Solutions Book Chapter 7, SCI 113 Spring 2008

(1) **Exercise 7.9** $A^T = \begin{pmatrix} 1 & -1 & 0 \\ 3 & 2 & 1 \end{pmatrix}$, $AA^T = \begin{pmatrix} 10 & 5 & 3 \\ 5 & 5 & 2 \\ 3 & 2 & 3 \end{pmatrix}$, $A^TA = \begin{pmatrix} 2 & 1 \\ 1 & 14 \end{pmatrix}$.

(2) **Exercise 7.10**

$$\begin{cases} x + y - 3z = 1 \\ 3x - y + 2z = 4 \\ 5x + y - 4z = 6. \end{cases}$$

(3) **Exercise 7.12** $AB = BA = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$.

(4) **Exercise 7.14**(a) $\frac{-1}{3}\begin{pmatrix} -1 & -1 \\ -2 & 1 \end{pmatrix}$, (b) $\frac{1}{43}\begin{pmatrix} 11 & -3 \\ 7 & 2 \end{pmatrix}$, (c) $\frac{-1}{2}\begin{pmatrix} -2 & 0 \\ 0 & 1 \end{pmatrix}$, (d) $\frac{1}{56}\begin{pmatrix} 0 & 7 \\ -8 & 10 \end{pmatrix}$, (e) $\frac{1}{19402}\begin{pmatrix} 98 & -100 \\ -97 & -99 \end{pmatrix}$.

(5) **Exercise 7.16** $A^{-1} = \begin{pmatrix} -2/3 & -1/3 & 4/3 \\ 1/3 & -1/3 & 1/3 \\ 2/3 & 1/3 & -1/3 \end{pmatrix}$, $A^{-1}\mathbf{d} = \begin{pmatrix} -17 \\ -2 \\ 8 \end{pmatrix}$, solution of the system is $\begin{pmatrix} -17 \\ -2 \\ 8 \end{pmatrix}$.

(6) **Exercise 7.19** $A = \begin{pmatrix} -2 & -4 & -6 \\ -1 & 0 & 3 \\ -4 & -14 & -36 \end{pmatrix}$, $\det(A) = 24$, $A^{-1} = \frac{1}{24}\begin{pmatrix} 42 & -60 & -12 \\ -48 & 48 & 12 \\ 14 & -12 & -4 \end{pmatrix}$.