

# Access to Mathematica and first experiments

## 1 Get access

If you have not had access to Mathematica yet, use one to the following methods.

**Method 1:** (no installation needed) Mathematica can be accessed without download, and from any computer, using OSU's Citrix receiver. The process is outlined as below:

- Search apps.oregonstate.edu in your web browser
- Login using your ONID username and password
- In small letters below the textbox, there should be the option to use the lite version if you do not wish to download Citrix to your computer.
- Go to the 'Apps' tab
- Find and select Mathematica

**Warning:** *for some reason the Copy-Paste function does not work in this online environment. You cannot save a plotted picture as a file. But you can take a screenshot, save it as an image file, and crop out the plot using a simple image editor.*

**Method 2:** (installation needed) To install Mathematica on your computer,

- Request a Mathematica activation code by sending an email to OSU.Software@oregonstate.edu with the subject line "Mathematica Code Request". You can just say that you need it for Math 483/583.
- The university will send you a code of the form \*\*\*\*-\*\*\*\*-\*\*\*\*\*
- Go to <https://www.wolfram.com/mathematica/trial/> to download a trial version of Mathematica 11.3.0. You will need to sign in with your Wolfram account which you created earlier. If you haven't created a Wolfram account, make sure you create it using your OSU's email address.
- Then install Mathematica on your computer. At the same time, you will get an email from Wolfram with the subject line "Your Mathematica trial has started" with an activation code for your trial version (different from, but of the same format as the code OSU provides in Step 2). After the installation finishes, enter this code, which will activate your trial version.
- Close Mathematica, and open it again. On the top right of the application window, you will see a line "Enter activation code" next to "Buy". Click on that, and enter the code OSU provides. Close Mathematica, and open it again. The message "Trial version" should disappear.

## 2 First experiments

(1) Type  $35/6$ , then Shift+Enter.

(2) Type  $N[35/6]$  (note: square brackets), then Shift+Enter.

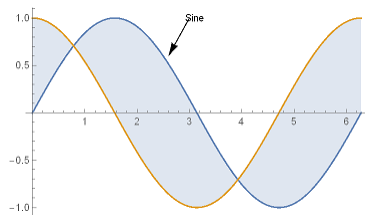
- (3) Type `Sqrt[2]` (note: capitalized S). Shift+Enter.
- (4) Type `N[%]`. Shift+Enter.
- (5) Type `Sin[Pi]` (note: capitalize S and P). Shift Enter.
- (6) Type `34^100;` (note: semicolon). Shift Enter.
- (7) Type `34^100` (note: without semicolon). Shift Enter.

At this point, you may have noticed that the function `N` is to evaluate an expression in decimal-point form. Each function's name is capitalized and used with square brackets (not parenthesis as we normally do on paper). The semicolon is to hold the output. One uses it when output is too long or not of interest. Next, try the following:

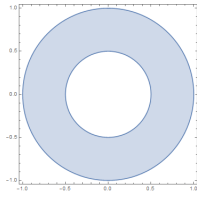
- (8) `Exp[1]`. Shift+Enter.
- (9) `Log[2]`. Shift+Enter.
- (10) `f[x_] := Sin[x]+Cos[x]` (note: the dash after `x`). Shift+Enter.
- (11) `f[Pi]+f[Pi/4]`. Shift+Enter.
- (12) `Clear[f]`. Shift+Enter.
- (13) `f[Pi]+f[Pi/4]`. Shift+Enter.

The natural logarithm function is named `Log` in Mathematica (not `ln`). `Exp` is the exponential function. The third command is to define a function. The dash is required in order to tell Mathematica that we are defining the function  $f$ . The function `Clear` is to remove a defined variable from the memory. Next, try the following:

- (14) `Plot[Sin[x], {x,0,2*Pi}]`. Shift+Enter.
- (15) `Plot[Sin[x], {x,0,2*Pi}, Filling->Axis]`. Shift+Enter. Note: the arrow is typed as `->`.
- (16) `f[x_] := Sin[x]+Cos[x]`. Shift+Enter.
- (17) `Plot[f[x], {x,0,2*Pi}, Filling->Axis]`. Shift+Enter. Note: the dash after  $x$  is no longer used after the definition of  $f$ .
- (18) `Plot[{Sin[x], Cos[x]}, {x, 0, 2*Pi},  
Epilog -> {Arrow[{3, 1}, {2.6, 0.6}], Text["E=5", {4, 2}],  
Text["Sine", {3.1, 1}]}, Filling -> {1 -> {2}}]`



- (19) `RegionPlot[1/4 <= x^2 + y^2 <= 1, {x, -1, 1}, {y, -1, 1}]`



To insert a figure into LaTeX file, use the commands:

```
\begin{figure}[h]  
\includegraphics[scale=0.6]{figurename.jpg}  
\end{figure}
```