

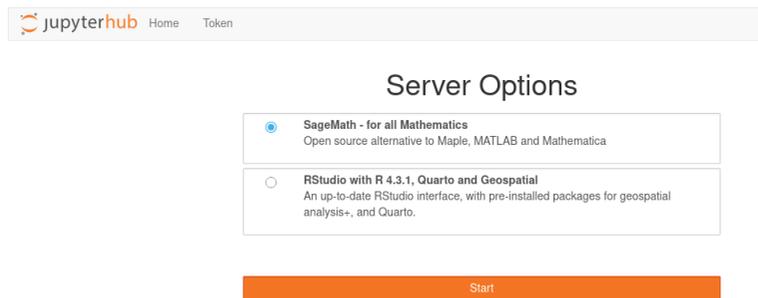
# Mathematics 1110H – Calculus I: Limits, Derivatives, and Integrals

TRENT UNIVERSITY, Summer 2025

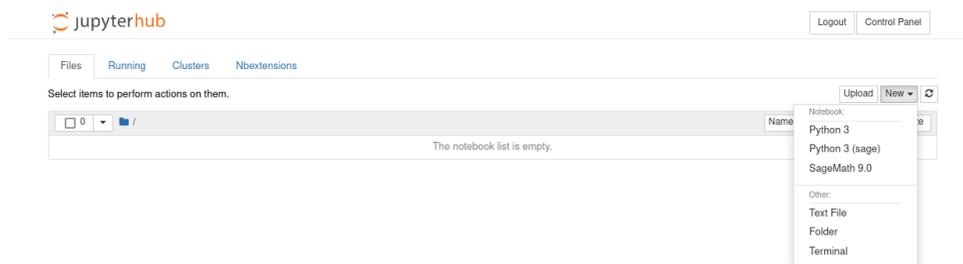
## Getting Started with `sage.trentu.ca`

SageMath is a cross-platform program that rolls together the functionality of many pieces of open-source mathematics software to get something comparable to the general-purpose commercial mathematics programs Mathematica or Maple. Unlike those two programs, SageMath is free to use. However, like those two programs, SageMath can be pretty resource-hungry and finicky to install, so at Trent we're running it on a server that you can access via your browser and do all your work online. Those of you who are interested in installing SageMath on your own computer should go to <https://www.sagemath.org> and take it from there. Most of the rest of this document is about getting started with Trent's SageMath server. It is strongly recommended that you attend the labs, where SageMath will be both demonstrated and explained.

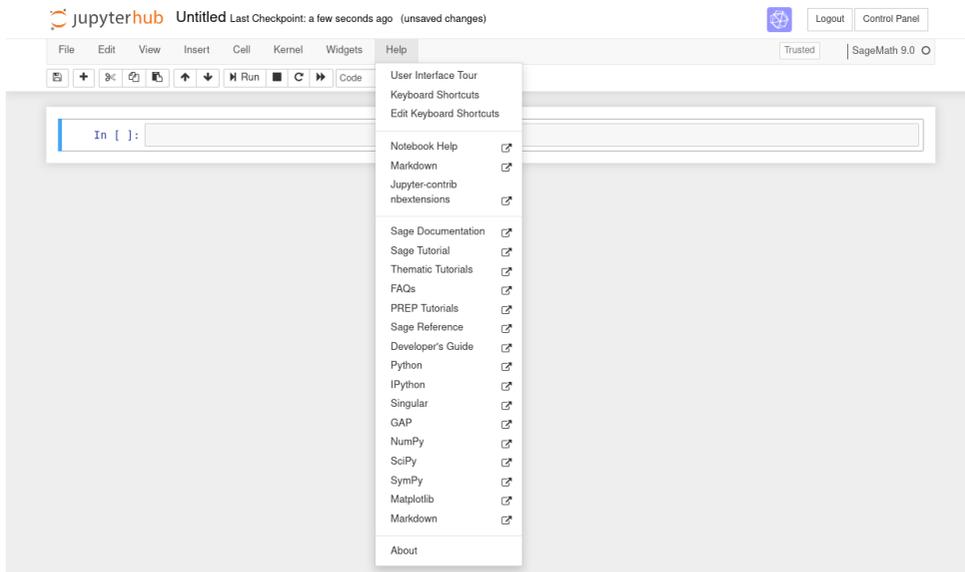
Point your browser to <https://sage.trentu.ca> and go there. You will be asked to login using your Trent email and password. This should bring you to a page that looks like:



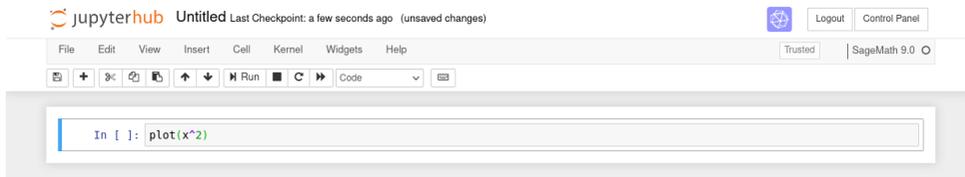
Make sure that SageMath is selected and click on the Start button. This should bring you to a page that looks like:



