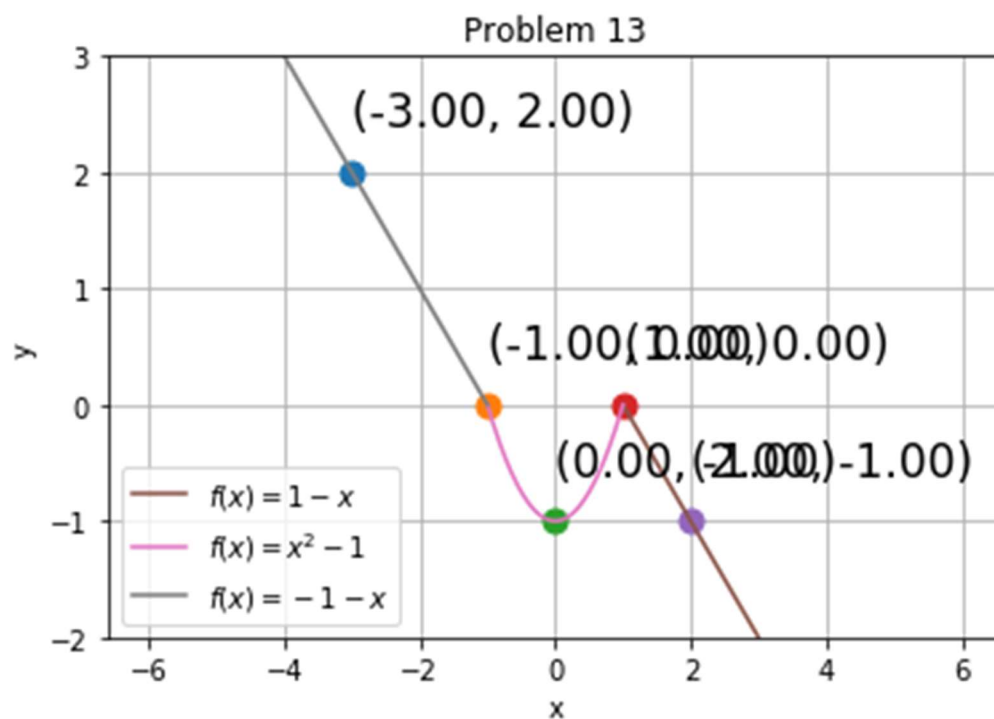The Math Keyboard and Jupyter Notebooks Installation Guide

Paul E. Monroe

$$f(x) = \begin{cases} 1-x & if & x \geq 1 \\ x^2 - 1 & if & -1 < x < 1 \\ -1-x & if & x \leq -1 \end{cases}$$

Problem 13

(-3.00, 2.00)

(-1.00(1.000,)0.00)

(0.00,(-1.000,)-1.00)

f(x) = 1 − x
f(x) = x² − 1
f(x) = −1 − x

In this tutorial, you will be guided through the process of installing a suite of programs that make participating in online math classes or practicing math on a computer much easier. In addition, you will also download some very useful Python programming software called Jupyter Notebooks that will generate math plots and factor polynomials. Below is a list of the programs you will be installing, the documents you will be downloading and, what they are used for:

- Onscren Math Keyboard – a program I have written that will insert math symbols into Algebra Practice.doc word document. It is written for widescreen computers so the program is made to lay across the bottom of your computer screen.

- Math Macros.doc – a Microsoft word document that I have loaded with macros that paste math symbols when directed to by the Onscren Math Keyboard.

- Anaconda Python – a scientific Python software distribution that allows you to graph mathematical functions and paste the resulting graphs into word documents. This distribution automatically installs a program called Jupyter Notebooks that allows you to run your computer code in your web browser.

- A GitHub Python Graphing notebook – a set of Python scripts I have written to get you started on graphing mathematical functions.

This tutorial is meant for those of you who wish to start learning Python but do not have any experience installing or using it. To those ends, these instructions are oriented around screen shots so that it is accessible, useful, and allows users to quickly produce good looking documents for your perspective classes.
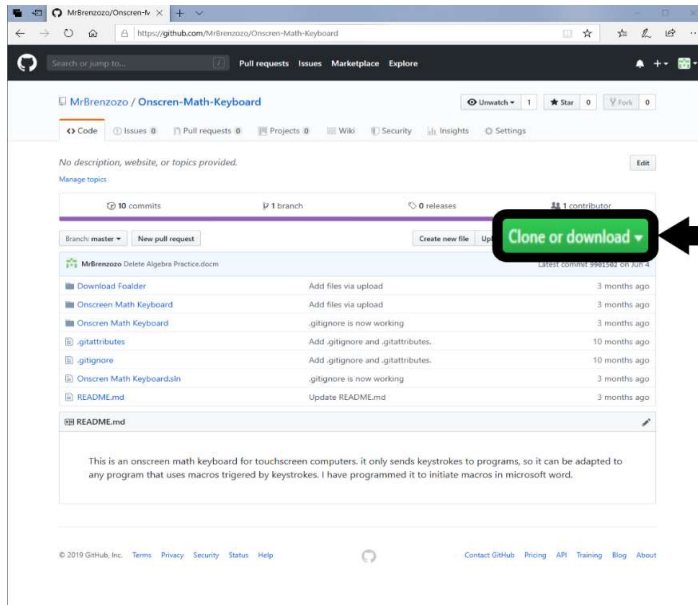
These instructions are written for the **Windows 10** operating system. Other operating systems will require different instructions.
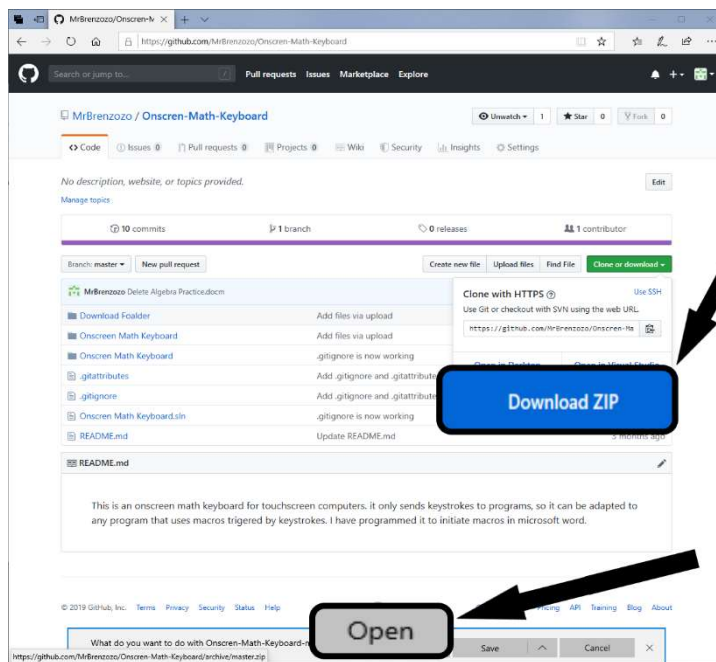
Installing the Math Keyboard
1. Downloading from *Onscren-keyboard* and associated files from GitHub

      1.1. Go to the following web page https://github.com/MrBrenzozo/Onscren-Math-Keyboard .

  1.2. Click on the *Clone or Download* button to see all of the download options as seen in Figure 1.
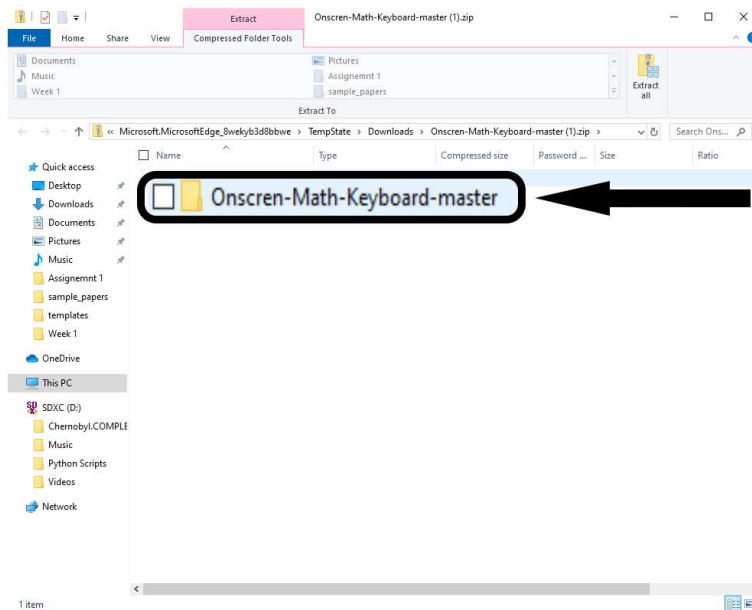
Figure 1

