31. Using a TI-83 to solve a system of linear equations in a matrix form with `rref()`:

Matrices of linear equations expect the coefficients in front of variable to be put in the same order in each row, and the numerical solution (= to) as the last value. So for the 2\textsuperscript{nd} set of equations in #27 (2x + 3y = 8 and 4x – y = 2), the matrix to enter would look like

\[
\begin{bmatrix}
2 & 3 & 8 \\
4 & -1 & 2
\end{bmatrix}
\]

1. Press `2nd [MATRIX]`. Press \(\leftarrow \rightarrow\) to display the MATRIX EDIT menu. Press 1 to select 1:\[A],

\[
\begin{bmatrix}
0 & 0 & 0 \\
0 & 0 & 0
\end{bmatrix}
\]

1 , 1=0

2. Press 2 ENTER 3 ENTER to define a 2 x 3 matrix. The rectangular cursor indicates the current element. Ellipses (…) indicate additional columns beyond the screen.

3. Press 2 ENTER to enter the first element. The rectangular cursor moves to the second column of the first row.

4. Press 3 ENTER 8 ENTER to complete the first row for 2x + 3y = 8

5. Press 4 ENTER -1 ENTER 2 ENTER to enter the second row for 4x – y = 2

6. Press `2nd [QUIT]` to return to the home screen. If necessary, press `CLEAR` to clear the home screen. Press `2nd [MATRIX] \leftarrow` to display the MATRIX MATH menu. Press \(\uparrow\) to wrap to the end of the menu. Select B:rref to copy `rref` to the home screen.

7. Press `2nd [MATRIX] 1` to select 1:\[A] from the MATRIX NAMES menu. Press \([\phantom{1}]\) ENTER. The reduced row-echelon form of the matrix is displayed and stored in `Ans`.

\[
\begin{bmatrix}
1 & 0 & 1 \\
0 & 1 & 2
\end{bmatrix}
\]

Therefore

\[
x = 1
\]

\[
y = 2
\]