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① $A = \begin{Bmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \\ 1 & 2 & 3 \end{Bmatrix} \times B = \begin{Bmatrix} 4 & 5 & 6 \\ 6 & 5 & 4 \\ 4 & 6 & 5 \end{Bmatrix}$

$$AB = \begin{Bmatrix} 4+12+12 & 5+10+18 & 6+8+15 \\ 12+12+4 & 15+10+6 & 18+8+5 \\ 4+12+12 & 5+10+18 & 6+8+15 \end{Bmatrix}$$

$$= \begin{Bmatrix} 28 & 33 & 29 \\ 28 & 31 & 31 \\ 28 & 33 & 29 \end{Bmatrix}$$

② $B = \begin{Bmatrix} 4 & 5 & 6 \\ 6 & 5 & 4 \\ 4 & 6 & 5 \end{Bmatrix} \times A = \begin{Bmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \\ 1 & 2 & 3 \end{Bmatrix}$

$$BA = \begin{Bmatrix} 4+15+6 & 8+10+12 & 12+5+18 \\ 6+15+4 & 12+10+8 & 18+5+12 \\ 4+19+5 & 8+12+10 & 12+6+15 \end{Bmatrix}$$

$$= \begin{Bmatrix} 25 & 30 & 35 \\ 25 & 30 & 35 \\ 27 & 30 & 33 \end{Bmatrix}$$

Check A×B

Computational Inputs:

» matrix 1: {{1,2,3},{3,2,1},{1,2,3}}

» matrix 2: {{4,5,6},{6,5,4},{4,6,5}}

Also include: matrix 3

Compute

Input

$$\begin{pmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \\ 1 & 2 & 3 \end{pmatrix} \cdot \begin{pmatrix} 4 & 5 & 6 \\ 6 & 5 & 4 \\ 4 & 6 & 5 \end{pmatrix}$$

Result — Step-by-step solution

$$\begin{pmatrix} 28 & 33 & 29 \\ 28 & 31 & 31 \\ 28 & 33 & 29 \end{pmatrix}$$

Dimensions

3 (rows) × 3 (columns)

Check B×A

Computational Inputs:

» matrix 1: {{4,5,6},{6,5,4},{4,6,5}}

» matrix 2: {{1,2,3},{3,2,1},{1,2,3}}

Also include: matrix 3

Compute

Input

$$\begin{pmatrix} 4 & 5 & 6 \\ 6 & 5 & 4 \\ 4 & 6 & 5 \end{pmatrix} \cdot \begin{pmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \\ 1 & 2 & 3 \end{pmatrix}$$

Result — Step-by-step solution

$$\begin{pmatrix} 25 & 30 & 35 \\ 25 & 30 & 35 \\ 27 & 30 & 33 \end{pmatrix}$$

Dimensions

3 (rows) × 3 (columns)

Code

```
[22] A = [[1,2,3], [3,2,1], [1,2,3]]
     B = [[4,5,6], [6,5,4], [4,6,5]]
```

```
[24] AB = [[0,0,0], [0,0,0], [0,0,0]]

     for k in range(len(A)):
       for i in range(len(A[0])):
         for j in range(len(A)):
           AB[k][i] += A[k][j] * B[j][i]
```

```
[25] BA = [[0,0,0], [0,0,0], [0,0,0]]

     for k in range(len(B)):
       for i in range(len(B[0])):
         for j in range(len(B)):
           BA[k][i] += B[k][j] * A[j][i]
```

```
[26] AB

     [[28, 33, 29], [28, 31, 31], [28, 33, 29]]
```

```
     BA

     [[25, 30, 35], [25, 30, 35], [27, 30, 33]]
```