  1.3. Click on *download zip file* option as seen in Figure 2.

  1.4. When the options bar appears at the bottom of the browser window appears, select the *Open* box as seen at the bottom of Figure 2.
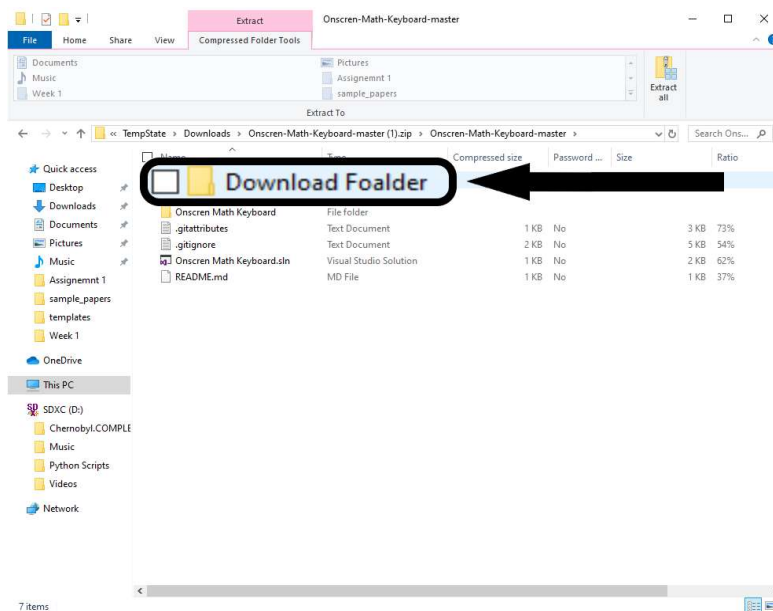
Figure 2

2. Saving a copy of Algebra Practice.doc

The Keyboard program must be used in conjunction with the Algebra Practice.doc file located in the files you downloaded from the Git Hub website. Follow the following steps to find it:
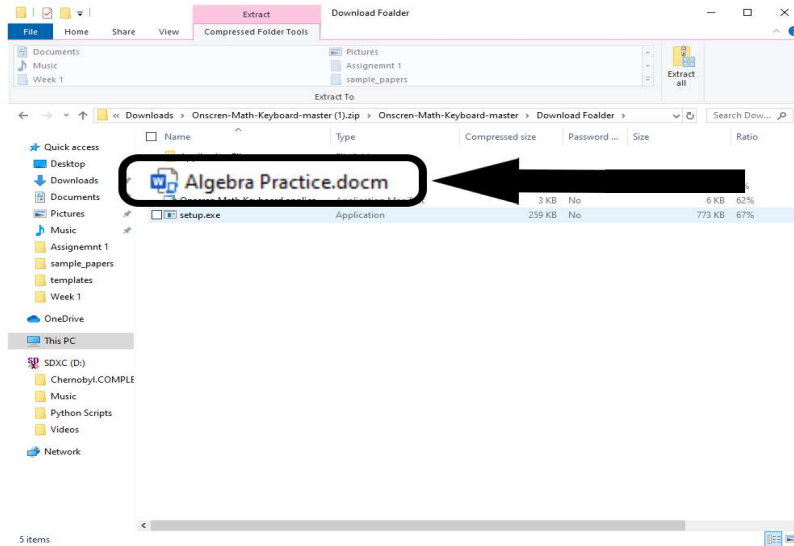

2.1. Open the *Onscren-Math-Keyboard-master* seen in figure 3.
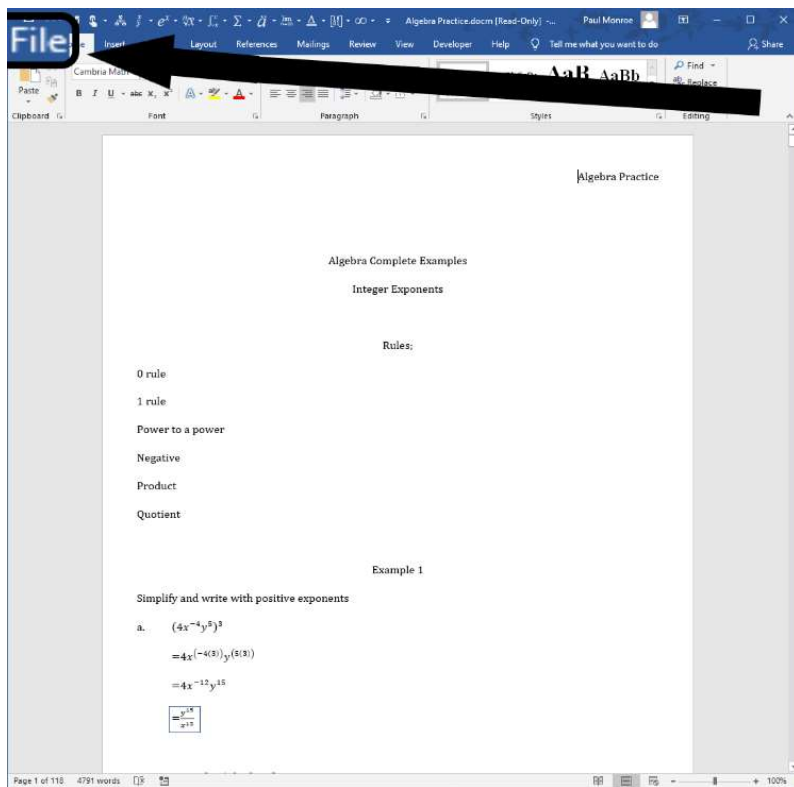
Figure 3

2.2. Next, Open the *Download Foalder* as seen in Figure 4.

Figure 4

2.3. Next, open the *Algebra Practice.doc*.

Figure 5

2.4 Click on the *File* tab of the opened Word document to find the save options screen as seen in Figure 6.
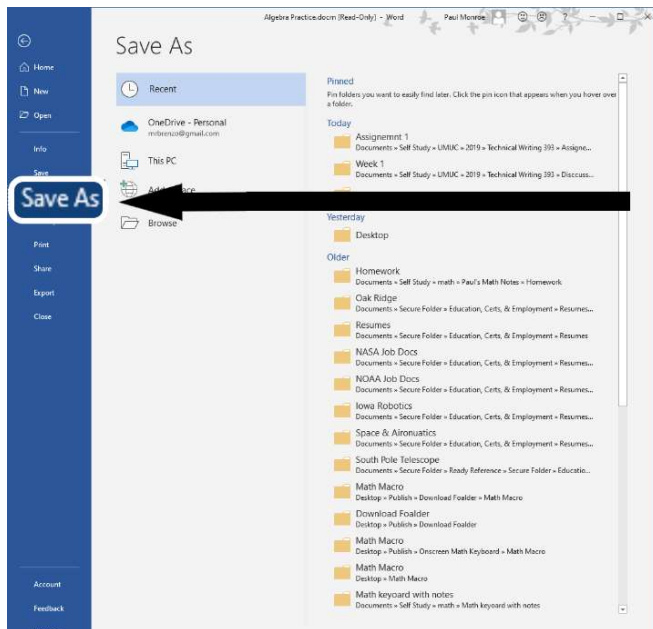
Figure 6

