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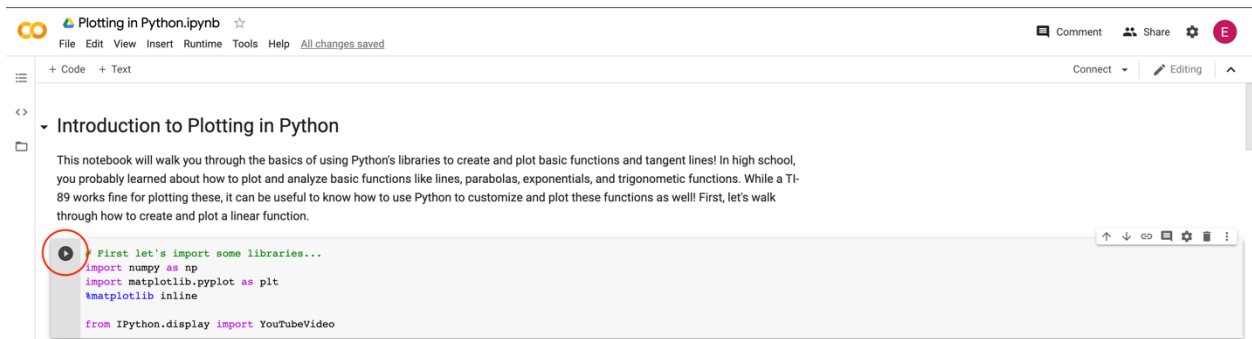
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What is Python? Activity Sheet

Directions

Open the file `WhatIsPython_NOTEBOOK.ipynb` in [Google Colaboratory](#) by selecting “File->Open Notebook” (NOTE: You will need a Google Account to use Google Colaboratory.) Read each cell (block) of text, and run each cell of code by clicking the play button on the left side of the block as indicated by the red circle in the figure below.



As you read, watch, and run each cell, answer the following questions:

1. **Plotting a line.** Watch the video on “Slope-intercept form” by Khan Academy that is linked in the notebook. Then, run the code to plot a line. Using the code as a guide, answer the following:
 - a. What is the role of the function `create_line()`? What does it do?
 - b. What do you think `np.arange()` does? (HINT: look at the comments in the code!)

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- c. Change the plotted line so that it has a slope of -7 and a y-intercept of 4. What did you need to change in the code to make these changes?

2. **Plotting points on a line.** Change the line-plotting code back so that it has a slope of 2 and a y-intercept of 1. Run the code to plot the line, then run the code to plot two points on the line. Using the code as a guide, answer the following:
 - a. What function was used to create the y coordinate for our point? (HINT: `y_pt` is the variable used for the y coordinate.)

 - b. In your own words, explain how the `create_line()` function works in this code block.

3. **Plotting a quadratic function.** Watch the video on “Graphing quadratics” by Khan Academy that is linked in the notebook. Then, run the code to plot a parabola and the code to plot a point on the parabola. Using the code as a guide, answer the following:
 - a. What is the role of the function `create_para()`? What does it do?

 - b. What value does each of the following variables hold? (HINT: the answer is NOT the numeric value, think about each part of the quadratic equation.)
 - i. `a`:

 - ii. `n`:

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- iii. xv:
 - iv. yv:
 - c. Change the plotted parabola so that it has a vertex at $(-2, 10)$. What did you need to change in the code to make these changes?
4. **Plotting a secant line.** Read the cell describing derivative estimation and plotting a secant line. Then, run the code to plot the secant line and answer the following:
- a. What is the role of the function `line2pts()`? What does it do? (HINT: You may want to review [how to find an equation using two points.](#))
5. **Plotting the derivative of a parabola.** Run the code for calculating and plotting the derivative of a parabola and answer the following:
- a. What is the role of the function `derive_para()`? What does it do?
 - b. Based on what you know about the derivative of a parabola, what should the derivative look like? Is it a parabola, line, or some other type of function?

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6. **Plotting the integral of a parabola.** Run the code for calculating and plotting the integral of a parabola and answer the following:
- a. What is the role of the function `integrate_para()`? What does it do?

 - b. Based on what you know about the integral of a parabola, what should the integral look like? Is it a parabola, line, or some other type of function?