How do I perform matrix multiplication in Excel? Can you provide some examples?

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Matrix multiplication is a mathematical operation in which two matrices are multiplied to produce a new matrix. This process is commonly used in various fields such as statistics, economics, and engineering. In Excel, matrix multiplication can be performed using the MMULT function, which takes two or more arrays as inputs and returns the product matrix. Some examples of using the MMULT function in Excel include calculating the total cost of a product by multiplying the unit price matrix with the quantity matrix, or finding the correlation between two sets of data by multiplying their respective covariance matrices. Overall, Excel provides a convenient and efficient way to perform matrix multiplication and analyze data in a matrix format.

Perform Matrix Multiplication in Excel (With Examples)

You can use the MMULT function in Excel to perform matrix multiplication.

This function uses the following basic syntax:

MMULT(array1, array2)

where:

array1, array2: The two matrices you'd like to multiply.

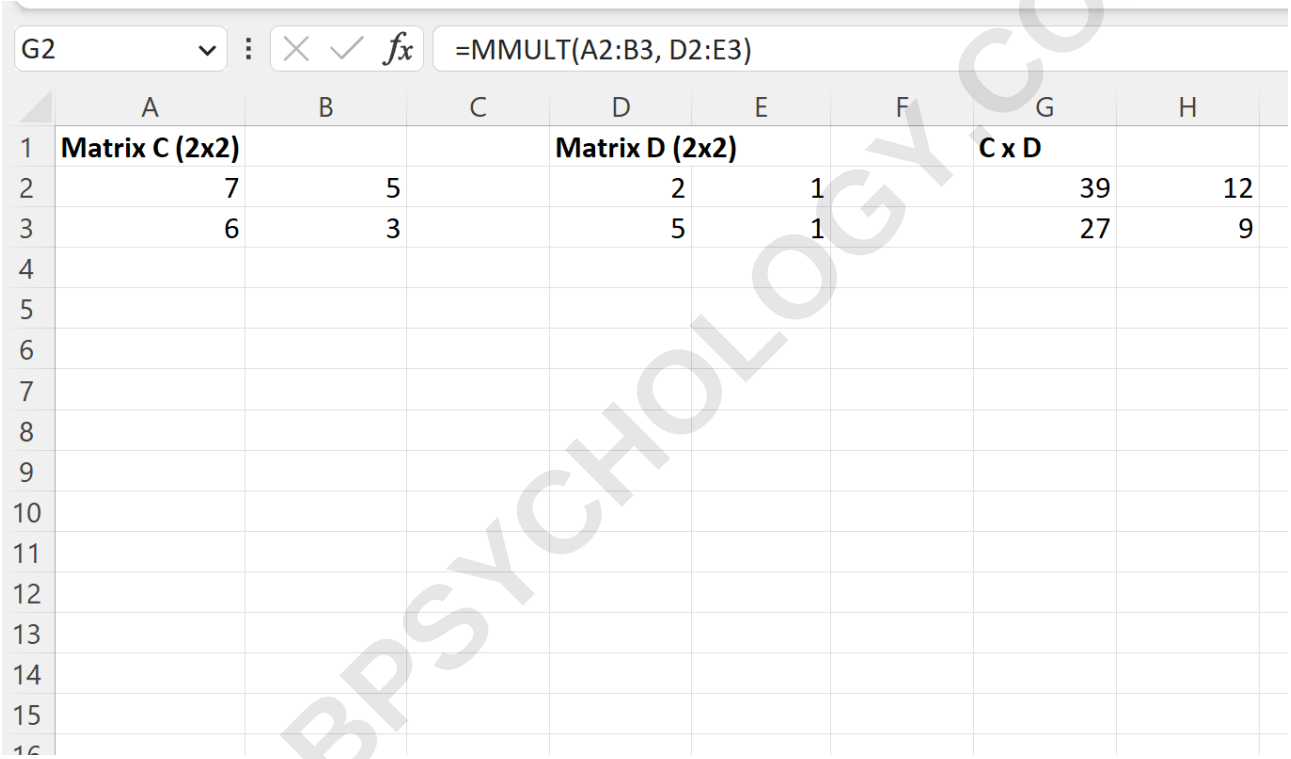
The following examples show how to use the MMULT function to perform the following matrix multiplications in Excel:

(2×2) by (2×2) Matrix Multiplication(2×2) by (2×3) Matrix Multiplication(3×3) by (3×2) Matrix Multiplication

Let's jump in!

