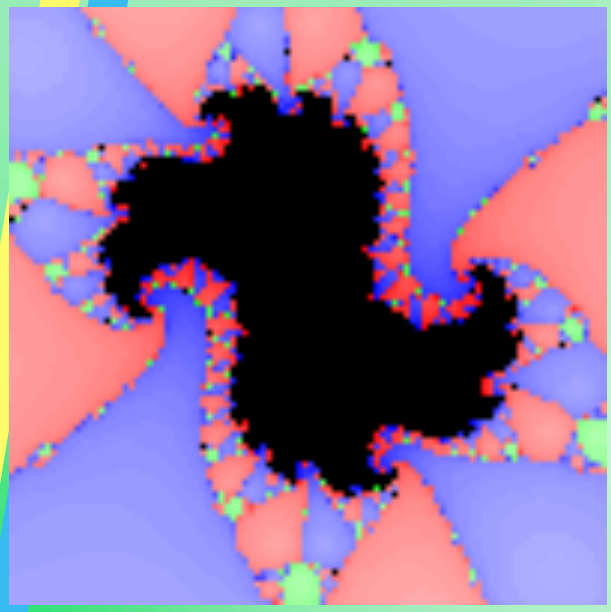
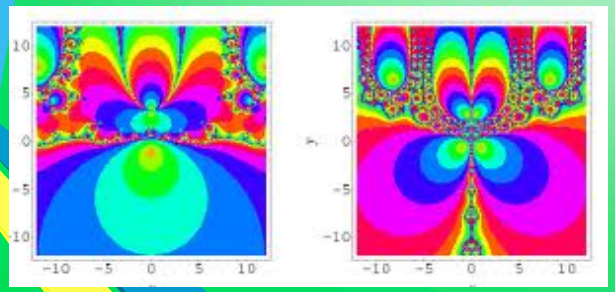
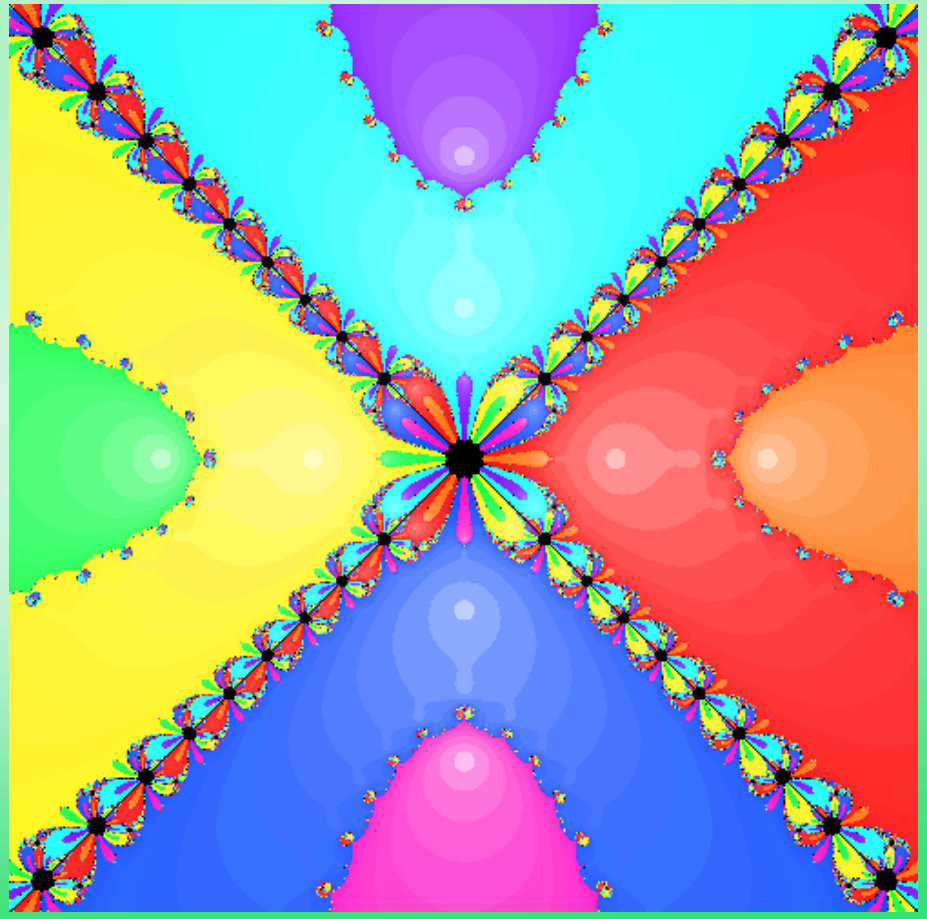
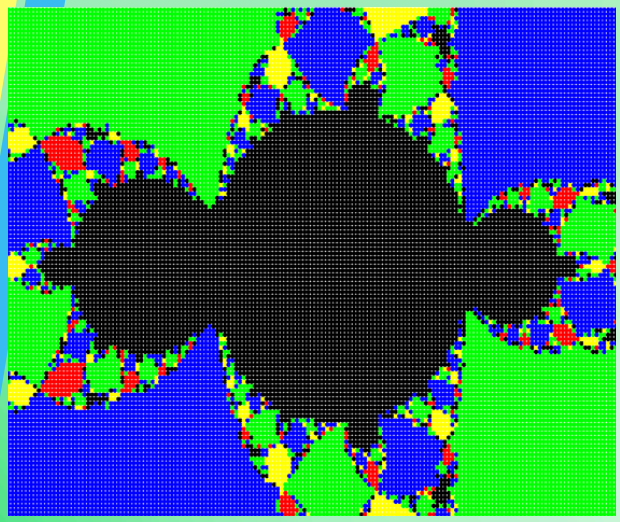
Complex Newton's Method

