

WORKS

$$A = \begin{bmatrix} 3 & 5 & 7 \\ 4 & 1 & 2 \end{bmatrix} \quad B = \begin{bmatrix} 2 & 3 & 3 & 8 \\ 9 & 5 & 2 & 0 \\ 0 & 1 & 6 & 7 \end{bmatrix}$$

A B AB
 2×3 3×4 $= 2 \times 4$ matrix
 columns = rows

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

AB 3×2

doesn't work

$$C = \begin{bmatrix} 3 & 5 \\ 4 & 1 \\ 5 & 8 \end{bmatrix} \quad D = \begin{bmatrix} 2 & 3 & 3 & 8 & 4 \\ 9 & 5 & 2 & 0 & 6 \\ 0 & 1 & 6 & 7 & 2 \end{bmatrix}$$

C D CD is not defined
 3×2 3×5
 columns \neq rows $(2 \neq 3)$

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

undefined $C_{1 \times 4}$ $D_{3 \times 4}$ $4 \neq 3$

Multiplying Matrices

WORDS	NUMBERS	ALGEBRA
<p>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>	$P = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 5 & 6 \\ 7 & 8 \end{bmatrix} =$ $\begin{bmatrix} 1 \cdot 5 + 2 \cdot 7 & 1 \cdot 6 + 2 \cdot 8 \\ 3 \cdot 5 + 4 \cdot 7 & 3 \cdot 6 + 4 \cdot 8 \end{bmatrix}$	$P = \begin{bmatrix} a_1 & a_2 \\ b_1 & b_2 \end{bmatrix} \begin{bmatrix} c_1 & c_2 \\ d_1 & d_2 \end{bmatrix} =$ $\begin{bmatrix} a_1c_1 + a_2d_1 & a_1c_2 + a_2d_2 \\ b_1c_1 + b_2d_1 & b_1c_2 + b_2d_2 \end{bmatrix}$

Multiply WX.

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

$$3(4) + (-2)(5)$$

$$3(7) - 2(1)$$

$$3(-2) - 2(-1)$$

$$1(4) + 0(5)$$

$$1(7) + 0(1)$$

$$1(-2) + 0(-1)$$

$$2(4) + (-1)(5)$$

$$2(7) - 1(1)$$

$$2(-2) - 1(-1)$$

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

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

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

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

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

Which matrices CAN be multiplied?

AZ 2×3

Which matrices CANNOT be multiplied?

DA, AD, DZ, ZD, ZA

Still need help with: