

Name: _____

Matrices

Exercise 1: Suppose that A, B, C, D, and E are the following matrices:

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

$$D = \begin{bmatrix} 1 & 5 & 2 \\ -1 & 0 & 1 \\ 3 & 2 & 4 \end{bmatrix}, E = \begin{bmatrix} 6 & 1 & 3 \\ -1 & 1 & 2 \\ 4 & 1 & 3 \end{bmatrix}$$

Determine whether the following matrix expressions are defined, and, for those that are defined, compute the resulting matrix:

- 1) $D + E$
- 2) $D - E$
- 3) $5A$
- 4) $-7C$
- 5) $2B - C$
- 6) $2E - 2D$
- 7) $-3(D + 2E)$
- 8) $A - A$
- 9) $D - 3E$
- 10) $4E - D$

Exercise 2: Suppose that A, B, and C are the following matrices and that $a = 4$ and $b = -7$.

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

Verify computationally that:

- 1) $A + (B + C) = (A + B) + C$
 - 2) $(a + b)C = aC + bC$
 - 3) $a(B - C) = aB - aC$
 - 4) $a(bC) = (ab)C$
- $B - C = -C + B$