

Name: Key**Directions:** Show all work. No credit for answers without work.

1. Let $A = \begin{bmatrix} 1 & 4 \\ -7 & 3 \end{bmatrix}$ and let $B = \begin{bmatrix} 0 & -2 \\ 5 & 3 \end{bmatrix}$.

(a) [4 points] Find $2A - B$.

$$\begin{aligned} 2A - B &= 2 \begin{bmatrix} 1 & 4 \\ -7 & 3 \end{bmatrix} - \begin{bmatrix} 0 & -2 \\ 5 & 3 \end{bmatrix} \\ &= \begin{bmatrix} 2 & 8 \\ -14 & 6 \end{bmatrix} - \begin{bmatrix} 0 & -2 \\ 5 & 3 \end{bmatrix} = \boxed{\begin{bmatrix} 2 & 10 \\ -19 & 3 \end{bmatrix}} \end{aligned}$$

(b) [1 point] Is $2A - B$ a linear combination of A and B ? Justify your answer.

Yes, $2A - B = 2A + (-1)B$.

(c) [1 point] Is $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ a linear combination of A and B ? Justify your answer.

Yes, $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix} = 0A + 0B$.

2. [4 points] Let $A = \begin{bmatrix} 3 & -1 \\ 1 & 2 \end{bmatrix}$ and let $B = \begin{bmatrix} 5 & -2 \\ 1 & 0 \\ 2 & -1 \end{bmatrix}$.

(a) If possible, find AB .

$A \quad B$
 $(2 \times 2) \quad (3 \times 2)$
 not possible

(b) If possible, find BA .

$$\begin{bmatrix} 5 & -2 \\ 1 & 0 \\ 2 & -1 \end{bmatrix} \begin{bmatrix} 3 & -1 \\ 1 & 2 \end{bmatrix} = \boxed{\begin{bmatrix} 13 & -9 \\ 3 & -1 \\ 5 & -4 \end{bmatrix}}$$