2.5. Finally, use the *Save As* button save a copy of the document to the location of your choice as seen in Figure 7.

Figure 7

2.6. For the purposes of the tutorial, save the *Algebra Practice.doc* on the desktop.
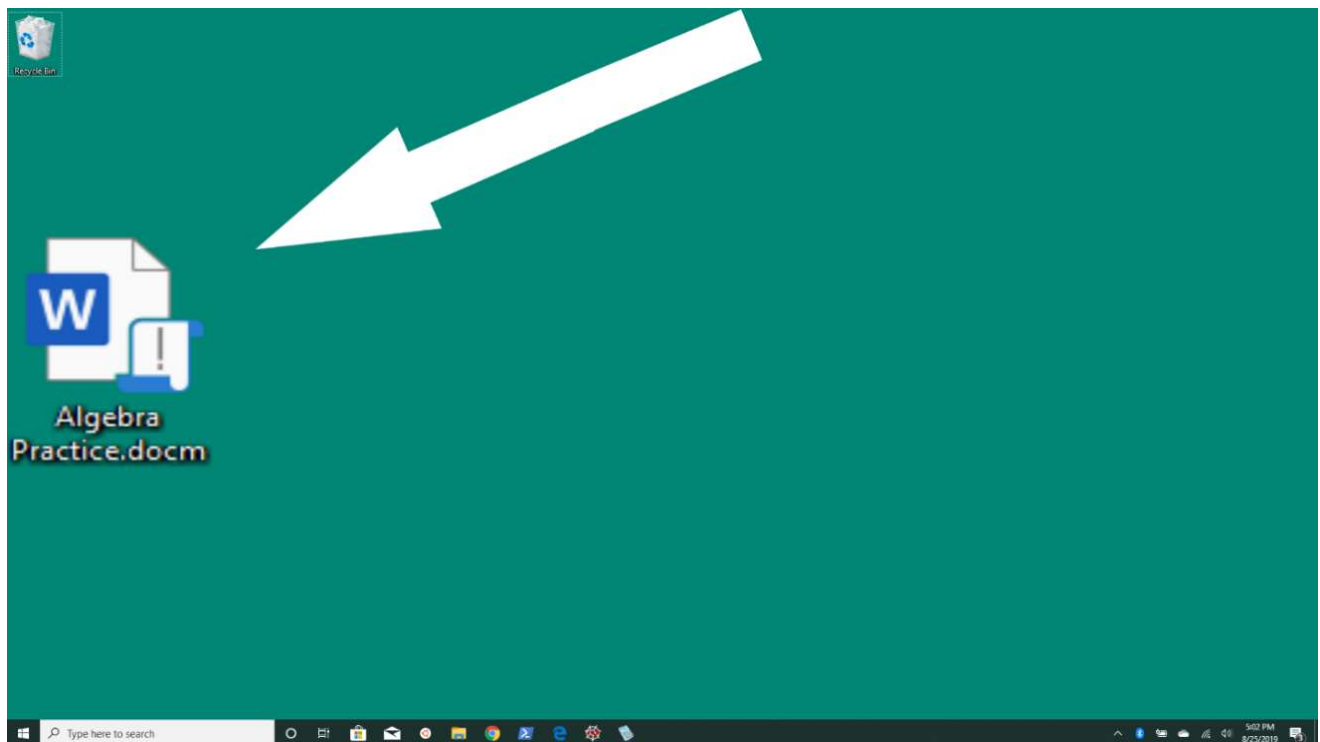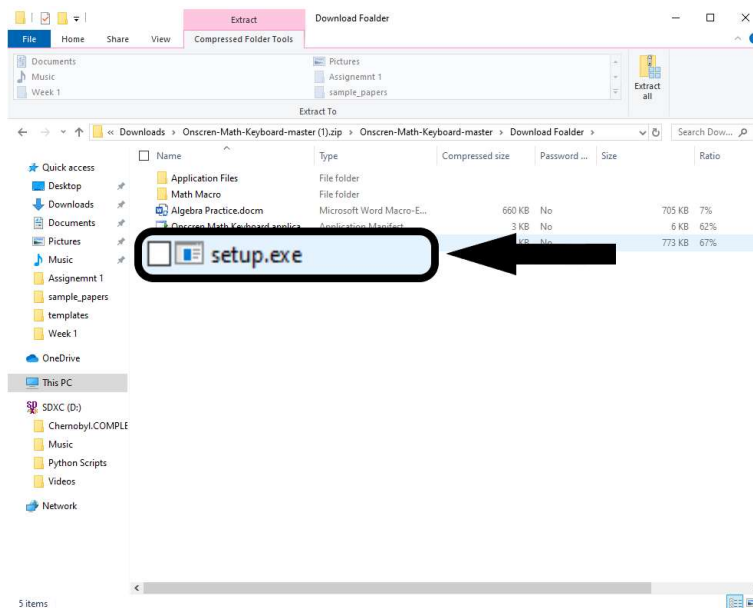

Figure 8

3. Installing the Onscren Math Keyboard program.

      3.1. Return to the same file navigation pane from the step 2.3.

3.2. Open the *setup.exe* to begin installing the Onscren Math Keyboard program on your computer as seen in Figure 9.

<div align="center">*Figure 9*</div>

Because the Onscren Math Keyboard is not a commercial program, its author is not identified by the Windows Defender security program. This program will present a warning the the keyboard might contain unsafe code. Since I wrote the program, you will have to be satisfied with my assurances that it does not.

3.3. Select *More info* button on the Windows Defender warning screen to proceed to the install anyway option as seen in Figure 10.

<div align="center">*Figure 10*</div>

Figure 11

3.4. Select the *Run Anyway* button and Windows Defender will allow you to install the *Onscren Math Keyboard* as seen in Figure 11.
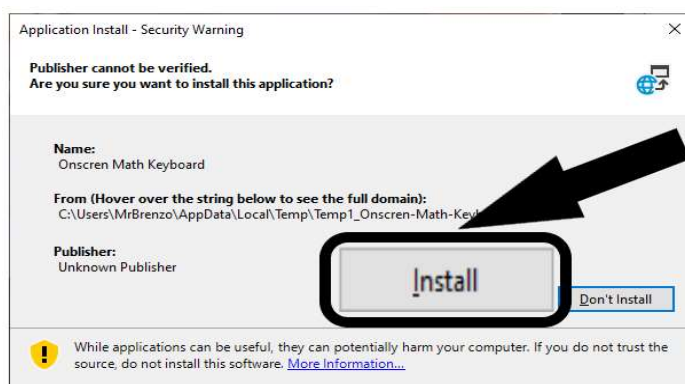

Figure 12

3.5. Finally, click on the *Install* button and the keyboard program will install as seen in Figure 12.

After the program has finished installing, it will bring up the math symbols keyboard shown below. Leave it on screen until you are finished with the tutorial. The program is formatted for wide computer screens, sot the end of it may hang off the edge of the screen.

Figure 13

4. Test driving the Onscren Math Keyboard program

To use the program, open the Algebra Practice.doc program saved in earlier steps;
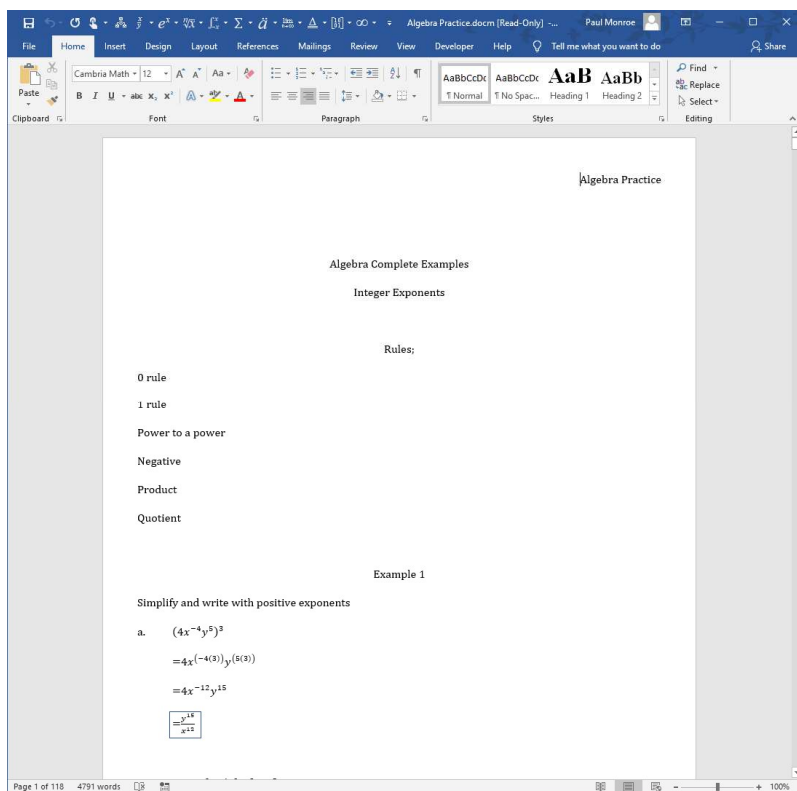

4.1. Scroll to the bottom of the document to find a blank space.

Figure 14

4.2. Return to the keyboard and use the dropdown field in top of the keyboard window.

Figure 15

Any file or program that is open on your computer will appear in the dropdown menu. Select the Algebra Practice.doc in the dropdown menu to select it as the program the keyboard will direct the keyboard output to. Then place your cursor in the open Algebra Practice.doc document. Where ever you have the cursor, the keyboard will insert the math symbol or equation of the button you clicked. After you insert an equation, you can populate the equations with the numbers or symbols you need to create your own math functions.

