Identity and Inverse Matrices

n x n identity matrix - the matrix that has 1's on the main diagonal and 0's elsewhere.

Ex. $I_{2x2} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ $I_{3x3} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

If A is any nxn matrix and I is the nxn identity matrix, then IA=A amd AI=A.

If B is any mxn matrix, then $I_{mxm}B=B$ and $BI_{nxn} = B$.

The Inverse of a 2x2 Matrix:

If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, then $A^{-1} = \frac{1}{|A|} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$, provided $|A| \neq 0$.

Ex 1. Find each inverse:

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

b. $B = \begin{bmatrix} 6 & 1 \\ -8 & -2 \end{bmatrix}$