

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 2nd 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 **▶▶** to display the MATRIX EDIT menu. Press **1** to select **1:[A]**,

```
MATRIX[A]  2 x3
[0  0  0  ]
[0  0  0  ]

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.

```
MATRIX[A]  2 x3
[2  0  0  ]
[0  0  0  ]

1 , 2=0
```

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] **▶** to display the MATRIX MATH menu. Press **▲** to wrap to the end of the menu. Select **B:rref** to copy **rref** to the home screen.

```
MATRIX[A]  2 x3
[2  3  8  ]
[4  -1  2  ]

2 , 3=2
```

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

$$1x + 0y = 1 \quad \text{therefore} \quad x = 1$$

$$0x + 1y = 2 \quad \text{therefore} \quad y = 2$$

```
rref(
```

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