To close the keyboard, click on the red x in the top right corner of the keyboard window as seen in Figure 16.
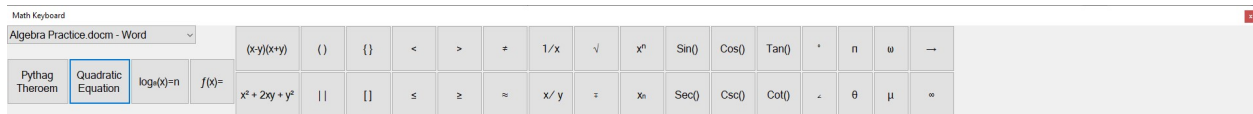

Figure 16

Because the Onscren Math Keyboard program was written for widescreen computers, you may need **grab** the top bar of the keyboard window with your mouse and **drag it to the left** until the **red x** appears on the top bar.
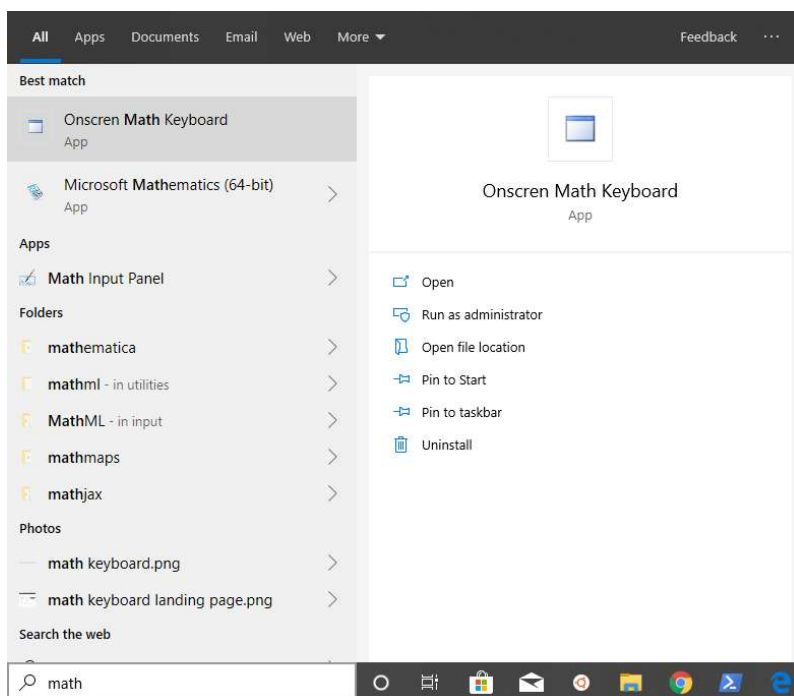

To access your Onscren Math Keyboard again, place your cursor in the Windows 10 taskbar seen in Figure 17. Enter "*math*" and the Windows 10 popup menu should present you with an icon to initialize the Onscren Math Keyboard again.

Figure 17

4. Installing Anaconda Python;

4.1. Downloading the Anaconda installation GUI

4.1.1. Got the page at https://www.anaconda.com/distribution/ , it should present the page below.
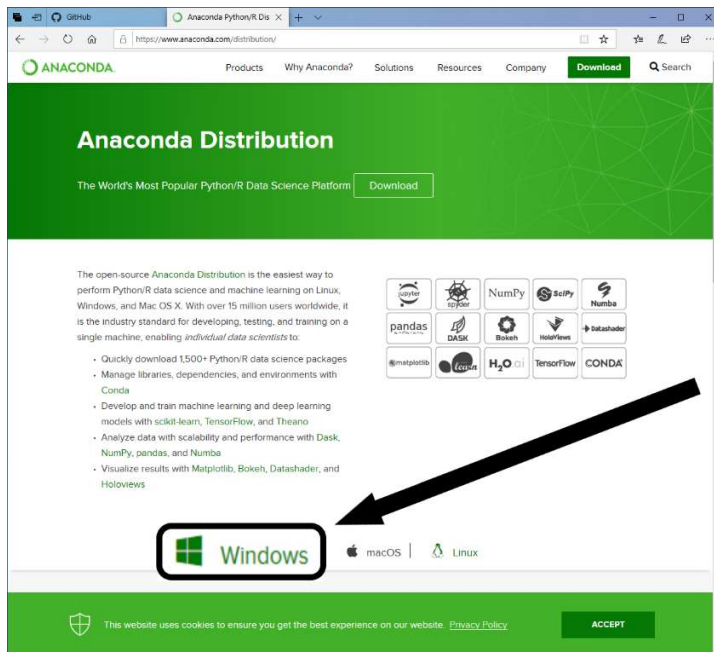
4.1.2. Click on the *Windows* button to select the files to install Anaconda on a Windows 10 system and scroll down the page to see the download page.
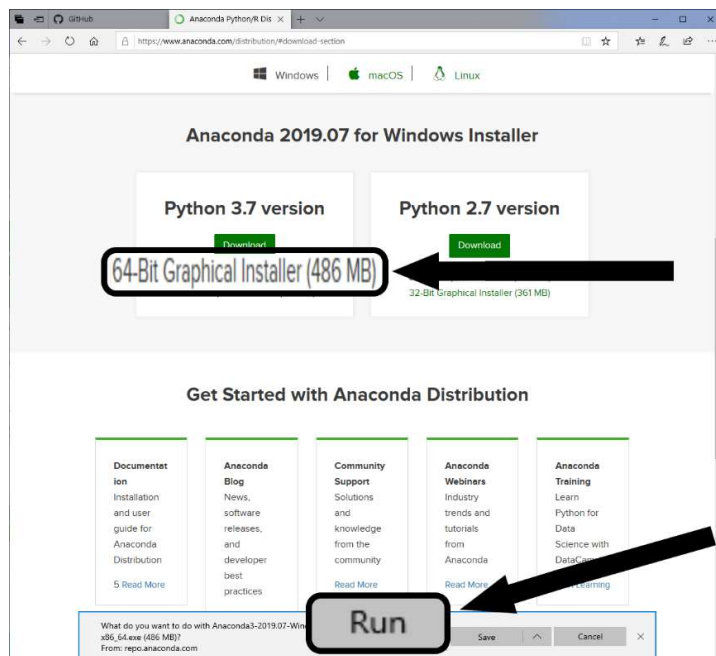
Figure 18

4.1.3. Select the link for the *64 bit Graphical Installer* of Python version 3.7 Windows Installer as seen in Figure 19.

