bmatrix} \begin{bmatrix} 1 \\ -2 \end{bmatrix} = \begin{bmatrix} 1 \\ -2 \end{bmatrix}$

(17) (a) $\begin{bmatrix} 0 \\ 0 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 0 & 0 \end{bmatrix}$

(c) $\begin{bmatrix} 0 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 3 & -2 \end{bmatrix}$

(26) $\begin{bmatrix} 1 & 3 & 0 \\ 10 & 14 & 4 \\ 7 & 8 & 1 \end{bmatrix}$

(32) $AX = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

(36) (a) $(AB)C$ (b) $(u^T v)w^T$

(c)

Sec 2.5

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

(5) $U = \begin{bmatrix} 1 & 1 \\ 0 & -1 \end{bmatrix}$

(10) $A^{-1} = \begin{bmatrix} 0 & 0 & 0 & \frac{1}{5} \\ 0 & 0 & \frac{1}{4} & 0 \\ 0 & \frac{1}{3} & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 \end{bmatrix}$ $B^{-1} = \begin{bmatrix} 3 & -2 & 0 & 0 \\ -4 & 3 & 0 & 0 \\ 0 & 0 & 6 & -5 \\ 0 & 0 & -7 & 6 \end{bmatrix}$

(11) (a) $A = \begin{bmatrix} 3 & 1 \\ 1 & 1 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 3 \\ 3 & 3 \end{bmatrix}$ ← different answers possible.

(b) $A = \begin{bmatrix} 3 & 2 \\ 3 & 2 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 1 \\ 2 & 2 \end{bmatrix}$ ← different answers possible.

(13) $B^{-1} = CM^{-1}A$

(22) $A^{-1} = \begin{bmatrix} 7 & -3 \\ -2 & 1 \end{bmatrix}$ $A^{-1} = \begin{bmatrix} -\frac{9}{3} & \frac{4}{3} \\ \frac{3}{3} & -\frac{1}{3} \end{bmatrix} = \begin{bmatrix} -3 & \frac{4}{3} \\ 1 & -\frac{1}{3} \end{bmatrix}$

Sec 2.5 contd:

(25) $A^{-1} = \begin{bmatrix} \frac{3}{4} & -\frac{1}{4} & -\frac{1}{4} \\ -\frac{1}{4} & \frac{3}{4} & -\frac{1}{4} \\ -\frac{1}{4} & -\frac{1}{4} & \frac{3}{4} \end{bmatrix}$ $B^{-1} = \text{DNE}$

(27) $A^{-1} = \begin{bmatrix} 1 & 0 & 0 \\ -2 & 1 & -3 \\ 0 & 0 & 1 \end{bmatrix}$ $A^{-1} = \begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & -1 \end{bmatrix}$

(29) (a) True (b) False (c) True

(44) Both singular or both invertible.