

Mult. of Matrices:

- Dimension

① $A (3 \times 2) (1 \times 3)$

② $(2 \times 3) (3 \times 3)$
 NP
 yes
 $AB = 2 \times 3$

③ $(4 \times 1) (1 \times 2)$
 yes
 4×2

④ $(4 \times 2) (3 \times 4)$
 NP

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① $X: \begin{bmatrix} AB \\ A \end{bmatrix}$

$B = \begin{bmatrix} 3 & 1 & -2 \\ 5 & 2 & 4 \\ -3 & -6 & 7 \end{bmatrix}$ 3×3

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

$AB = \begin{bmatrix} 1(3) + 4(5) + (-2)(-3) & 1(1) + 4(2) + (-2)(-6) \\ 3(3) + (-1)(5) + 0(-3) & 3(1) + 2(-1) + 0(-2) \end{bmatrix}$

$= \begin{bmatrix} 29 & 21 & 0 \\ 4 & 1 & -10 \end{bmatrix}$ 2×3

Calculations shown:
 $1(2) + 4(4) + 2(5)$
 $1(3) + 4(5) + (-2)(-3)$
 $1(1) + 4(2) + (-2)(-6)$
 $3(3) + (-1)(5) + 0(-3)$
 $3(1) + 2(-1) + 0(-2)$
 $3(-2) + (-1)(4) + 0(7)$

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② $[AB]$

$\begin{bmatrix} 5 \\ -2 \\ 3 \\ -1 \end{bmatrix} \begin{bmatrix} 1 & 7 \end{bmatrix}$ 4×1

$= \begin{bmatrix} 5(1) & 5(7) \\ -2(1) & -2(7) \\ 3(1) & 3(7) \\ 1(1) & 1(7) \end{bmatrix}$

$= \begin{bmatrix} 5 & 35 \\ -2 & -14 \\ 3 & 21 \\ 1 & 7 \end{bmatrix}$

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③ $[AB]$

$\begin{bmatrix} 2 & -1 & 2 \\ 1 & 0 & 3 \\ 0 & -4 & 1 \end{bmatrix} \begin{bmatrix} 3 \\ 2 \\ 4 \end{bmatrix}$ 3×3

$= \begin{bmatrix} 2(-2) + 0(1) + 0(1) & 2(-1) + 0(2) + 1(-4) \\ -3(-2) + 1(1) + 2(0) & -3(1) + 1(2) + 2(-4) \\ 0(-2) + 0(1) + 4(0) & 0(-1) + 0(2) + 4(-4) \end{bmatrix}$

$= \begin{bmatrix} -4 & -6 & 5 \\ 7 & -5 & -1 \\ 0 & -16 & -4 \end{bmatrix}$

Calculations shown:
 $2(-2) + 0(1) + 0(1)$
 $2(-1) + 0(2) + 1(-4)$
 $-3(-2) + 1(1) + 2(0)$
 $-3(1) + 1(2) + 2(-4)$
 $0(-2) + 0(1) + 4(0)$
 $0(-1) + 0(2) + 4(-4)$

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④ $[AB]$

$\begin{bmatrix} 1 & -2 \\ 3 & 0 \\ 2 & 4 \end{bmatrix} \begin{bmatrix} 2 & -1 & 4 & 2 \\ 1 & 0 & 5 & -3 \end{bmatrix}$ 3×2 2×4

$= \begin{bmatrix} 0 & -1 & -6 & 8 \\ 8 & -3 & 12 & 6 \\ 2 & -2 & 28 & 6 \end{bmatrix}$ 3×4

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