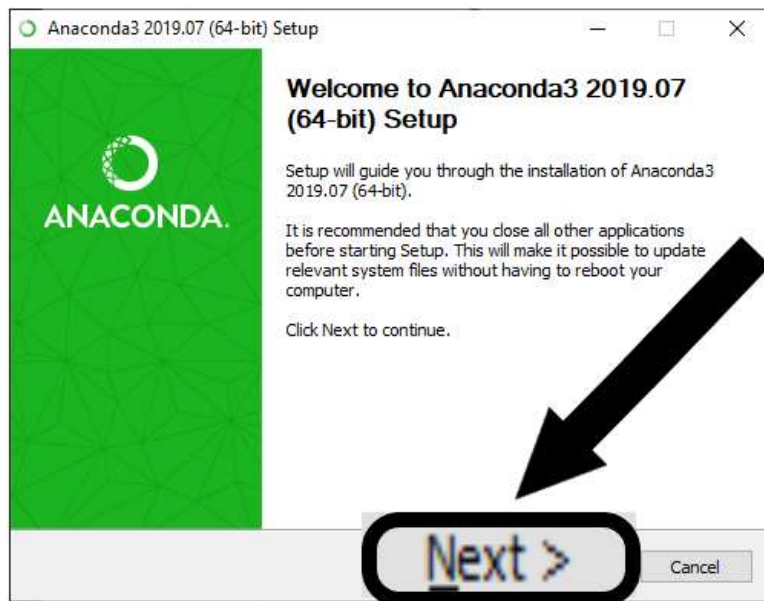4.1.4. Select the *run* button to continue as seen in Figure 19.
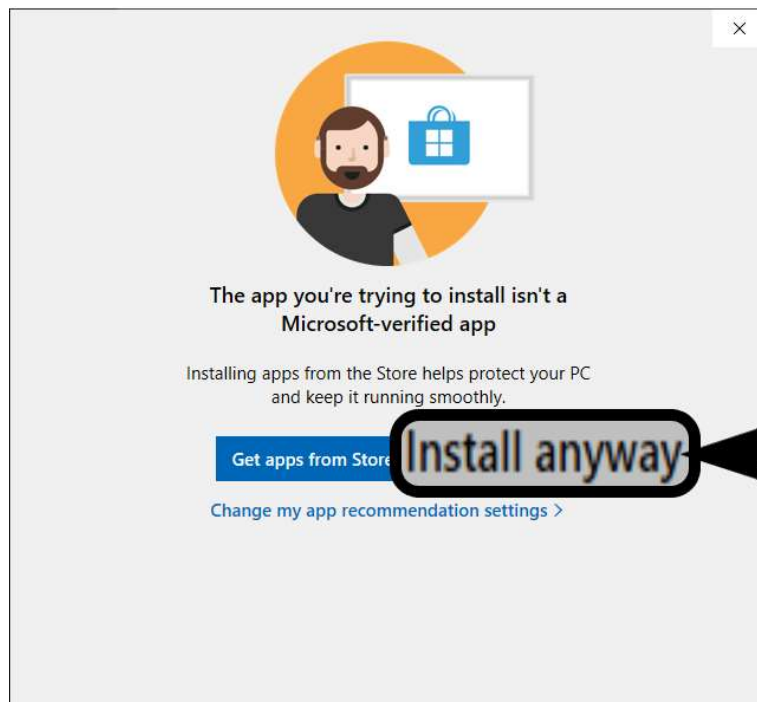
Figure 19

4.1.5. As seen in Figure 20, The Microsoft marketing department feels compelled to scare you into buying software only from their store. Select the *Install anyway* button to stick to the man.

Figure 20

Figure 21

4.1.6. Anaconda will present you with this welcome window. Click on the *Next* button as seen in Figure 21.

Figure 22
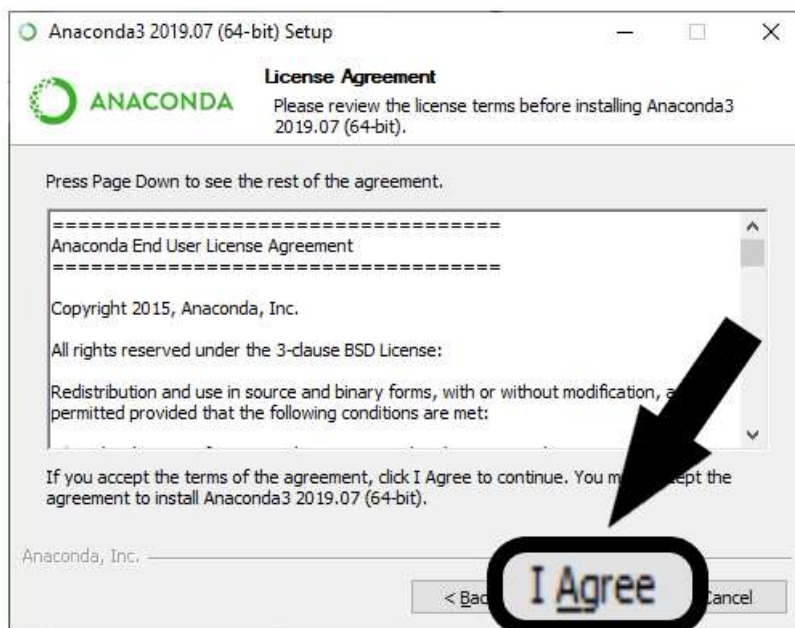
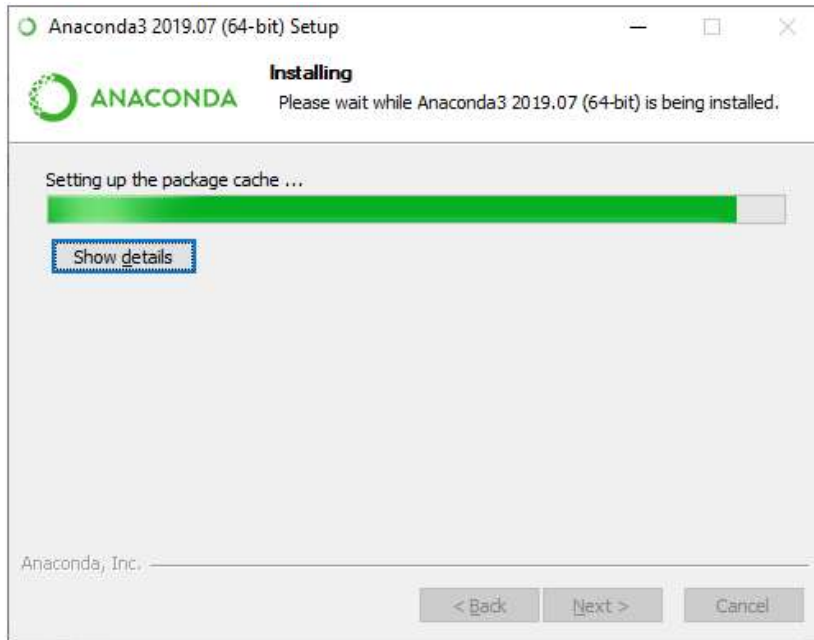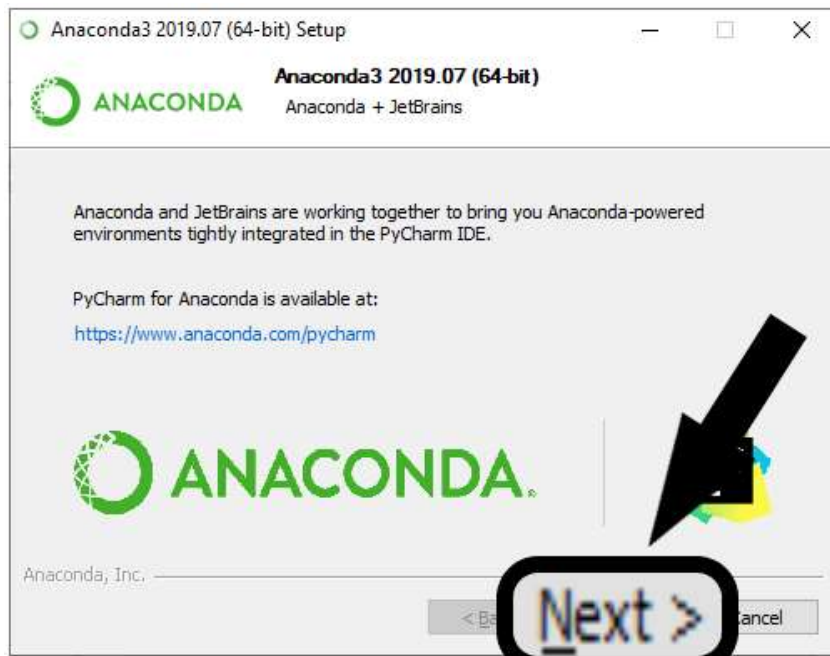4.1.7. Click the *I Agree button* to agree to the licensing requirements and proceed with installation as seen in Figure 22.

Figure 23 shows the progress screen. It may take a few minutes for the program to install.

