

WORKS

$A = \begin{bmatrix} 3 & 5 & 7 \\ 4 & 1 & 2 \end{bmatrix}$
 $B = \begin{bmatrix} 2 & 3 & 3 & 8 \\ 9 & 5 & 2 & 0 \\ 0 & 1 & 6 & 7 \end{bmatrix}$
 A B AB
 2×3 $3 \times 4 = 2 \times 4$ matrix
 columns = rows

State the dimensions of the product. $A_{3 \times 4}$ & $B_{4 \times 2}$; **AB**

AB 3×2

doesn't work

$C = \begin{bmatrix} 3 & 5 \\ 4 & 1 \\ 5 & 8 \end{bmatrix}$
 $D = \begin{bmatrix} 2 & 3 & 3 & 8 & 4 \\ 9 & 5 & 2 & 0 & 6 \\ 0 & 1 & 6 & 7 & 2 \end{bmatrix}$
 C D CD is not defined
 3×2 3×5 (2 \neq 3)
 columns \neq rows

If defined, write the product. If undefined, write why it cannot be multiplied. $C_{1 \times 4}$ & $D_{3 \times 4}$; **CD**
undefined $4 \neq 3$

Multiplying Matrices

WORDS	NUMBERS	ALGEBRA
In a matrix product $P = AB$, each element P_{ij} is the sum of the products of consecutive entries in row i in matrix A and column j in matrix B .	$P = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 5 & 6 \\ 7 & 8 \end{bmatrix} =$ $\begin{bmatrix} 1 \cdot 5 + 2 \cdot 7 & 1 \cdot 6 + 2 \cdot 8 \\ 3 \cdot 5 + 4 \cdot 7 & 3 \cdot 6 + 4 \cdot 8 \end{bmatrix}$	$P = \begin{bmatrix} a_1 & a_2 \\ b_1 & b_2 \end{bmatrix} \begin{bmatrix} c_1 & c_2 \\ d_1 & d_2 \end{bmatrix} =$ $\begin{bmatrix} a_1c_1 + a_2d_1 & a_1c_2 + a_2d_2 \\ b_1c_1 + b_2d_1 & b_1c_2 + b_2d_2 \end{bmatrix}$

Multiply WX .

$W = \begin{bmatrix} 3 & -2 \\ 1 & 0 \\ 2 & -1 \end{bmatrix}$
 $X = \begin{bmatrix} 4 & 7 & -2 \\ 5 & 1 & -1 \end{bmatrix}$

$[A][B]$
 3×3

$$= \begin{bmatrix} 2 & 19 & -4 \\ 4 & 7 & -2 \\ 3 & 13 & -3 \end{bmatrix}$$

Matrix $A = 3 \times 2$

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

Matrix $B = 2 \times 3$

$X = \begin{bmatrix} 4 & 7 & -2 \\ 5 & 1 & -1 \end{bmatrix}$

Calculator Steps:

- 1) 2nd X^{-1}
- 2) EDIT
- 3) Dimensions & Entries
- 4) 2nd X^{-1}
- 5) Pick the Matrix you want

$$A = \begin{bmatrix} 4 & -2 \\ -3 & 10 \end{bmatrix}$$

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

$$D = [6 \ -3 \ 8]$$

Which matrices CAN be multiplied?

AZ 2×3

Which matrices CANNOT be multiplied?

DA, AD, DZ, ZD, ZA

A square matrix is any matrix that has the same a number of rows as columns.

Task 4:

- Create an example of a square matrix.
 2×2
 $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$
- Create an example that would not be a square matrix.
 2×3
 $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$

The main diagonal of a square matrix is the diagonal from the upper left corner to the lower right corner.

Task 5:

Create a square matrix of your choice and circle the main diagonal of your matrix.

$$\begin{bmatrix} 1 & 0 & 1 \\ 2 & 3 & 2 \\ 4 & 6 & 4 \end{bmatrix}$$

3×3

The multiplicative identity matrix is any square matrix, named with the letter I, that has all the entries along the main diagonal equal to 1 and all of the other entries equal to 0.

$I_{2 \times 2} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ Because square matrices can be multiplied by themselves any number of times, you can find powers of square matrices.

Task 6:

Create the identity matrix for a 5×5 .

$$I_{5 \times 5} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

$I_{5 \times 5} =$

Still need help with: