Exercise 1

Clone your Lab 0 repository

Work

I ran the command below into the terminal in order to clone the repository.

```
$ git clone git@github.com:lfc-math-cs/lab-0-Lcarrico.git
```

Solution

This there is an empty repository with the lab name on my computer as shown below.

```
$ ls -a
.  ..  lab-0-Lcarrico
```

Exercise 2

Write a function that accepts a single array as input. Make a copy of the array, then use fancy indexing to set all negative entries of the copy to 0. Return the copy.

Work

I followed the instructions and used a mask to create a function that set all values less than 0 to 0 from a numpy array, then return it.

Python 3 Code

```
def removeNegatives(n):
    copy = n.copy()
    mask = copy < 0
    copy[mask] = 0
    return copy
```

Solution

Now when I run the function removeNegatives, it follows the given instructions. See code below for example.

Python 3 Code

```
INPUT:
test = np.arange(-5, 5)
print(test)
test = removeNegatives(test)
print(test)

OUTPUT:
[-5 -4 -3 -2 -1  0  1  2  3  4]
[0 0 0 0 0 0 1 2 3 4]
```

Exercise 3

Plot the $x^2 - 3$ on the interval $[-1 : 10]$.

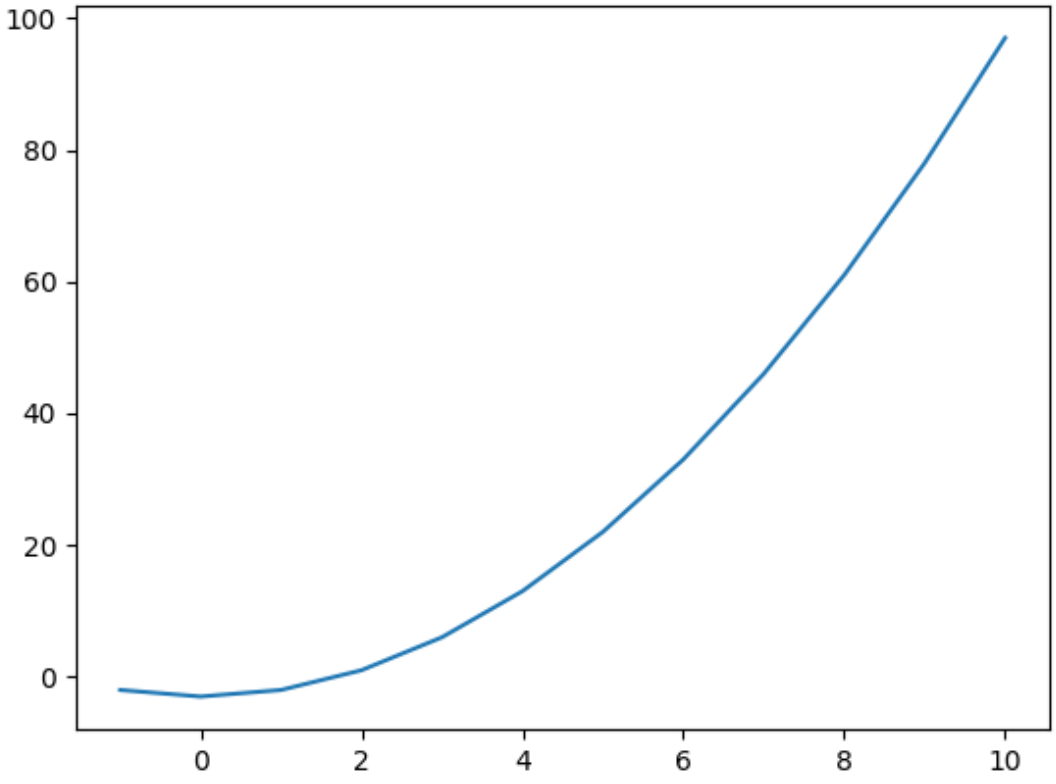
Work

For this I created the interval for the plot, created and lambdified the function, and finally plotted it with matplotlib. The code is shown below.

```
t = np.arange(0, 11)
x = sy.symbols('x')
f = sy.lambdify(x, x**2 - 3)
plt.plot(t, f(t))
plt.show()
```

Solution

This created an plot that appeared. Plot image is below.



