Name: SOLUTIONS.
Stu#:

(1) [5] Let

$$\mathbf{A}=\begin{bmatrix}1 & -2 & 0\\ 5 & 1 & 2\end{bmatrix},\quad \mathbf{B}=\begin{bmatrix}2 & -3 & 4\\ 0 & 2 & 1\end{bmatrix},\quad \mathbf{C}=\begin{bmatrix}-3 & 0 & 5\\ 2 & 1 & 3\end{bmatrix}$$

Compute $4\mathbf{A}+3(\mathbf{B}+\mathbf{C})$.

$$4\begin{bmatrix}1 & -2 & 0\\ 5 & 1 & 2\end{bmatrix}+3\left(\begin{bmatrix}2 & -3 & 4\\ 0 & 2 & 1\end{bmatrix}+\begin{bmatrix}-3 & 0 & 5\\ 2 & 1 & 3\end{bmatrix}\right)$$

$$=\begin{bmatrix}4 & -8 & 0\\ 20 & 4 & 8\end{bmatrix}+3\begin{bmatrix}-1 & -3 & 9\\ 2 & 3 & 4\end{bmatrix}$$

$$=\begin{bmatrix}4 & -8 & 0\\ 20 & 4 & 8\end{bmatrix}+\begin{bmatrix}-3 & -9 & 27\\ 6 & 9 & 12\end{bmatrix}$$

$$=\begin{bmatrix}1 & -17 & 27\\ 26 & 13 & 20\end{bmatrix}$$

(2) [5] Compute the following product:

$$\begin{bmatrix}1 & -2 & 3\\ 4 & 0 & 6\end{bmatrix}\begin{bmatrix}0 & -2\\ 1 & 0\\ 2 & -4\end{bmatrix}$$

$$=\begin{bmatrix}4 & -14\\ 12 & -32\end{bmatrix}$$

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(3) [5] Let $\mathbf{A} = \begin{bmatrix} 7 & 3 \\ 5 & 2 \end{bmatrix}$. Determine $\mathbf{A}^{-1}$.

$$\left[\begin{array}{cc|cc} 7 & 3 & 1 & 0 \\ 5 & 2 & 0 & 1 \end{array}\right]$$

$R_1 = \frac{1}{7} r_1$:
$$\left[\begin{array}{cc|cc} 1 & \frac{3}{7} & \frac{1}{7} & 0 \\ 5 & 2 & 0 & 1 \end{array}\right]$$

$R_2 = (-5) r_1 + r_2$:
$$\left[\begin{array}{cc|cc} 1 & \frac{3}{7} & \frac{1}{7} & 0 \\ 0 & -\frac{1}{7} & -\frac{5}{7} & 1 \end{array}\right]$$

$R_2 = -7 R_2$:
$$\left[\begin{array}{cc|cc} 1 & 3/7 & 1/7 & 0 \\ 0 & 1 & 5 & -7 \end{array}\right]$$

$R_1 = (-3/7) r_2 + r_1$:
$$\left[\begin{array}{cc|cc} 1 & 0 & -2 & 3 \\ 0 & 1 & 5 & -7 \end{array}\right]$$

$$\therefore A^{-1} = \begin{bmatrix} -2 & 3 \\ 5 & -7 \end{bmatrix}$$