

Secondary I Honors Matrices Unit

Name: _____

Identity and Inverse Matrices

Hour _____

1. Find $\frac{1}{|A|}$ if $A = \begin{bmatrix} 6 & -7 \\ -2 & 4 \end{bmatrix}$

$$\frac{1}{|A|} = \frac{1}{10}$$

2. What is $\frac{1}{|A|}$ used for? To find inverses of a matrix

3. Why do we use inverses of matrices?

Because we cannot divide matrices

4. Write a 4x4 identity matrix.

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

For each matrix state if an inverse exists

5. $\begin{bmatrix} -9 & -9 \\ 2 & 2 \end{bmatrix}$

NO

6. $\begin{bmatrix} -2 & 1 \\ -6 & 1 \end{bmatrix}$

YES

7. $\begin{bmatrix} 4 & -5 \\ -9 & 6 \end{bmatrix}$

YES

8. $\begin{bmatrix} 0 & 0 \\ -6 & 4 \end{bmatrix}$

NO

Find the inverse of each matrix

9. $\begin{bmatrix} 11 & -5 \\ 2 & -1 \end{bmatrix}$

$$\begin{bmatrix} 1 & -5 \\ 2 & -11 \end{bmatrix}$$

10. $\begin{bmatrix} 0 & -2 \\ -1 & -9 \end{bmatrix}$

$$\begin{bmatrix} a & -1 \\ -\frac{1}{2} & 0 \end{bmatrix}$$

11. $\begin{bmatrix} -1 & 7 \\ -1 & 7 \end{bmatrix}$

No Inverse exists

12. $\begin{bmatrix} 1 & -1 \\ -6 & -3 \end{bmatrix}$

$$\begin{bmatrix} \frac{1}{3} & -\frac{1}{a} \\ -\frac{2}{3} & -\frac{1}{a} \end{bmatrix}$$

$$13. \begin{bmatrix} 3 & -2 \\ -4 & 6 \end{bmatrix}$$

$$\begin{bmatrix} \frac{3}{9} & \frac{-2}{9} \\ \frac{2}{5} & \frac{3}{10} \end{bmatrix}$$

$$14. \begin{bmatrix} -6 & 11 \\ -4 & 7 \end{bmatrix}$$

$$\begin{bmatrix} \frac{7}{2} & -\frac{11}{2} \\ 2 & -3 \end{bmatrix}$$

$$15. \begin{bmatrix} -9 & -6 \\ -5 & -4 \end{bmatrix}$$

$$\begin{bmatrix} -\frac{2}{3} & 1 \\ \frac{5}{6} & -\frac{3}{2} \end{bmatrix}$$

$$16. \begin{bmatrix} 5 & -8 \\ 6 & -9 \end{bmatrix}$$

$$\begin{bmatrix} -3 & \frac{8}{3} \\ -2 & \frac{5}{3} \end{bmatrix}$$

$$17. \begin{bmatrix} 2 & -1 & -3 \\ 4 & 1 & 0 \\ 3 & -4 & -2 \end{bmatrix}$$

$$18. \begin{bmatrix} 1 & 3 & 1 \\ 2 & 0 & 1 \\ 3 & 2 & 2 \end{bmatrix}$$

$$\begin{bmatrix} \frac{-2}{45} & \frac{2}{9} & \frac{1}{15} \\ \frac{8}{45} & \frac{1}{9} & \frac{-4}{15} \\ \frac{-19}{45} & \frac{1}{9} & \frac{2}{15} \end{bmatrix}$$

$$\begin{bmatrix} 2 & 4 & -3 \\ 1 & 1 & -1 \\ -4 & -7 & 6 \end{bmatrix}$$

Solve for x.

$$A = \begin{bmatrix} -5 & 5 \\ 1 & -2 \end{bmatrix} \quad B = \begin{bmatrix} 9 & 3 \\ 0 & 3 \end{bmatrix} \quad C = \begin{bmatrix} 1 & 1 \\ 2 & 1 \end{bmatrix}$$

$$19. AX = B$$

$$X = A^{-1} \cdot B$$

$$20. CX = A$$

$$X = C^{-1} \cdot A$$

$$\begin{bmatrix} -\frac{2}{9} & -1 \\ -\frac{1}{9} & -1 \end{bmatrix}^{-1} \cdot \begin{bmatrix} 9 & 3 \\ 0 & 3 \end{bmatrix} = \begin{bmatrix} -\frac{18}{5} & -\frac{21}{5} \\ -\frac{9}{5} & -\frac{18}{5} \end{bmatrix}$$

$$= \begin{bmatrix} -\frac{18}{5} & -\frac{21}{5} \\ \frac{9}{5} & -\frac{18}{5} \end{bmatrix} = X$$

$$\begin{bmatrix} -1 & 1 \\ 2 & -1 \end{bmatrix}^{-1} \cdot \begin{bmatrix} -5 & 5 \\ 1 & -2 \end{bmatrix} = X$$

$$X = \begin{bmatrix} 6 & -7 \\ -11 & 12 \end{bmatrix}$$