1.14 Matrices
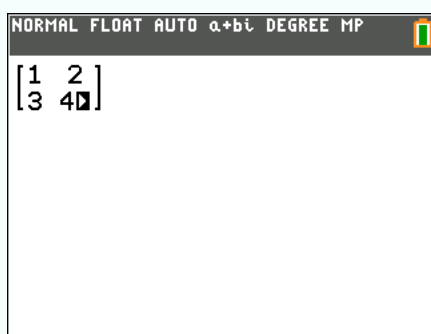
1.14.1 Enter a matrix

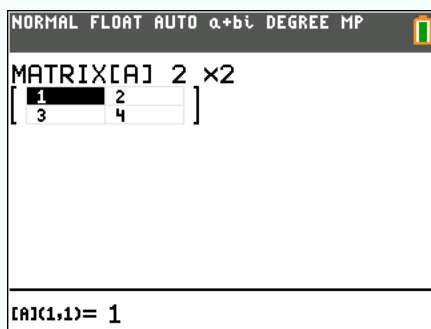Consider the matrix

$$\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$$

There are two ways to enter a matrix in your calculator.

1st way: If you just want to use the matrix for one computation, press `alpha` , `zoom` , choose the proper dimensions (here, **Row=2** and **Col=2**), and press **OK**. You can then fill the matrix as follows:

use ◁◇▷ to navigate through cells

2nd way: If you want to store the matrix in the calculator, press `2nd` , `x⁻¹` , **EDIT**. Choose an available slot (here: **[A]**), and input the following:

use `enter` to go to next cell

⚠ We will use the second way throughout the section, but first method also works

1.14.2 Call a matrix

Consider the matrix

$$A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$$

Once you entered it (see 1.14.1), you can display it in the main screen by pressing `2nd` , `x⁻¹` (matrix D) , choosing it (here: `[A]`) and pressing `enter` (entry solve) .
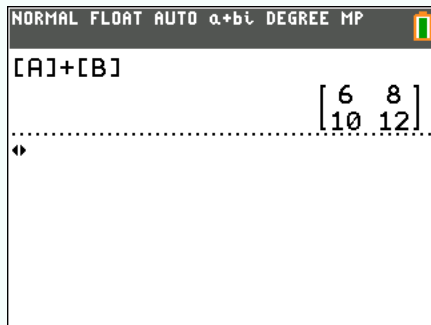
1.14.3 Operations on matrices

Consider the two matrices

$$A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix} \qquad\qquad B = \begin{pmatrix} 5 & 6 \\ 7 & 8 \end{pmatrix}$$

Suppose you want to add A and B.

① Enter A and B (see 1.14.1), call A (see 1.14.2), press `+` (mem ") and call B (see 1.14.2). Press `enter` (entry solve) . The following should be displayed:

```
NORMAL FLOAT AUTO a+bi DEGREE MP
[A]+[B]
                          [ 6   8]
                          [10  12]
◄►
```

If you want to subtract or multiply the matrices, follow the same procedure and change the operation (`−` for subtraction, and `×` for multiplication).

To multiply a matrix by a scalar, use also `×` .

1.14.4 Identity and zero matrix

To quickly enter the identity matrix on the calculator, say in dimension 5, press `2nd` , `x⁻¹` (matrix D) , `MATH`, `identity(`, and input the dimension in the parenthesis (here: 5).

To enter the zero matrix on the calculator, see 1.14.1 (the default entries of the cell are 0's).

1.14.5   Compute the determinant of a matrix

Suppose you want to know the determinant of the following matrix:

$$A = \begin{pmatrix} 1 & 1 & 0 \\ 1 & 2 & 0 \\ 1 & 1 & 3 \end{pmatrix}$$

① Enter the matrix (see 1.14.1)

② Press [2nd] , [x⁻¹] , MATH and select det(

③ Call the matrix (see 1.14.2)

④ Press [enter]

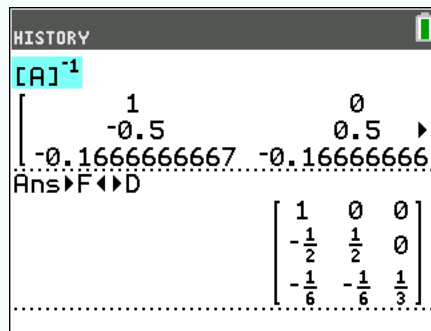The result should be 3.

1.14.6   Inverse of a matrix

Suppose you want to know the inverse of the following matrix:

$$A = \begin{pmatrix} 1 & 0 & 0 \\ 1 & 2 & 0 \\ 1 & 1 & 3 \end{pmatrix}$$

① Enter the matrix (see 1.14.1)

② Call the matrix (see 1.14.2)

③ Press [x⁻¹]

④ Press [enter]

The following result should be displayed:

press **alpha** (A-lock) , **y=** (stat plot f1) and ▶F◀▶D

to display it in fractions