MORE PRACTICE: Identity and Inverse Matrices

Find the inverse of the matrix (if it exists).

1. $\begin{bmatrix} 1 & 1 \\ -3 & 7 \end{bmatrix}$ 2. $\begin{bmatrix} -2 & 3 \\ 5 & 0 \end{bmatrix}$ 3. $\begin{bmatrix} 3 & 9 \\ 1 & 3 \end{bmatrix}$ 4. $\begin{bmatrix} 4 & 2 \\ -2 & 1 \\ -3 & 0 \end{bmatrix}$

$|A| = 7-(-3) = 10$ $|A| = 0-15 = -15$ $|A| = 9-9 = 0$ NOT SQUARE

$A^{-1} = \frac{1}{10}\begin{bmatrix} 7 & -1 \\ 3 & 1 \end{bmatrix}$ $A^{-1} = \frac{-1}{15}\begin{bmatrix} 0 & -3 \\ -5 & -2 \end{bmatrix}$ NO INVERSE SINGULAR NO INVERSE

5. For the matrices $A = \begin{bmatrix} 2 & 0 \\ -4 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} \frac{1}{2} & 0 \\ 2 & 1 \end{bmatrix}$, PROVE that they are inverses of each other.

$$A \cdot B = \begin{bmatrix} 2 & 0 \\ -4 & 1 \end{bmatrix}\begin{bmatrix} \frac{1}{2} & 0 \\ 2 & 1 \end{bmatrix} = \begin{bmatrix} 1+0 & 0+0 \\ -2+2 & 0+1 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$B \cdot A = \begin{bmatrix} \frac{1}{2} & 0 \\ 2 & 1 \end{bmatrix}\begin{bmatrix} 2 & 0 \\ -4 & 1 \end{bmatrix} = \begin{bmatrix} 1+0 & 0+0 \\ 4-4 & 0+1 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$