Example 1: (2×2) by (2×2) Matrix Multiplication

The following screenshot shows how to multiply a (2×2) matrix with another (2×2) matrix in Excel:



	A	B	C	D	E	F	G	H
1	**Matrix C (2x2)**			**Matrix D (2x2)**			**C x D**	
2	7	5		2	1		39	12
3	6	3		5	1		27	9
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

We typed the following formula in cell G2 to perform this matrix multiplication:

=MMULT(A2:B3, D2:E3)

Here are the actual formulas that Excel used to perform this matrix multiplication:

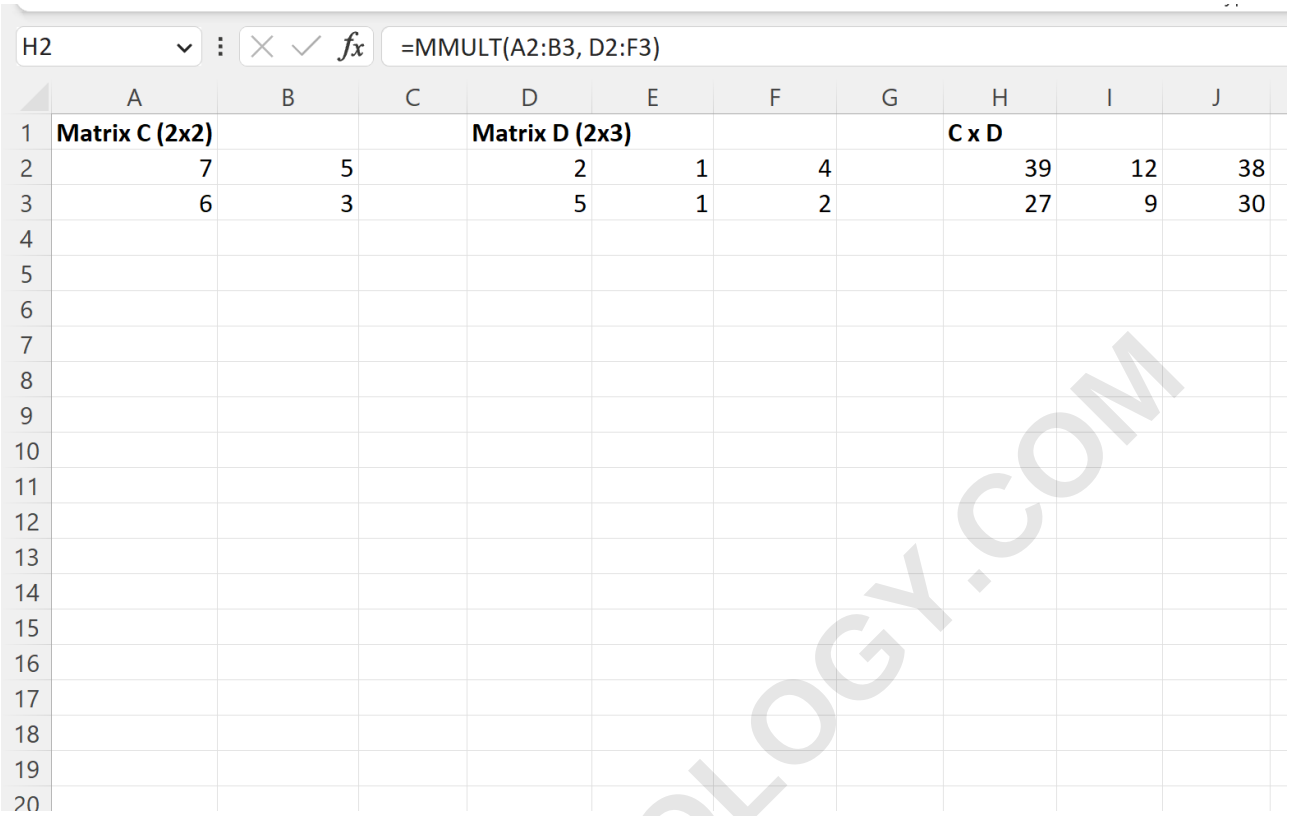
$$C \times D = \begin{bmatrix} 7*2+5*5 & 7*1+5*1 \\ 6*2+3*5 & 6*1+3*1 \end{bmatrix}$$

This results in the following 2×2 matrix:

$$C \times D = \begin{bmatrix} 39 & 12 \\ 27 & 9 \end{bmatrix}$$

Example 2: (2×2) by (2×3) Matrix Multiplication

The following screenshot shows how to multiply a (2×2) matrix with a (2×3) matrix in Excel:



H2 | =MMULT(A2:B3, D2:F3)

	A	B	C	D	E	F	G	H	I	J
1	**Matrix C (2x2)**			**Matrix D (2x3)**				**C x D**		
2	7	5		2	1	4		39	12	38
3	6	3		5	1	2		27	9	30

We typed the following formula in cell H2 to perform this matrix multiplication:

=MMULT(A2:B3, D2:F3)

Here are the actual formulas that Excel used to perform this matrix multiplication:

