Homework 5

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In the code that I wrote, I began by defining the functions for the, well, functions. I took one that was convex and its derivative, and one that was *not* convex and its derivative:

A screenshot of a computer program

Description automatically generated

After which, I defined the function for the gradient descent method as such:

A screen shot of a computer program

Description automatically generated

Defined the function to use for creating the graphs:

A computer screen shot of a code

Description automatically generated

Created a menu in which to create the graphs in order:

A screen shot of a computer program

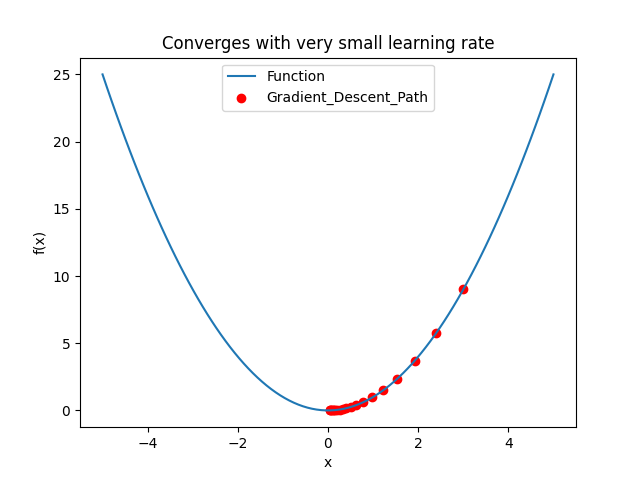
Description automatically generated

And in said menu, created the graphs with appropriate values

A screenshot of a computer program

Description automatically generated

As for the examples, this is the graph resulted from a small learning rate:



This is the graph for which the learning rate is a bit bigger:

A graph of function and function

Description automatically generated

This is the graph for which the learning rate is too large (in this case the function that creates the graph bugged out and I had to take a smaller starting x and a smaller number of iterations):

A graph of a function

Description automatically generated

And lastly, the case in which f is a non-convex function, the values get stuck in a local minimum:

A graph of a function

Description automatically generated

The github link for the repository: <https://github.com/drmatei/Analysis>

The files are: Homework5.py and Homework\_5.docx