



Fall 2021 Precalc Lesson 5.1

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Herbert H. Lehman High School
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VOCAB
identity matrix



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Do now... Get out your notebook/binder. Write down the **date and goal**. Be **Sure** to carefully answer the questions below in your notebook.

Can the pairs of matrices be multiplied? For each, explain why or why not in a complete sentence:

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

b. $\begin{bmatrix} 6 & 2 & 0 \\ 3 & -1 & 2 \\ 1 & 4 & 6 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ -3 \end{bmatrix} =$

c. $\begin{bmatrix} -2 & 1 \\ 1 & -3 \\ 1 & 4 \end{bmatrix} \begin{bmatrix} -2 & 3 & 1 & 4 \\ 0 & 1 & -1 & 2 \\ 2 & -1 & 0 & 1 \end{bmatrix}$

class: precalc goal: practice multiplying matrices

1. 3X2 and 2X2
2. No because they have different dimensions
3. $\begin{bmatrix} 6 & -4 \end{bmatrix} \begin{bmatrix} 8 & -2 \end{bmatrix}$



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framing

- **what:** Multiply matrices
- **why:** Matrix multiplication is an important part of matrix algebra. It makes it easier to solve systems of equations (though it will seem weird at first)
- **where to:** More matrix algebra

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B24 rules

Welcome to our new room, B24! Please read the information below:

1. When you come in, please find a seat at a desk (if one's available) or one of the six closest desks to the screen. **Do not sit in the back of the classroom.** We'll conduct the do now and mini lesson from here.
2. When I dismiss you for independent work, find a sit at one of the computer workstations.
3. **No food or drink by the computers.**
4. At the end of the period, you'll be directed to assemble for the exit ticket/debrief. Log out of your computer, and **quietly** return to a seat near the front.

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Today's activity: practice problems

Today we'll be working on Pset #3.

If you choose to work in a group with Dr. O'Brien

Be sure to:

1. Sit at a desk.
2. Ask questions!

If you feel confident enough to do the pset on your own...

Be sure to:

1. Move to a seat near a computer.
2. Follow directions carefully. For each problem show all work or answer in a complete sentence.
3. Feel free to work with a partner!

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Problem (1d)

$$A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}, B = \begin{bmatrix} -3 & 2 & 12 \\ 8 & 0 & -7 \\ -6 & 2 & -10 \end{bmatrix}$$

Identity matrix

An $n \times n$ matrix with 1s on its main diagonal and zeros everywhere else. Denoted by I . Multiplying any compatible matrix A by I results in the original matrix A .

Why Can these matrices be multiplied? Because A has 3 columns and B 3 rows.

What do you notice about the product of A and B? It's identical to B.

Do you think the order of operations matter here (ie does $AB=BA$?) no the output will be B no ,after what.



Problem (2b)

Why is the matrix equation below equivalent to the system of linear equations?

Matrix equation:

$$\begin{bmatrix} 1 & 0 & -3 \\ 3 & 1 & -2 \\ 2 & 2 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -2 \\ 5 \\ 4 \end{bmatrix}$$

System of linear equations:

$$\begin{cases} x - 3z = -2 \\ 3x + y - 2z = 5 \\ 2x + 2y + z = 4 \end{cases}$$

Coefficient matrix A times variable matrix x equals the left hand side of the equation. Matrices are only equal if each element of one matrix is equal to the corresponding element of the other.



Reflection:

be sure to: Answer each question below with a complete sentence. Be prepared to share out!

1. How is matrix multiplication similar to matrix addition? How is it different?
2. Why do you think matrix multiplication is defined the way it is?



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wrapping up!

be sure to: read the directions below!



1. Make sure there isn't any litter near your workstation.
2. If you borrowed headphones, sign them back in.
3. **Make sure you are logged out of your computer!**
4. Remain in your seat until the bell rings.

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