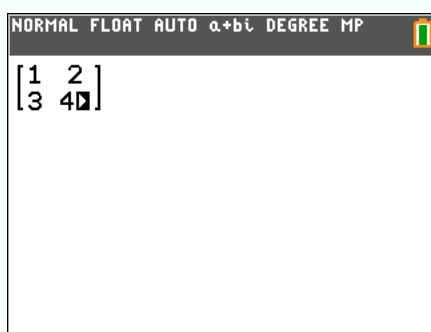## 1.14 Matrices

1.14.1 Enter a matrix

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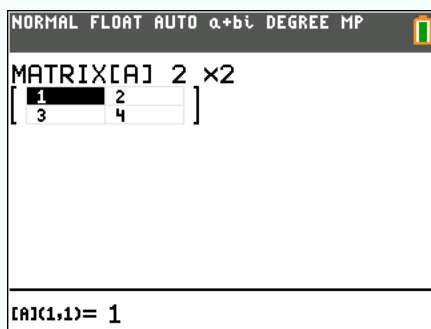
$$\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$$

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) .
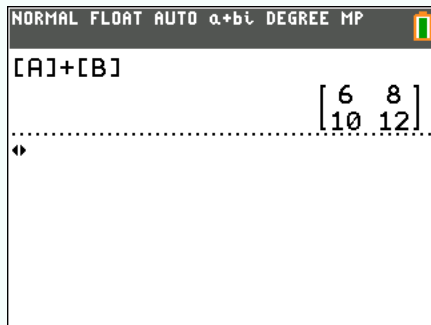
1.14.3   Operations on matrices

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] (matrix D), MATH and select det(

③ Call the matrix (see 1.14.2)

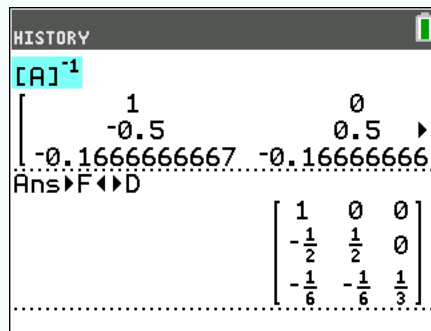④ Press [enter] (entry solve)

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] (matrix D)

④ Press [enter] (entry solve)

The following result should be displayed:

press [alpha], [y=] and ►F◄►D

to display it in fractions