

# Numerical-Integral-Approximation

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Uses matplotlib to visualize numeric integration techniques.

## Purpose

1. Visualize left endpoint, right endpoint, midpoint, trapezoid, and simpson's approximations of integrals.
2. Graphically show the error each method gives for a given function

## Requirements

1. Python
  1. Matplotlib
  2. Sympy
  3. Numpy

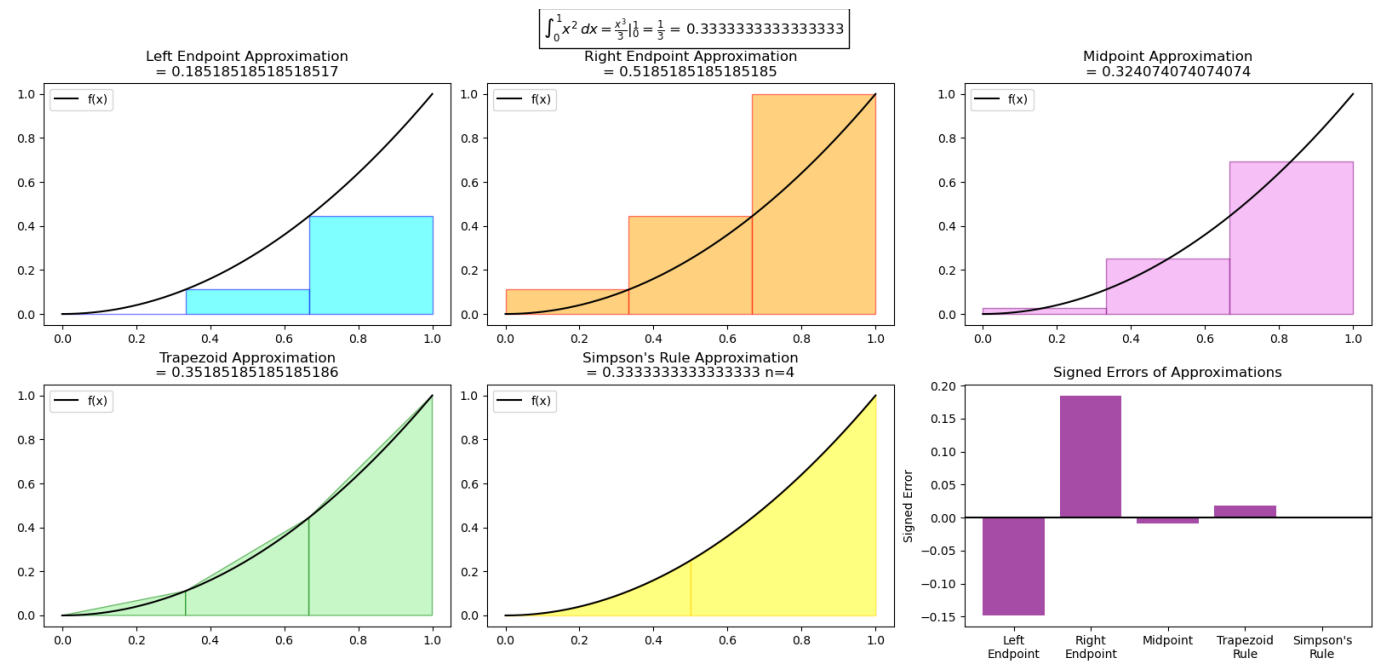
Install requirements with command: `pip install matplotlib sympy numpy` If that doesn't work, try this: `pip3 install matplotlib sympy numpy` If still not working ensure pip is installed: `python -m ensurepip --upgrade`

## Instructions

1. Run `main.py`
2. Follow prompts to enter:
  - Function
  - Variable in function (x, t, etc)
  - Lower bound for integral
  - Upper bound for integral
  - Number of subintervals(# of Rectangles/Trapezoids)
  - Quality of Graph (Independant of Riemann Sum calculations just number of points used to plot)
3. Press Enter

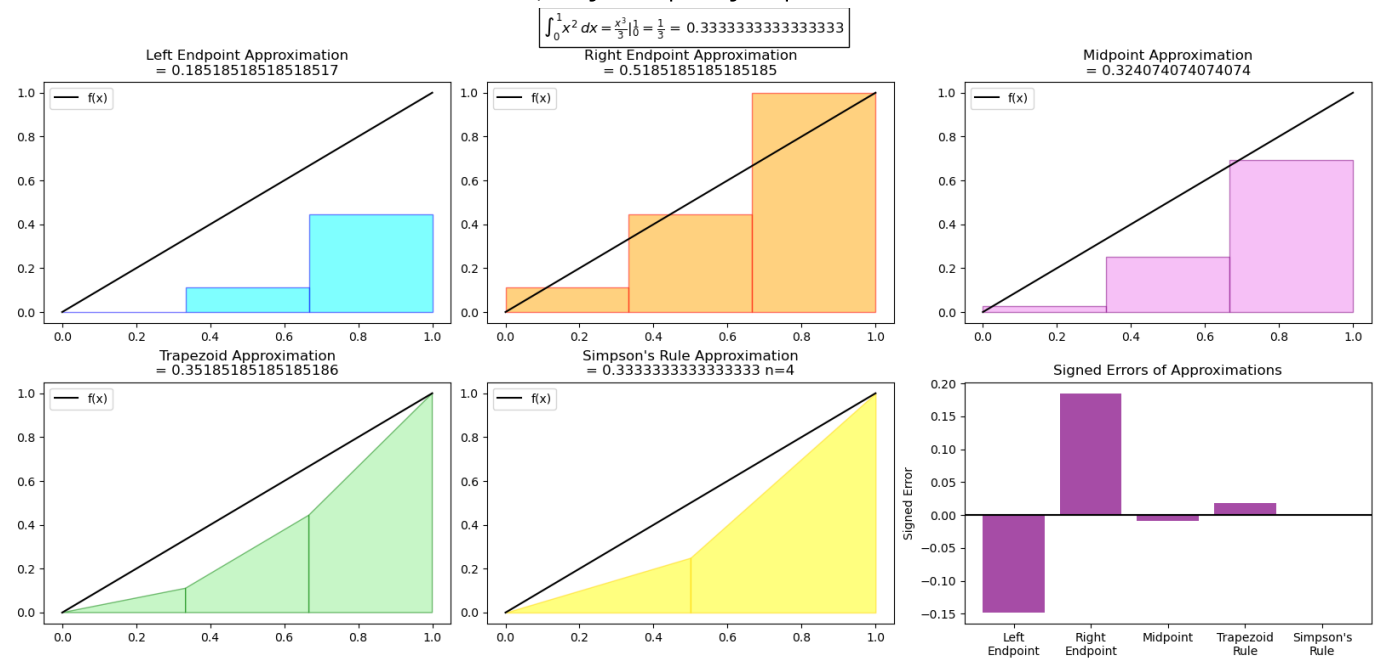
## Examples

Default case, when user doesn't give function.



Same function as above, but with quality set to 2 instead of 1000

Notice that sum calculations are the same, only the quality of plot is affected.



Known Issues:

- 1. Divide by zero is not handled. If an endpoint is undefined the approximation will give nan or inf.