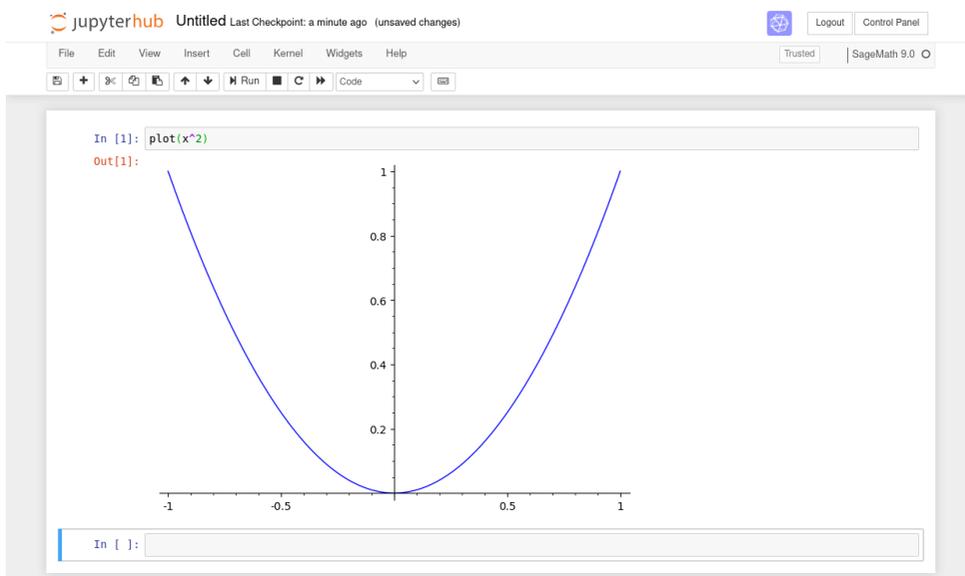
The Upload button next to the New menu button can be used to upload Jupyter notebook files to your SageMath directory. Selecting SageMath from the New menu should bring you to a page that looks like this when you click on the Help menu:



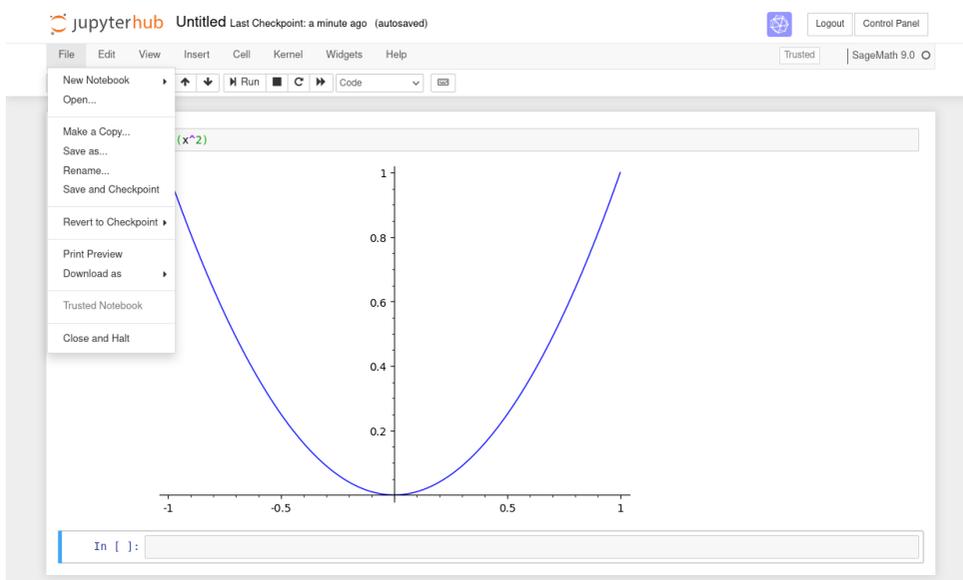
Unfortunately, the Help menu items related to SageMath, as well as many others, were not active as of when this document was written. You are now in a position to type in SageMath commands, such as the command to draw a graph of  $y = x^2$  below.



After typing in the command, when you click on the Run button (or type Shift-Enter) you should get the following:



You can do the usual file operations, including saving what you have produced in some other format, using the File menu:



In particular, you can use the “Save as . . . ” item in the File menu to save your work in pdf format for submission as part or all of an assignment.

To actually learn about SageMath and what it can do, there are a few documents in the SageMath folder in the Course Content section of the MATH 1110H Blackboard site: two quick references for SageMath commands, one them optimized for calculus, and a book, *Sage for Undergraduates* by Gregory Bard. (Most of what you’ll need for MATH 1110H is in Chapter I, which is about 60 pages long, though you will need to consult later parts of the book at times.)