

Investigation: What can you do with Newton's Method?

Newton's Method is a way to find zeros of a function by using tangent lines to make better and better guesses of a zero. Unfortunately, Newton's method does not always work. It can be undefined for some guesses. It can diverge and not find an answer. It can also get caught up in loop and bounce back and forth between answers.

The goal of this lab is to investigate how effective Newton's Method is on finding zeros to the sine function. In particular,

- a) Describe as best you can what the basin of attraction is for each zero. How many pieces are there in each basin of attraction? Where is each piece located? How large is each piece?
- b) Do other attractor(s) other than the zeros exist? If so, how do we find them? What are their basins of attraction?
- c) What type(s) of behavior can happen that would cause Newton's Method to fail? How do you find out where these occurs?

Investigation: Newton's Method in the Complex Plane.

See *Contemporary Calculus through applications*, published by Glencoe Publishing, and written by the mathematics faculty at NCSSM, pages 173-176.

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