1.3

August 31, 2025

A	B	C	D	E
$(4x5)$	$(4x5)$	$(5x2)$	$(4x2)$	$(5x4)$

Determine whether the given matrix expression is defined. For those that are defined give size of the resulting matrix.

1 a)

BA

c)

$AC + D$

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

Compute Matricies if defined

3 e)

$2B - C$

g)

$-3(D + 2E)$

i)

$tr(D)$

4 a)

$2A^T + C$

g)

$2E^T - 3D^T$

5 c)

$(3E)D$

d)

$(AB)C$

g)

$(DA)^T$

i)

$tr(DD^T)$

In each part of Exercises 11–12, find matrices A, $\mathbf{x}$, and $\mathbf{b}$ that express the given linear system as a single matrix equation $A\mathbf{x} = \mathbf{b}$, and write out this matrix equation.

11 b)

$$\begin{aligned} 4x_1 - 3x_3 + x_4 &= 1 \\ 5x_1 + x_2 - 8x_4 &= 3 \\ 2x_1 - 5x_2 + 9x_3 - x_4 &= 0 \\ 3x_2 - x_3 + 7x_4 &= 2 \end{aligned}$$