

Utilize your graphing calculator to solve the system

$$\begin{aligned}x + y + z &= 150,000 \\0.10x + 0.08y + 0.07z &= 12,900 \\x - y - z &= -20,000\end{aligned}$$

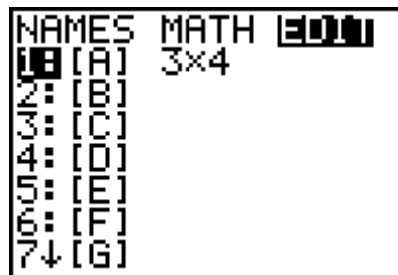
Start by converting this system to an augmented matrix,

$$\left[ \begin{array}{ccc|c} 1 & 1 & 1 & 150000 \\ 0.10 & 0.08 & 0.07 & 12900 \\ 1 & -1 & -1 & -20000 \end{array} \right]$$

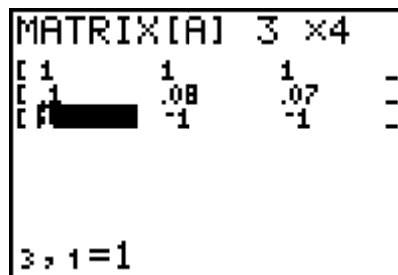
Your calculator can put a matrix into reduced row echelon form using the rref command.

### Enter the Matrix

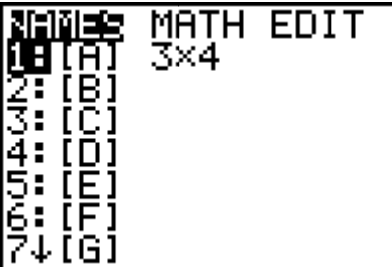
1. Press  $\boxed{2nd} \boxed{x^{-1}}$  to access the MATRIX menu.
2. Use  $\boxed{\blacktriangleright}$  to go to EDIT.
3. Press  $\boxed{1}$  or move the cursor to 1: [A] and press  $\boxed{ENTER}$ . Note that if you used this matrix name before, it will have a dimension next to it.

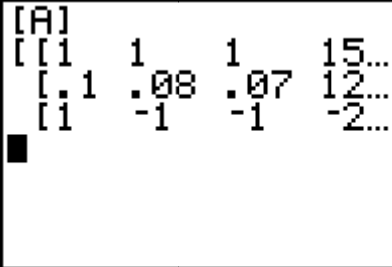
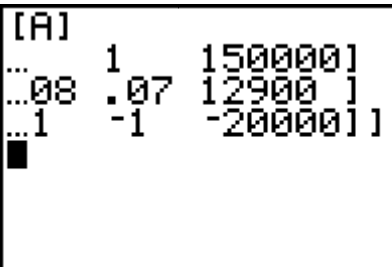


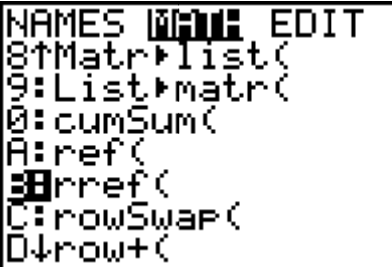
4. Enter the dimension of matrix A as 3 x 4.
5. Enter the values into the matrix as shown. Press  $\boxed{ENTER}$  after each entry. Note that the position is given at the bottom of the screen as 3, 1=1 etc. This matrix will need two screens. Use  $\boxed{\blacktriangleright}$  to see last column and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



	
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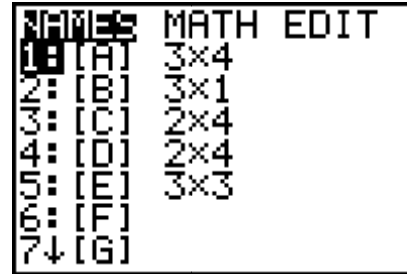
<p><b>View the Matrix on the Home Screen</b></p> <p>7. Press <math>\text{2nd}</math> <math>\text{x}^{-1}</math> to access the MATRIX menu. You are in the NAMES menu.</p>	
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<p>8. Move the cursor to 1: [A] and press <math>\text{ENTER}</math>. This will put [A] on the Home screen.</p> <p>9. Press <math>\text{ENTER}</math> to view the matrix on the home screen. Use the right arrow to scroll through the entire matrix.</p>	 
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<p><b>Find the reduced row-echelon form of the matrix, rref ([A])</b></p> <p>10. Press <math>\text{2nd}</math> <math>\text{x}^{-1}</math> to access the MATRIX menu.</p> <p>11. Use <math>\text{MATH}</math> to go to MATH.</p> <p>12. Use <math>\text{MATH}</math> to select B: rref( . Press <math>\text{ENTER}</math>. This puts rref( on the home screen.</p>	
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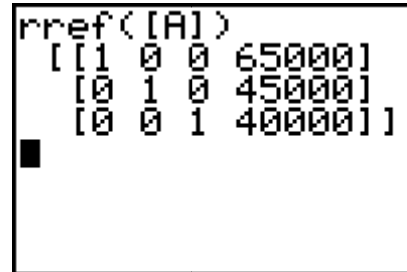
13. To enter the name of the matrix you wish to use in the parentheses, press  $\boxed{2nd}\boxed{x^{-1}}$  to access the MATRIX menu.

14. Press  $\boxed{1}$  or highlight 1: [A] and press  $\boxed{ENTER}$ . This will paste the name of the matrix we entered above, [A], into the  $rref$  ( command on the home screen. If you enter the name of the matrix any other way, you will get an ERR: DATA TYPE message.



TI-84 Plus MATH EDIT  
1: [A] 3x4  
2: [B] 3x1  
3: [C] 2x4  
4: [D] 2x4  
5: [E] 3x3  
6: [F]  
7↓ [G]

15. Press  $\boxed{ENTER}$  to calculate the reduced row echelon form of the augmented matrix.



$rref([A])$   
[[1 0 0 65000]  
[0 1 0 45000]  
[0 0 1 40000]]

Based on this reduced row echelon form, the solution to the system is

$$x = 65,000 \quad y = 45,000 \quad z = 40,000$$