

## Exercise Set

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### Exercise 1 (Chris Black)

Let  $A = \begin{bmatrix} 1 & 4 & -3 \\ 6 & 3 & 0 \end{bmatrix}$ ,  $B = \begin{bmatrix} 3 & 2 & 1 \\ -2 & -6 & 5 \end{bmatrix}$  and  $C = \begin{bmatrix} 2 & 4 \\ 4 & 0 \\ -2 & 2 \end{bmatrix}$ . Let  $\alpha = 4$  and  $\beta = \frac{1}{2}$ .

Perform the following calculations: (1)  $A + B$ , (2)  $A + C$ , (3)  $B^T + C$ , (4)  $A + B^T$ , (5)  $\beta C$ , (6)  $4A - 3B$ , (7)  $A^T + \alpha C$ , (8)  $A + B - C^T$ , (9)  $4A + 2B - 5C^T$ .

### Exercise 2 (Robert Beezer)

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

Compute  $AB$ . What about  $BA$ ?

### Exercise 3 (Chris Black)

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

Compute  $AB$ . What about  $BA$ ? Conclude.

### Exercise 4

Let  $A = \begin{bmatrix} 1 & 3 & 2 \\ -1 & 2 & 1 \\ 0 & 1 & 0 \end{bmatrix}$ .  $I_3 = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ . Compute  $AI_3$ . What about  $I_3A$ ? Conclude.

### Exercise 5

Let  $A = \begin{bmatrix} 1 & 3 & 2 \\ -1 & 2 & 1 \\ 0 & 1 & 0 \end{bmatrix}$ .  $D = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 3 \end{bmatrix}$ . Compute  $AD$ . What about  $DA$ ?

### Exercise 6

Verify that  $B$  is the inverse of  $A$ . Is  $A$  the inverse of  $B$ ?

$$A = \begin{bmatrix} 1 & 1 & -1 & 2 \\ -2 & -1 & 2 & -3 \\ 1 & 1 & 0 & 2 \\ -1 & 2 & 0 & 2 \end{bmatrix} \quad B = \begin{bmatrix} 4 & 2 & 0 & -1 \\ 8 & 4 & -1 & -1 \\ -1 & 0 & 1 & 0 \\ -6 & -3 & 1 & 1 \end{bmatrix}$$