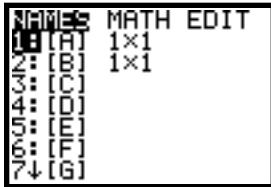


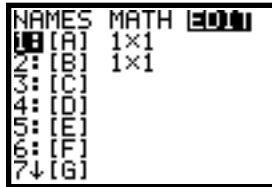
## Matrices on the TI-83

To enter the matrix  $\begin{bmatrix} 4 & 5 \\ -2 & 10 \end{bmatrix}$  into MATRIX A, and the matrix  $\begin{bmatrix} 5 \\ 4 \end{bmatrix}$  into MATRIX B:

1. Push the button labeled **MATRIX**



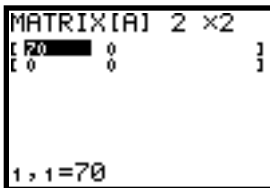
2. Arrow over to **EDIT**;



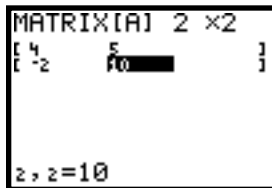
push **ENTER**.



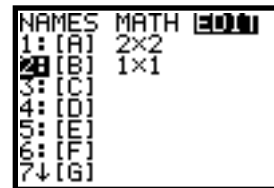
3. If necessary, change matrix dimensions to 2x2.



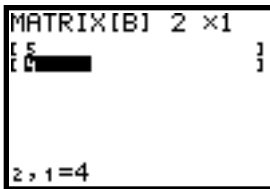
4. Enter matrix elements.



5. Push **2nd QUIT**, then **MATRIX**, over to **EDIT** and down to **B**. Push **ENTER**

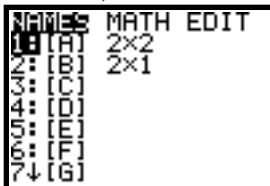


6. If necessary, change matrix dimensions to 2x1; enter elements. Push **2nd QUIT** to return to home screen.

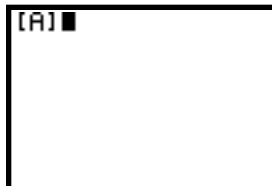


To multiply the inverse of MATRIX A by Matrix B:

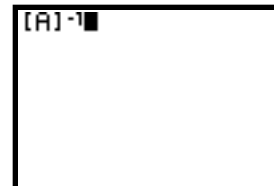
1. Push **MATRIX**; with **NAMES** highlighted, select **A**, and hit **ENTER**



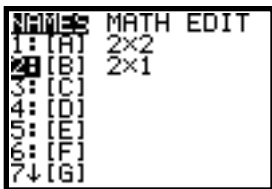
2. **[A]** will appear on the home screen.



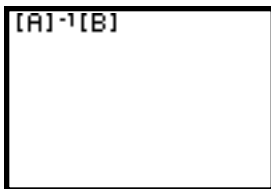
3. Push  $x^{-1}$



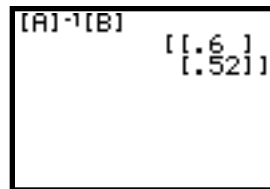
4. Push **MATRIX**,  
select **B**, and hit **ENTER**.



5. Home screen:



7. Push **ENTER**.



The last screen shows you that if you multiply the inverse of Matrix A by Matrix B, you get the matrix  $\begin{bmatrix} 0.6 \\ 0.52 \end{bmatrix}$  for your product.

If we have the following system of equations:  $4x + 5y = 5$   
 $-2x + 10y = 4$ , it can be represented by the matrix

$$\text{equation } \begin{bmatrix} 4 & 5 \\ -2 & 10 \end{bmatrix} * \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 5 \\ 4 \end{bmatrix}$$

If we multiply both sides (on the left) by the inverse of matrix A, we have:

$$\begin{bmatrix} 4 & 5 \\ -2 & 10 \end{bmatrix}^{-1} * \begin{bmatrix} 4 & 5 \\ -2 & 10 \end{bmatrix} * \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 4 & 5 \\ -2 & 10 \end{bmatrix}^{-1} * \begin{bmatrix} 5 \\ 4 \end{bmatrix}$$

The product of any matrix and its inverse is the identity matrix, so now we would have

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} * \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 4 & 5 \\ -2 & 10 \end{bmatrix}^{-1} * \begin{bmatrix} 5 \\ 4 \end{bmatrix}$$

which is the same as

$$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 4 & 5 \\ -2 & 10 \end{bmatrix}^{-1} * \begin{bmatrix} 5 \\ 4 \end{bmatrix}$$

That means that the solution to a system of equations can be found by multiplying the inverse of the matrix of the coefficients by the matrix of the constants.

Since the inverse can be figured by your graphing calculator, all you have to do is enter the coefficients into one matrix and the constants into another matrix, and multiply the inverse of the first by the second!