Figure 23

4.1.8. Figure 24 shows notifications about software packages you do not need for the purposes of doing math in Python. Click the *Next* button to proceed with installation.
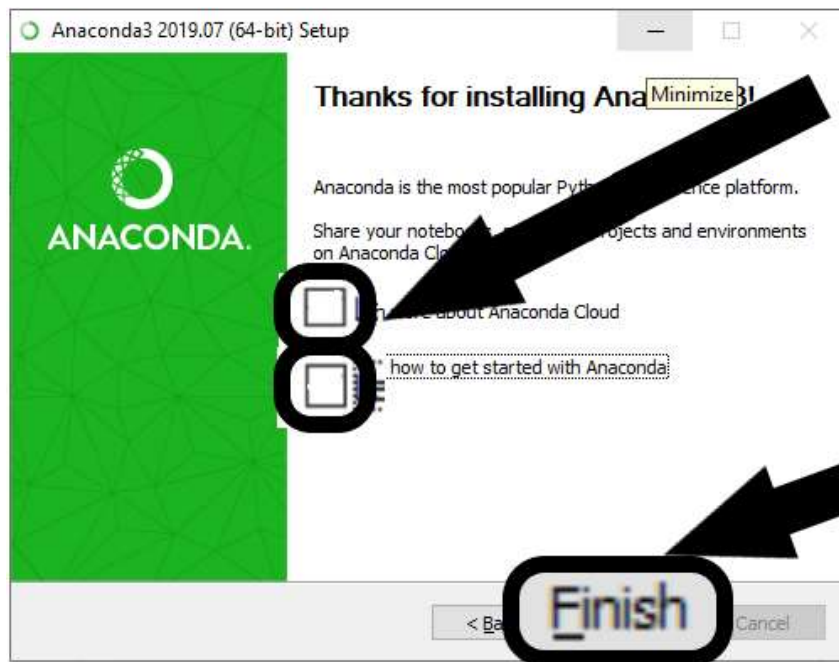
Figure 24

4.1.9. The next page is a thank you message, and an invitation to go to their website. *Uncheck* both boxes and click the *Finish* button seen in Figure 25 to complete the Anaconda Python installation process.

Figure 25

Saving a copy of Python Graphing Notebook
5. Download a copy of the Python Graphing notebook.

    5.1. Got to *https://github.com/MrBrenzozo/Python-Graphing* to see the following page;

5.1.1. Select *Download ZIP* from the dropdown menu as seen in Figure 26.

5.1.2. Click the *Open* box in the download selection bar as seen in Figure 26.

Figure 26

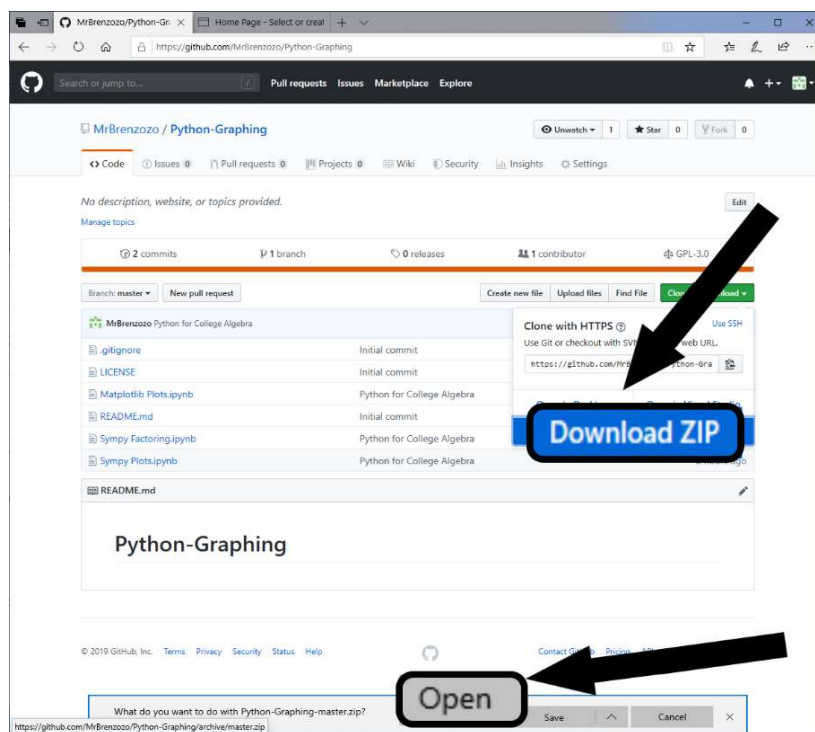5.1.3. Open the *Python-Graphing-master.zip* file seen in Figure 27.
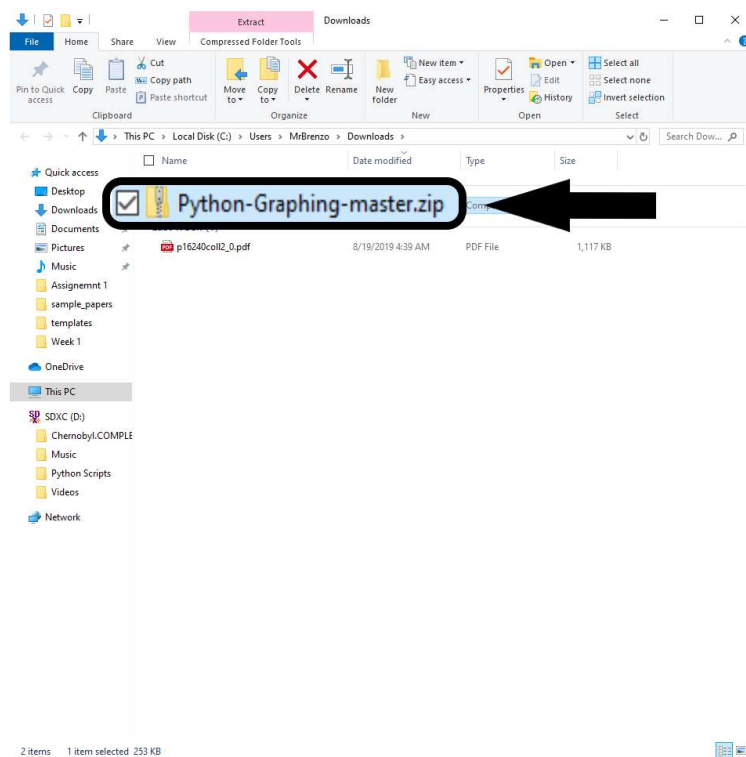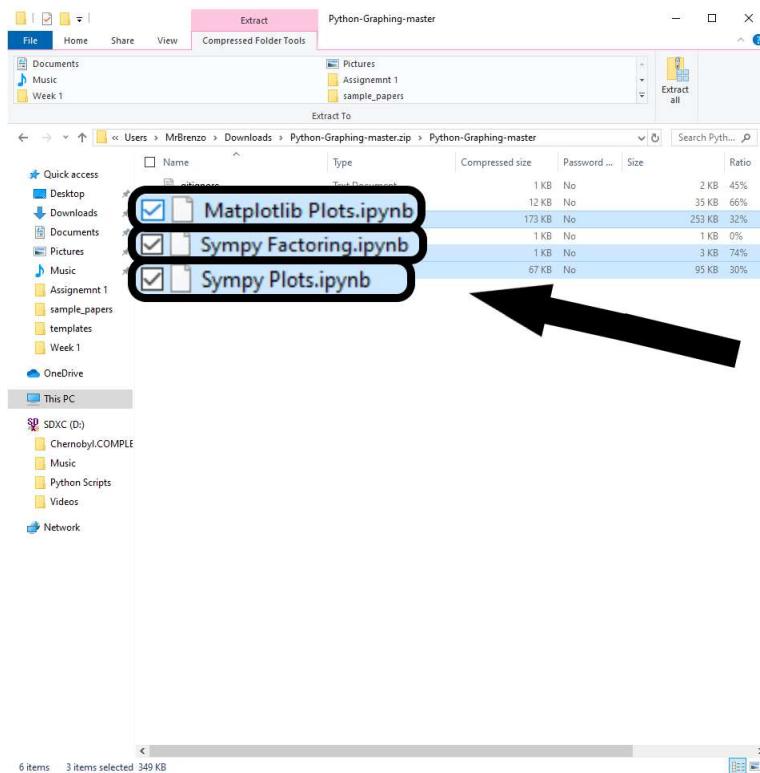
Figure 27

5.1.4. Cut and Paste the following files into a folder on your Desktop: *Matplotlib Plots.ipynb* *Sympy Factoring.ipynb* *Sympy Plots.ipynb* shown in Figure 29.

