

Reduced Row Echelon Form on a TI Graphing Calculator

In this example, we want to utilize your graphing calculator to solve the system

$$4x - 2y - 5z = 11$$

$$x + y + z = 2$$

$$-2x + 3y - 2z = -14$$

Start by converting this system to an augmented matrix,

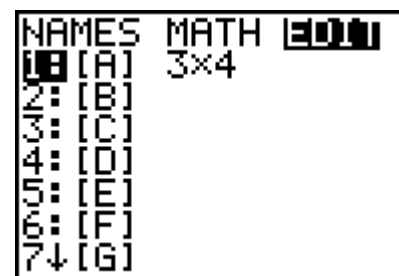
$$\left[\begin{array}{ccc|c} 4 & -2 & -5 & 11 \\ 1 & 1 & 1 & 2 \\ -2 & 3 & -2 & -14 \end{array} \right]$$

Your calculator can put a matrix into reduced row echelon form using the rref command.

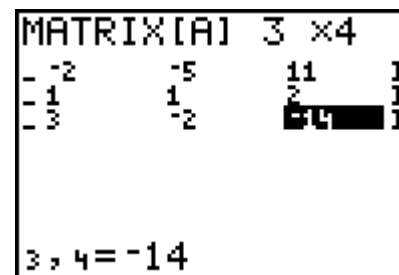
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Enter the Matrix

1. Press $\boxed{2\text{nd}} \boxed{x^{-1}}$ to access the MATRIX menu.
2. Use $\boxed{\blacktriangleright}$ to go to EDIT.
3. Press $\boxed{1}$ or move the cursor to 1: [A] and press $\boxed{\text{ENTER}}$. Note that if you used this matrix name before, it will have a dimension next to it.



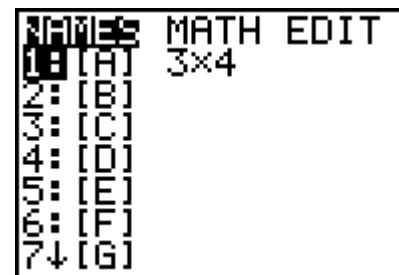
4. Enter the dimension of matrix A as 3 x 4.
5. Enter the values into the matrix as shown. Press $\boxed{\text{ENTER}}$ after each entry. Note that the position is given at the bottom of the screen as 3, 1=1 etc. This matrix will need two screens. Use $\boxed{\blacktriangleright}$ to see last column and to enter.
6. Press $\boxed{2\text{nd}} \boxed{\text{MODE}}$ to QUIT and return to the home screen.



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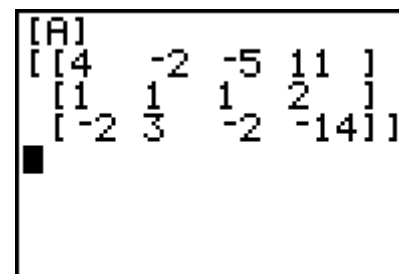
View the Matrix on the Home Screen

7. Press $\boxed{2\text{nd}}$ $\boxed{x^{-1}}$ to access the MATRIX menu. You are in the NAMES menu.



8. Move the cursor to 1 : [A] and press $\boxed{\text{ENTER}}$. This will put [A] on the Home screen.

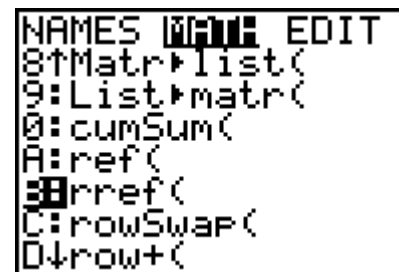
9. Press $\boxed{\text{ENTER}}$ to view the matrix on the home screen. You may need to use the right arrow to scroll through the entire matrix.



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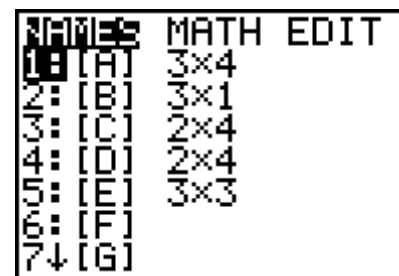
Find the reduced row-echelon form of the matrix

10. Press $\boxed{2\text{nd}} \boxed{x^{-1}}$ to access the MATRIX menu.
11. Use $\boxed{\blacktriangleright}$ to go to MATH.
12. Use $\boxed{\blacktriangledown}$ to select B: $\text{rref}(\)$. Press $\boxed{\text{ENTER}}$. This puts $\text{rref}(\)$ on the home screen.



```
NAMES MATH EDIT
8:Matr list(
9:List matr(
0:cumSum(
A:ref(
B:rref(
C:rowSwap(
D:row+(
```

13. To enter the name of the matrix you wish to use in the parentheses, press $\boxed{2\text{nd}} \boxed{x^{-1}}$ to access the MATRIX menu.
14. Press $\boxed{1}$ or highlight 1: [A] and press $\boxed{\text{ENTER}}$. This will paste the name of the matrix we entered above, [A], into the $\text{rref}(\)$ command on the home screen. If you enter the name of the matrix any other way, you will get an ERR: DATA TYPE message.



```
NAMES MATH EDIT
1: [A] 3x4
2: [B] 3x1
3: [C] 2x4
4: [D] 2x4
5: [E] 3x3
6: [F]
7: [G]
```

Reduced Row Echelon Form on a TI Graphing Calculator

15. Press **ENTER** to calculate the reduced row echelon form of the augmented matrix.

```
rref([A])  
[[1 0 0 3 1  
 [0 1 0 -2]  
 [0 0 1 1 1]]
```