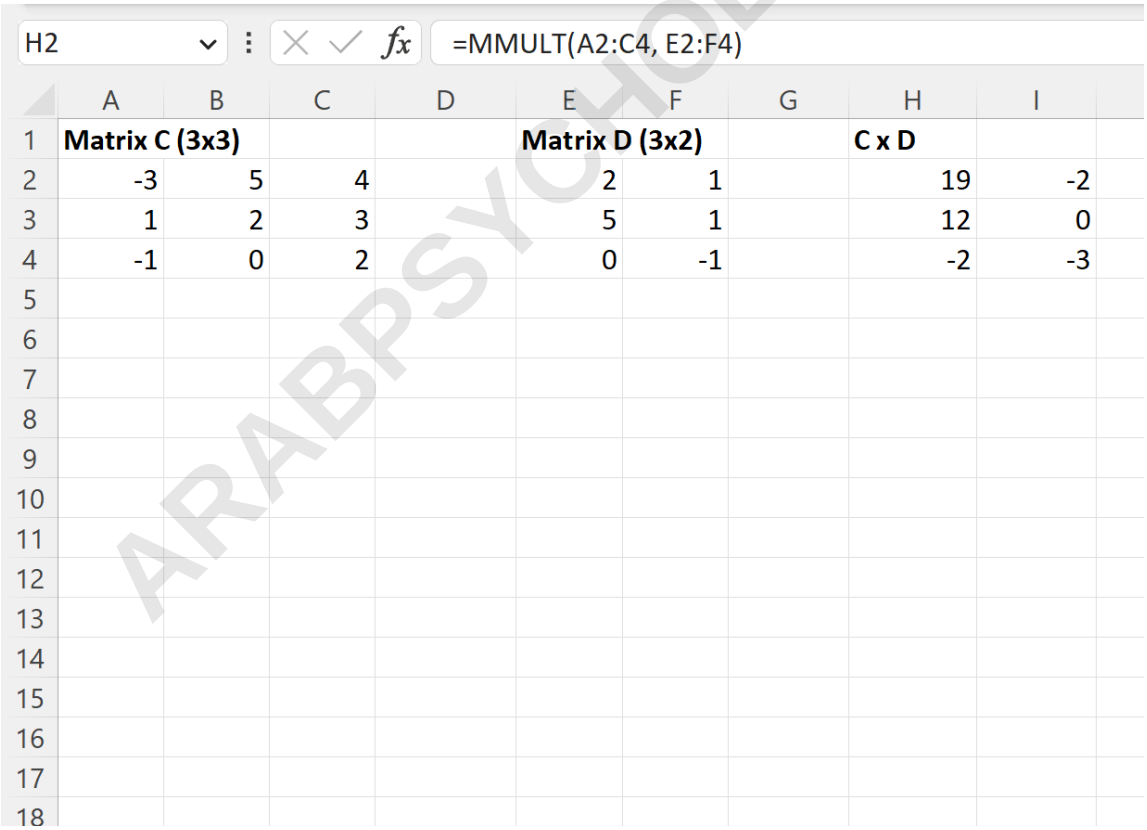
$$\mathbf{C \times D} = \begin{bmatrix} 7*2+5*5 & 7*1+5*1 & 7*4+5*2 \\ 6*2+3*5 & 6*1+3*1 & 6*4+3*2 \end{bmatrix}$$

This results in the following 2×3 matrix:

$$C \times D = \begin{bmatrix} 39 & 12 & 38 \\ 27 & 9 & 30 \end{bmatrix}$$

Example 3: (3×3) by (3×2) Matrix Multiplication

The following screenshot shows how to multiply a (3×3) matrix with a (3×2) matrix in Excel:



	A	B	C	D	E	F	G	H	I
1	**Matrix C (3x3)**				**Matrix D (3x2)**			**C x D**	
2	-3	5	4		2	1		19	-2
3	1	2	3		5	1		12	0
4	-1	0	2		0	-1		-2	-3

We typed the following formula in cell H2 to perform

this matrix multiplication:

=MMULT(A2:C4, E2:F4)

Here are the actual formulas that Excel used to perform this matrix multiplication:

$$C \times D = \begin{bmatrix} -3*2+5*5+4*0 & -3*1+5*1+4*-1 \\ 1*2+2*5+3*0 & 1*1+2*1+3*-1 \\ -1*2+0*5+2*0 & -1*1+0*1+2*-1 \end{bmatrix}$$

This results in the following 3×2 matrix:

$$C \times D = \begin{bmatrix} 19 & -2 \\ 12 & 0 \\ -2 & -3 \end{bmatrix}$$

Note: You can find the complete documentation for the MMULT function in Excel .

The following tutorials explain how to perform other common tasks in Excel: