Forester Scholar's Weekend

Lake Forest College

What we will do

1 Introductions.

2 Answer the questions about root finding here.

3 Explanation of the bisection methods

4 Explanation of Python . The following notebook

Open the notebook **tutorial.ipynb** using either:

- On Google collab.
- On Binder.

5 Answers the questions from the Jupyter notebook.

Open the notebook **RootFindgin.ipynb** using either:

- On Google collab.
- On Binder.

Once you are done,

- Save your notebook and download it.
- Rename your notebook **lastname_firstname.ipynb**
- Submit on Dropbox.

Notes

Definition: Roots (also called zeros)

The roots (or zeroes) of a function f are the values of x for which $f(x) = 0$.

For example. Let

$$f(x) = x^2 - 1.$$

The roots are the x's such that

$$f(x) = 0 \Leftrightarrow x^2 - 1 = 0 \Leftrightarrow x = 1 \text{ or } x = -1.$$

The roots (or zeros) are -1 and 1.

Bisection Methods

Start with a function f, the end points a and b, and the number of iteration N. The pseudocode goes as follows

```
i = 1
while i less that N
    c = (a + b)/2 // new midpoint
    if f(c) and f(b) have the same sign
        a = c
    if not
        b = c
    i = i+1
end while
```