TI 83/84 Matrices
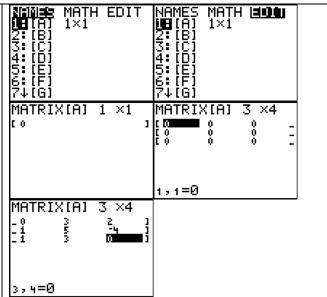
We will be using the following matrix for parts A-C

$$\begin{bmatrix} 1 & 0 & 3 & | & 2 \\ -1 & 1 & 5 & | & -4 \\ 0 & 1 & 3 & | & 0 \end{bmatrix}$$

A. Entering a Matrix into the Calculator

1. Press 2nd then x^{-1} (Matrix)
2. Use the right arrow and go over to Edit
3. Press enter
4. Type in the dimensions (press enter after each number)
5. Type in the numbers in the matrix and press enter after each number. The cursor will automatically go to the next spot (it moves left to right).
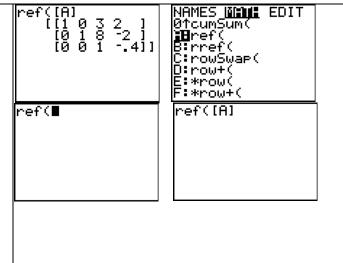
To exit press 2nd then mode

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

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

```
MATRIX[A]  1 ×1
[ 0                ]
```

```
MATRIX[A]  3 ×4
[ 0    0    0    ]
[ 0    0    0    ]
[ 0    0    0    ]

1,1=0
```

```
MATRIX[A]  3 ×4
[ 0    3    2    ]
[ 1    5    -4   ]
[ 1    3    0    ]

3,4=0
```

B. Getting the Matrix in Row-Echelon Form

1. Enter the matrix into your calculator
2. Press 2nd Mode to go back to the home screen
3. Press 2nd x^{-1}
4. Go over to math
5. Scroll down to ref(and press enter
6. Press 2nd x^{-1}
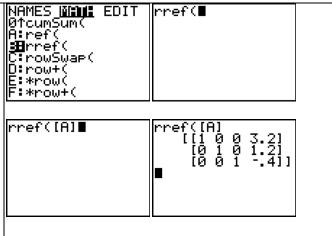7. Select the matrix that you want to be in row-echelon form and press enter
8. Press enter

The matrix given is in row-echelon form.

```
ref([A]
   [[1 0 3 2 ]
    [0 1 8 -2 ]
    [0 0 1 -.4]]



ref(
```

```
NAMES MATH EDIT
0↑cumSum(
A:ref(
B:rref(
C:rowSwap(
D:row+(
E:*row(
F:*row+(

ref([A]
```
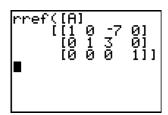
C. Getting the Matrix in Reduced Row-Echelon Form

1. Follow steps 1-4 from part B: getting the matrix in row-echelon form
2. Scroll down to rref(and press enter
3. Press 2nd x^{-1}
4. Select the matrix that you want to be in reduced row-echelon form and press enter
5. Press enter

   The matrix given is in reduced row-echelon form.

```
NAMES MATH EDIT
0↑cumSum(
A:ref(
B:rref(
C:rowSwap(
D:row+(
E:*row(
F:*row+(
```

```
rref(■
```

```
rref([A]■
```

```
rref([A]
     [[1 0 0 3.2]
      [0 1 0 1.2]
      [0 0 1 -.4]]
■
```

- If the you are using a matrix to solve a system of equations, where the last row is all zeros except for the last column which has a 1 (see example below), then there are no solutions.
- If you get a row that is all zeros, then there are infinitely many solutions.

```
rref([A]
     [[1 0 -7 0]
      [0 1 3  0]
      [0 0 0  1]]
■
```

D. Finding the determinant of a matrix

Using example $\begin{bmatrix} 4 & 3 \\ 5 & 4 \end{bmatrix}$

1. Enter the matrix into your calculator
2. Press 2nd Mode to go back to the home screen
3. Press 2nd x^{-1}
4. Go over to math
5. Select det(and press enter
6. Press 2nd x^{-1}
7. Select the matrix whose determinant you want to know
8. Press enter

   The determinant is given

```
det(■
```

```
det([A]
```

```
det([A]
              1
■
```