Save them in a file called *Python Graphing Scripts* as shown in Figure 29 on the next page.
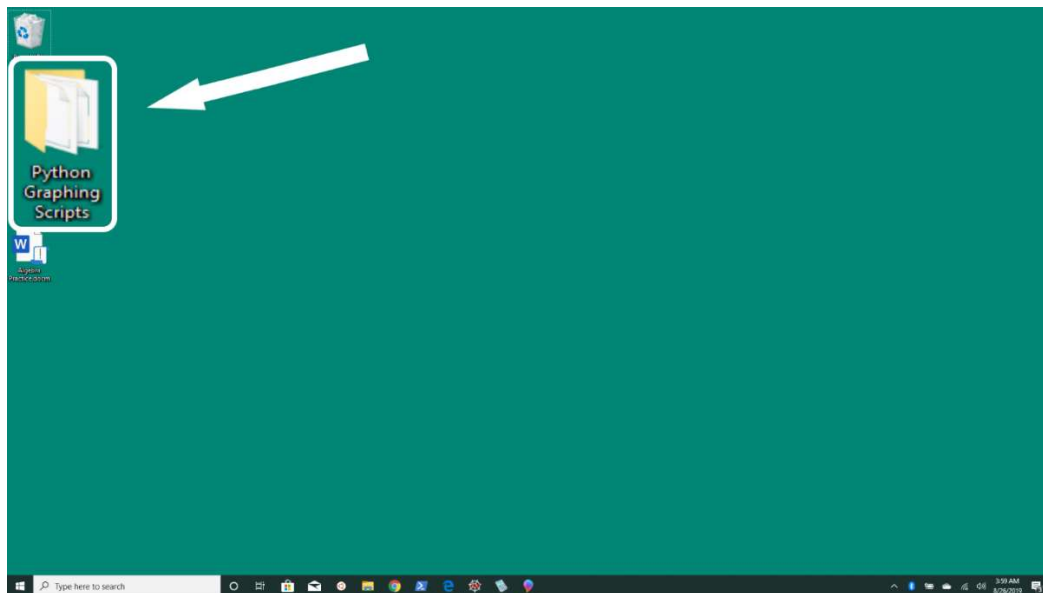
Figure 28

Figure 20

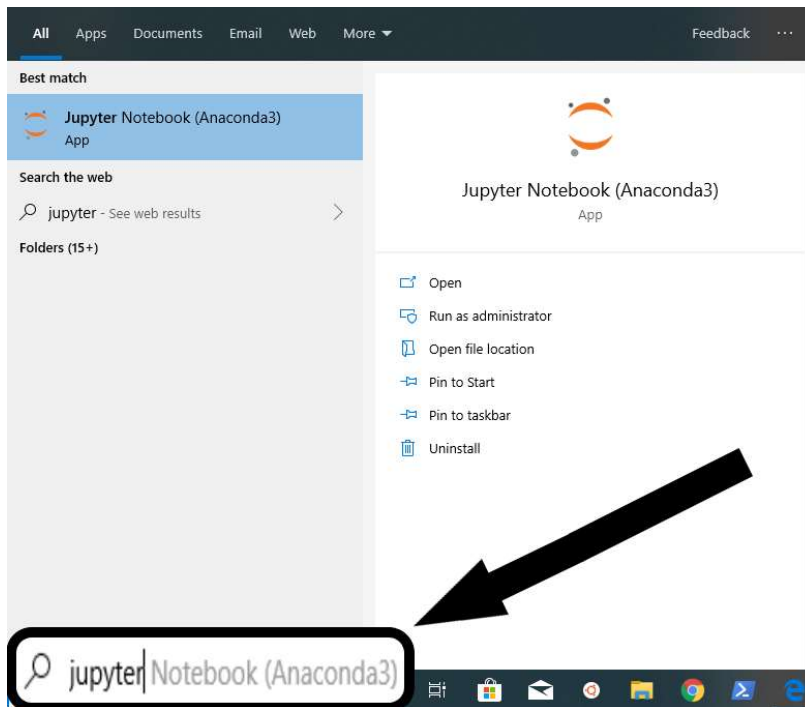6. Open the Jupyter Notebook application using the steps below;

Figure 30

6.1. To access your Jupyter Notebooks, place your cursor in the Windows 10 taskbar search field seen in Figure 30. Type "*jupyter*." The Windows 10 popup menu should present you with an icon to initialize the Jupyter Notebook.
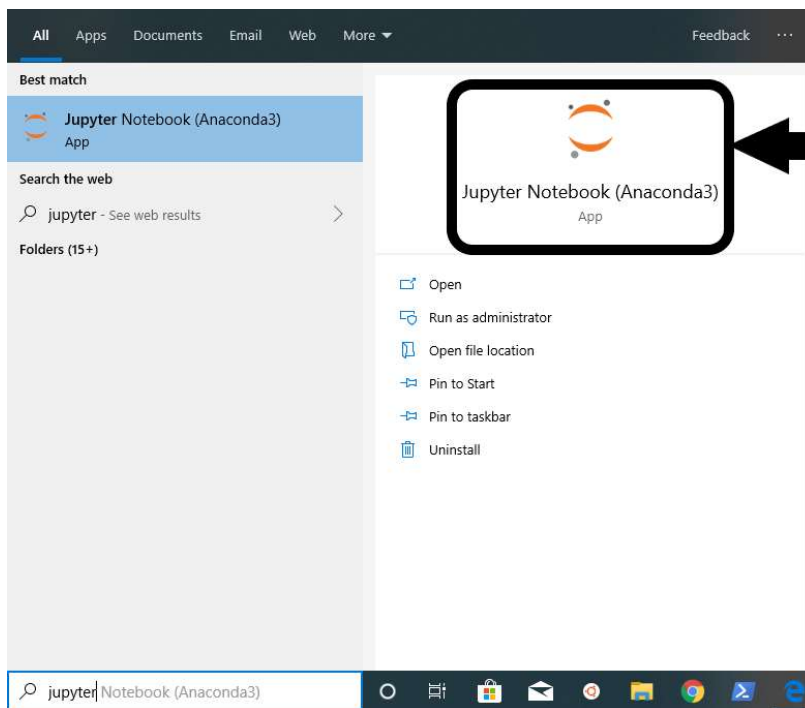

Figure 31

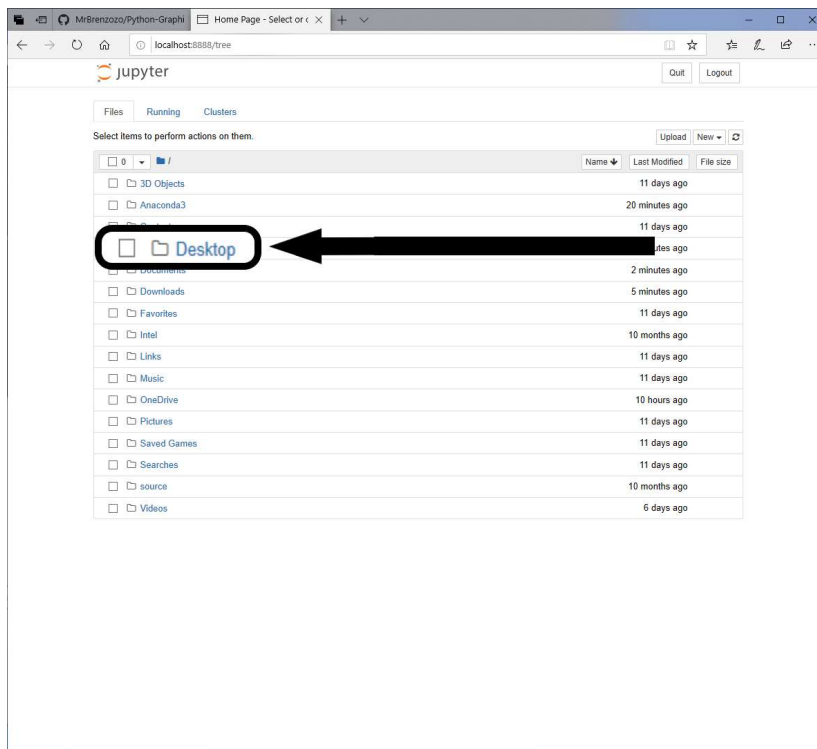6.2. Click on the *Jupyter Notebook* icon seen in Figure 31.

Figure 32

Figure 32 Shows an open Jupyter webpage. Jupyter will automatically start your web browser and open a tab showing a list of folders. Previous steps in the tutorial saved the notebook files on the user Desktop.

