

This is a 10 point Homework Assignment. You may use your book and course notes, and you may work with other members of the class, but you may not consult with outside tutors (at least not on these specific problems). Use the back of this sheet if you run out of room to work.

1. Given that:

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

Find the following:

(a) (3 points) $2A - B$

$$2A - B = \begin{bmatrix} -2 & 4 & 0 \\ 0 & 2 & -4 \\ -4 & 0 & 6 \end{bmatrix} - \begin{bmatrix} 2 & 0 & -1 \\ 0 & 2 & 1 \\ 2 & -3 & 0 \end{bmatrix} = \begin{bmatrix} -4 & 4 & 1 \\ 0 & 0 & -5 \\ -6 & 3 & 6 \end{bmatrix}$$

(b) (3 points) AB

$$AB = \begin{bmatrix} -1 & 2 & 0 \\ 0 & 1 & -2 \\ -2 & 0 & 3 \end{bmatrix} \cdot \begin{bmatrix} 2 & 0 & -1 \\ 0 & 2 & 1 \\ 2 & -3 & 0 \end{bmatrix} = \begin{bmatrix} -2+0+0 & 0+4+0 & 1+2+0 \\ 0+0-4 & 0+2+6 & 0+1+0 \\ -4+0+6 & 0+0-9 & 2+0+0 \end{bmatrix} = \begin{bmatrix} -2 & 4 & 3 \\ -4 & 8 & 1 \\ 2 & -9 & 2 \end{bmatrix}$$

(c) (4 points) $BC - CB$

$$BC = \begin{bmatrix} 2 & 0 & -1 \\ 0 & 2 & 1 \\ 2 & -3 & 0 \end{bmatrix} \cdot \begin{bmatrix} 0 & 1 & 2 \\ 3 & 2 & 0 \\ 1 & 0 & 2 \end{bmatrix} = \begin{bmatrix} 0+0-1 & 2+0+0 & 4+0-2 \\ 0+6+1 & 0+4+0 & 0+0+2 \\ 0-9+0 & 2-6+0 & 4+0+0 \end{bmatrix} = \begin{bmatrix} -1 & 2 & 2 \\ 7 & 4 & 2 \\ -9 & -4 & 4 \end{bmatrix}$$

$$CB = \begin{bmatrix} 0 & 1 & 2 \\ 3 & 2 & 0 \\ 1 & 0 & 2 \end{bmatrix} \cdot \begin{bmatrix} 2 & 0 & -1 \\ 0 & 2 & 1 \\ 2 & -3 & 0 \end{bmatrix} = \begin{bmatrix} 0+0+4 & 0+2-6 & 0+1+0 \\ 6+0+0 & 0+4+0 & -3+2+0 \\ 2+0+4 & 0+0-6 & -1+0+0 \end{bmatrix} = \begin{bmatrix} 4 & -4 & 1 \\ 6 & 4 & -1 \\ 6 & -6 & -1 \end{bmatrix}$$

$$BC - CB = \begin{bmatrix} -1 & 2 & 2 \\ 7 & 4 & 2 \\ -9 & -4 & 4 \end{bmatrix} - \begin{bmatrix} 4 & -4 & 1 \\ 6 & 4 & -1 \\ 6 & -6 & -1 \end{bmatrix} = \begin{bmatrix} -5 & 6 & 1 \\ 1 & 0 & 3 \\ -15 & 2 & 5 \end{bmatrix}$$