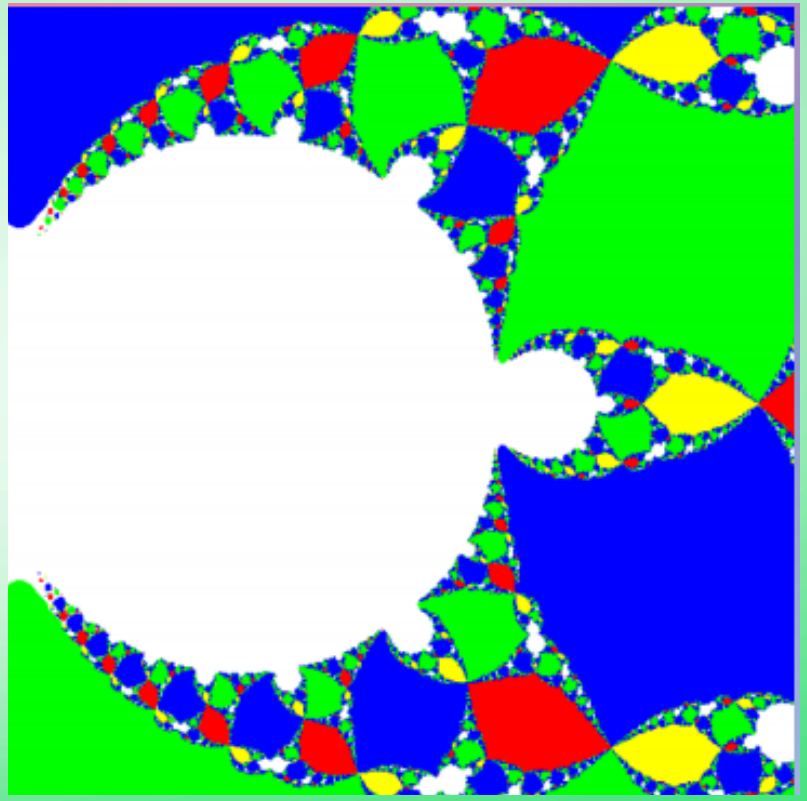



10
5
0
-5
-10
-10 -5 0 5 10
y
10
5
0
-5
-10
-10 -5 0 5 10





Basin of z=1 is yellow
Basin of z=-1 is red
Basin of z=0.4i is green
Basin of z=-0.4i is blue
Wasteland is black

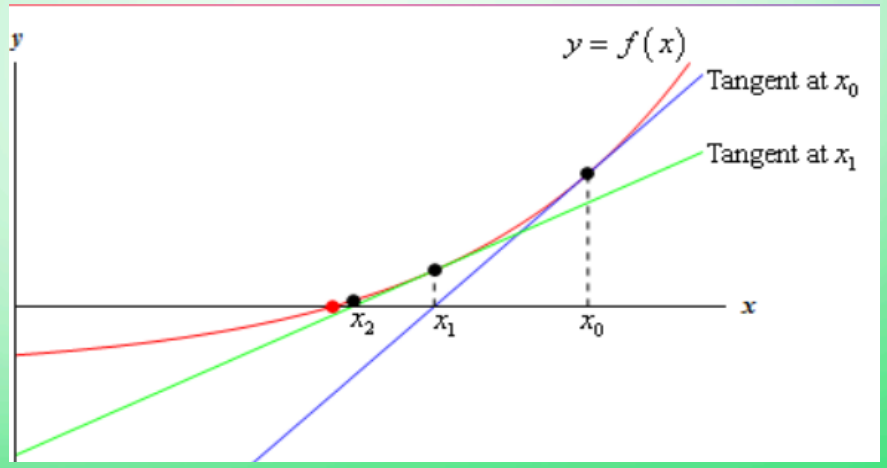


This is what we are trying to make

Newton's Method

$$X = X - f(X)/f'(X)$$

- approximates a root, given an initial x-value
- In the case of multiple roots



What's Different…?

Complex Roots

-we will factor in complex roots by using a matrix of complex numbers.
-This will yield a complex number plane

$Z = X + i*Y$

Iterating over a grid

"meshgrid" takes a vector and translates it to create a square matrix (or grid)

This will give us a grid that we can iterate over at once

Polynomials and Derivatives

- In this lab, we will need to take polynomial functions and evaluate there derivatives also
- However, MATRICES
- We will need to encode these polynomials and make a function to derive them