

Name: _____

Multiplying Matrices

1) Let $A = \begin{bmatrix} 0 & 1 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 5 \\ 6 & 7 \end{bmatrix}$. Find AB and BA

2) Obtain the matrix resulting from each of the following operations:

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

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

3) If $U = \begin{pmatrix} 1 & -1 & 4 \end{pmatrix}$, $X = \begin{pmatrix} 0 & 1 & 2 \end{pmatrix}$, $V = \begin{pmatrix} 5 \\ 0 \\ 1 \end{pmatrix}$, $Y = \begin{pmatrix} -1 \\ -1 \\ 2 \end{pmatrix}$

Find: a) $UV + XY$

b) $5UV + 10[X(2V - Y)]$

4) If A is 2×3 , B is 4×3 , C is 3×3 , and D is 3×2 , determine the size of:

- | | |
|---------|-----------|
| 1) AC | 2) BC |
| 3) DA | 4) DAC |
| 5) AD | 6) $BCDA$ |

5) If $A = \begin{pmatrix} -1 & -2 & -2 \\ 1 & 2 & 1 \\ -1 & -1 & 0 \end{pmatrix}$, $B = \begin{pmatrix} -3 & -6 & 2 \\ 2 & 4 & -1 \\ 2 & 3 & 0 \end{pmatrix}$, $C = \begin{pmatrix} -5 & -8 & 0 \\ 3 & 5 & 0 \\ 1 & 2 & 1 \end{pmatrix}$

Show that:

- 1) $A^2 = B^2 = C^2$
- 2) $AB = BA = C$
- 3) $BC = CB = A$
- 4) $AC = CA = B$

6) If $A = \begin{pmatrix} 1 & 0 \\ 1 & 0 \end{pmatrix}$, $B = \begin{pmatrix} 0 & 0 \\ 1 & 1 \end{pmatrix}$, $C = \begin{pmatrix} 2 & 2 \\ 2 & 2 \end{pmatrix}$, $D = \begin{pmatrix} 2 & 3 \\ 4 & 5 \end{pmatrix}$

Find:

- 1) $AB - 2CD$
- 2) A^2
- 3) $(BC)^2$

7) Given that $A = \begin{pmatrix} 1 & 2 & -1 \\ 2 & 0 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 3 & 1 \\ 0 & -1 \\ -2 & 3 \end{pmatrix}$

Find $C = A \times B$

8) Determine whether each matrix product is defined. If so, state the dimensions of the product

1) $A_{7 \times 4} \cdot B_{4 \times 3}$

2) $A_{3 \times 5} \cdot B_{5 \times 8}$

3) $A_{2 \times 1} \cdot B_{1 \times 6}$

4) $A_{3 \times 2} \cdot B_{3 \times 2}$

5) $A_{1 \times 9} \cdot B_{9 \times 1}$

6) $A_{9 \times 1} \cdot B_{1 \times 9}$