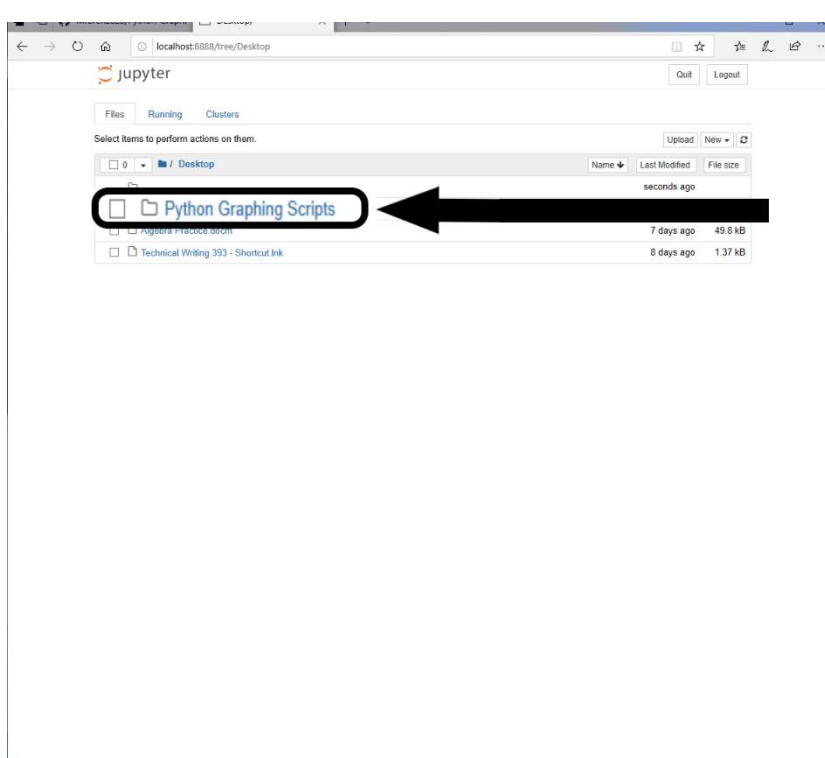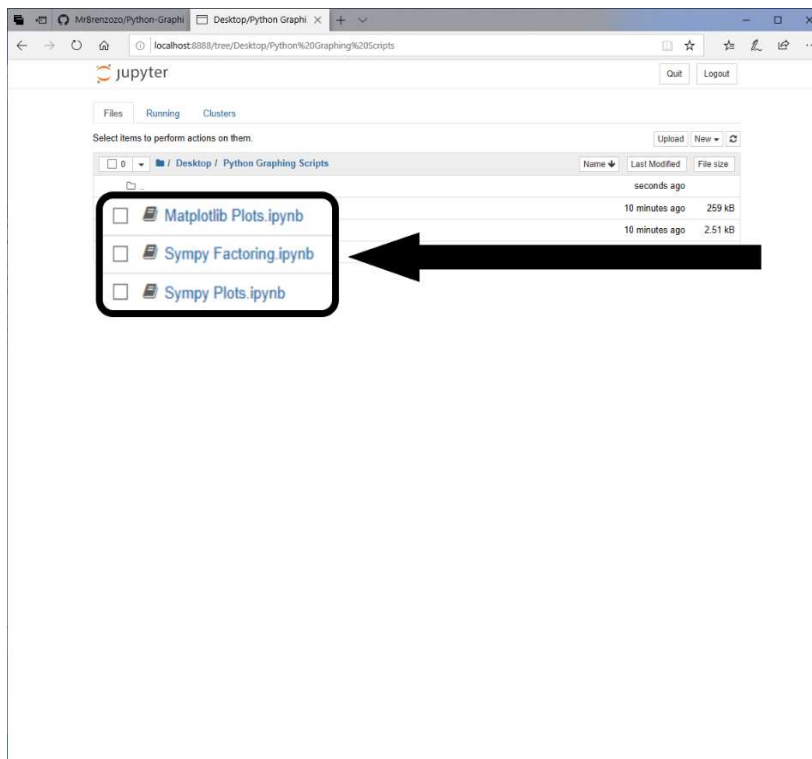6.3. Open the Desktop folder to access the files you saved in step 5.1.4.

Figure 33

6.4. Open the *Python Graphing Scripts* folder from saved in step 5.1.4. to see your Notebooks. Any files you have saved on your Desktop will be listed here. See Figure 33 as an example.

Figure 34

6.5. Choose any of these 3 notebooks to work from, but for the purposes of this demonstration, choose the *Sympy Factoring notebook*.
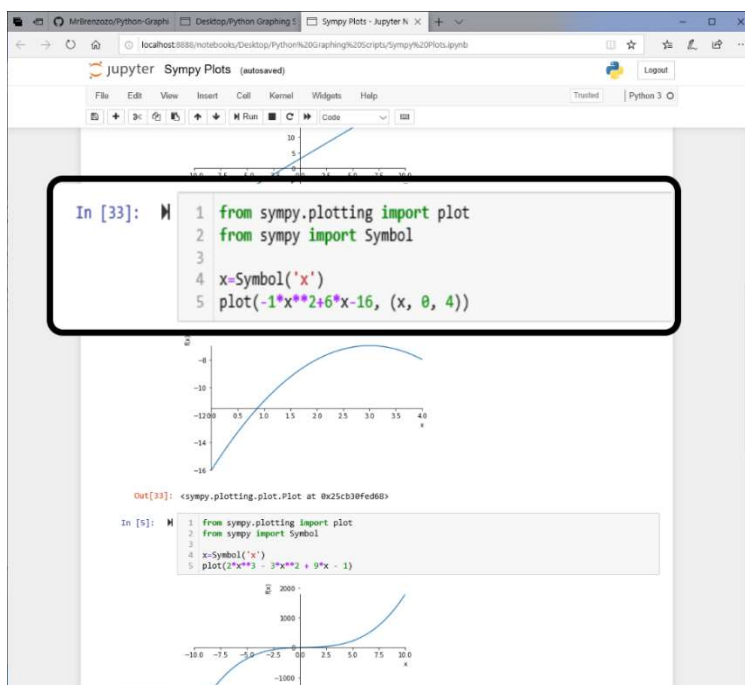

Figure 215

Figure 35 shows the Sympy Graphing notebook. The grey fields are called "cells" of computer code and are used to generate plots immediately below them.

To generate your function plot, place your cursor in the cell and press the key combination *ctrl+enter.* You may need to enter the ctrl+enter key combination twice before the graph plot appears
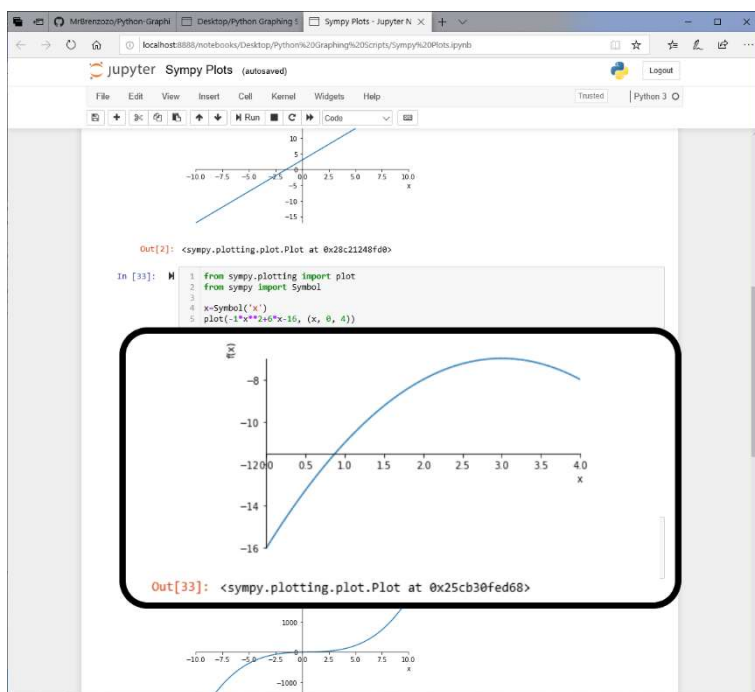
Figure 36

Figure 36 highlights the plots generated by the scripts .png files. You can copy and paste these graphics directly from your notebook into the Algebra Practice.doc.

If you practice the use of the Onscren Math Keyboard in conjunction with the Jupyter Notebooks scripts to generate documents for your math classes, you can achieve results like those shown in Figure 37.

For $\quad f(x) = \begin{cases} 1 - x & if \quad x \geq 1 \\ x^2 - 1 & if \quad -1 < x < 1 \\ -1 - x & if \quad x \leq -1 \end{cases}$

Figure 37