

SHOW ALL WORK AND JUSTIFY ALL ANSWERS.

1. Given the matrices with the indicated dimensions:

$$A_{3 \times 3} \quad B_{4 \times 3} \quad C_{3 \times 3} \quad D_{3 \times 4}$$

Which of the following are valid matrix operations? There may be more than one.

- ~~(a) $AB + C$~~ ~~$3 \times 3 + 4 \times 3$~~
~~(b) $AD + B$~~ ~~$3 \times 3 + 3 \times 4$~~ ~~$3 \times 4 + 4 \times 3$~~
 (c) $CD + B^T$ $3 \times 3 + 3 \times 4$ $3 \times 4 + 3 \times 4$ ✓
 (d) $DB + C$ $3 \times 4 + 4 \times 3$ $3 \times 3 + 3 \times 3$ ✓
 (e) None of the above

2. Let $A = \begin{bmatrix} -2 & 6 & -4 & 2 \\ 5 & 2 & 7 & -3 \\ n & -1 & 0 & 7 \\ 8 & g & 4 & 6 \\ 7 & 11 & 1 & 1 \\ 8 & 3 & h & 10 \end{bmatrix}$ and $B = \begin{bmatrix} 8 & 1 & 3x \\ 6 & 2y & 10 \\ 3z & 6 & 9 \\ 2 & 5m & 7 \end{bmatrix}$

If $AB = C$, find c_{31} and c_{42} . Show your work.

$$c_{31} = n(8) + (-1)(6) + 0(3z) + 7(2)$$

$$= 8n - 6 + 14 = 8n + 8$$

use Row 3 in A use Col 1 in B

$$c_{42} = 8(1) + g(2y) + 4(6) + 6(5m)$$

$$= 8 + 2gy + 24 + 30m$$

use Row 4 in A use Col 2 in B

$$c_{42} = 2gy + 30m + 32$$