PROJECT 7 – NUMERICAL INTEGRATION

Due by 11pm Wednesday, November 24, 2020:

For the purposes of this project, a numerical integrator is a procedure which takes four arguments

- a function f
- the left end point a of the interval over which to integrate
- the right end point b of the interval over which to integrate
- the number of sub-intervals n to use in the numerical integration.

(1) Using a Mathematica command such as

```
numIntegrator[f_,a_,b_,n_]:=Module[{}, ...
```

create a numerical integrator for each of the following rules:
(a) left end point rule
(b) right end point rule
(c) trapazoid rule
(d) Simpson's rule

(2) Using Mathematica's `N` and `Integrate` functions, numerically integrate the function $f(x) = x + \sin x$ over the interval $[0, 10]$.

(3) Using the numerical integrator for the left end point rule that you defined in Part (1a), numerically integrate the function $f(x) = x + \sin x$ over the interval $[0, 10]$ using 10 sub-intervals.

(4) Using the numerical integrator for the right end point rule that you defined in Part (1b), numerically integrate the function $f(x) = x + \sin x$ over the interval $[0, 10]$ using 10 sub-intervals.

(5) Using the numerical integrator for the trapazoid rule that you defined in Part (1c), numerically integrate the function $f(x) = x + \sin x$ over the interval $[0, 10]$ using 10 sub-intervals.

(6) Using the numerical integrator for the Simpson's rule that you defined in Part (1d), numerically integrate the function $f(x) = x + \sin x$ over the interval $[0, 10]$ using 10 sub-intervals.

(7) Create a table which compares the numbers you obtained in parts (2) through (6) above.

(8) Repeat parts (3) through (7) above using 1000 sub-intervals instead of 10.