

Unit 3: Matrices

Lesson 4: Inverse of Matrices (Part 1)

EQ:

Part I: Defining Inverse Matrices

- Terms to Recall

Square Matrix -

Zero Matrix -

Ex. 1 Multiply.

a) $\begin{bmatrix} 3 & 1 \\ 2 & 4 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} =$

b) $\begin{bmatrix} -4 & 6 & 9 \\ 0 & 2 & 3 \\ -5 & 8 & 7 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} =$

- What do you notice about each product?
- What name can we give a matrix in the form
- What are the characteristics of this matrix?

$$\begin{bmatrix} 1 & 0 & 0 & \dots & 0 \\ 0 & 1 & 0 & \dots & 0 \\ 0 & 0 & 1 & \dots & 0 \\ \dots & \dots & \dots & \dots & \dots \\ 0 & 0 & 0 & \dots & 1 \end{bmatrix} \quad ?$$

❖ When a given _____, A , is multiplied by the _____, I , the matrix A keeps its values.

Therefore _____

Ex. 2 Multiply.

a) Let $A = \begin{bmatrix} -3 & 1 \\ 5 & -2 \end{bmatrix}$ Find AB
 $B = \begin{bmatrix} -2 & -1 \\ -5 & -3 \end{bmatrix}$

b) Let $M = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ Find MN
 $N = \begin{bmatrix} -2 & 1 \\ \frac{3}{2} & \frac{-1}{2} \end{bmatrix}$

- What was the product matrix both times?

The product of _____ is _____. $\frac{-2}{3} \cdot \frac{-3}{2} = 1$

Two matrices are _____ of each other if their product is the

_____ = _____ = _____

Ex. 3 Determine if each pair of matrices are inverses of each other.

a) $A = \begin{bmatrix} 3 & 1 \\ 2 & 1 \end{bmatrix}$
 $B = \begin{bmatrix} 1 & -1 \\ -2 & 3 \end{bmatrix}$

b) $C = \begin{bmatrix} 2 & 5 \\ 3 & 7 \end{bmatrix}$
 $D = \begin{bmatrix} -7 & 5 \\ 3 & -2 \end{bmatrix}$