Exercise 4

Compute the antiderivative of $\frac{x}{x^2+2x+1}$.

Work

I defined the necessary function, used the integrate method to find the antiderivative, then printed that output.

```
f1 = sy.lambdify(x, x / (x**2 + 2*x + 1))
f2 = sy.integrate(f1(x), x)
print(f2)
f2 = sy.lambdify(x, f2)
```

Solution

Below is the output from this.

```
log(x + 1) + 1/(x + 1)
```

Exercise 5

Plot the derivative of $\frac{x}{x^2+2x+1}$ on the interval $[0, 1]$.

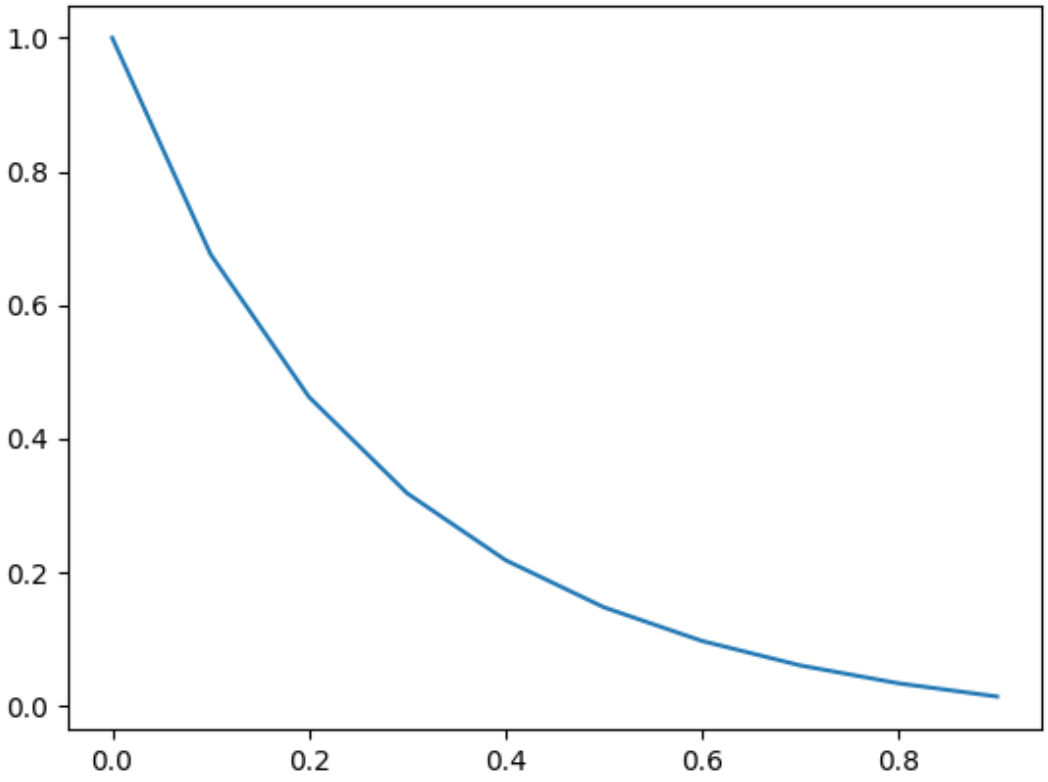
Work

I defined the necessary function, used the diff method to find the derivative, then plotted it using matplotlib. Code is seen below.

```
f2 = sy.diff(f1(x), x)
f2 = sy.lambdify(x, f2)
t = np.arange(0, 1, .1)
plt.plot(t, f2(t))
plt.show()
```

Solution

Below is the plot saved from this.



Exercise 6

Write a REAMDE.md, a report.pdf, and push your changes to your GitHub repository for Lab 0.

Solution

Please see the github page for the uploaded files.