Reimann sums provide a useful method of approximating definite integrals. This is especially true if there is no function, but only data, to estimate the integral. However these programs will help you (i) check your answer when you do a simple Reimann sum, trapezoid approximation, or Simpson rule; (ii) compare all of the above for large values of n, the number of subintervals; and (iii) lead you to a deeper understanding of the defintion of the definite integral.

Beginning with version 1.3 on the TI−Nspire CAS, you can put this file in the 'MyLib' folder and refresh the library to use it the program while you are in any document. To refresh the library... while on the Calculator page, press MENU, arrow to the right when you go all the way down to Library. Choose 'Refresh Libraries.'

For more tns files (especially calculus) check out http://cs3.covenantchristian.org/bird/Nspire.html

Simpson = .083333333333
∫ = .083333333333

Done

rsa2(1,0,5)

left = .08
right = .08
midpoint = .085
trapezoid= .08
Simpson = .083333333333
∫ = .083333333333

Done

area\rsa2(1,0,7)

left = .081632653061
right = .081632653061
midpoint = .084183673469
trapezoid= .081632653061
Simpson = .083333333333
∫ = .083333333333

Done

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rs 8/8

Define LibPub **rs**(b,a,n)=

Prgm

©**rs**(b,a,n) Define **f1**(x), $\Delta x=\frac{b-a}{n}$

©*Reimann* Sum *rectangles with trapezoid, Simpson & definite in*

Disp "left =", $\sum_{i=1}^{n} \left(h\cdot \mathbf{f1}(a+(i-1)\cdot h)\right) | h=\frac{b-a}{n}$

Disp "right =", $\sum_{i=1}^{n} \left(h\cdot \mathbf{f1}(a+i\cdot h)\right) | h=\frac{b-a}{n}$

Disp "midpoint =", $\sum_{i=1}^{n} \left(h\cdot \mathbf{f1}\left(a+\left(i-\frac{1}{2}\right)\cdot h\right)\right) | h=\frac{b-a}{n}$

Disp "trapezoid=", $\sum_{i=1}^{n} \left(\frac{1}{2}\cdot h\cdot (\mathbf{f1}(a+(i-1)\cdot h)+\mathbf{f1}(a+i\cdot h))\right) | h=\frac{b-a}{n}$

Disp "Simpson =", $\frac{h}{3}\cdot \sum_{i=0}^{n-1} (\mathbf{f1}(a+2\cdot i\cdot h)+4\cdot \mathbf{f1}(a+(2\cdot i+1)\cdot h)+\mathbf{f1}(a$

Disp "∫ =", $\int^{b} \mathbf{f1}(x)dx$

rsa 2/7

Prgm

©**rsa**(b,a,n) Define **f1**(x), **rs** *approximate*

Disp "left =", $\sum_{i=1.}^{n} \left(h\cdot \mathbf{f1}(a+(i-1)\cdot h)\right) | h=\frac{b-a}{n}$

Disp "right =", $\sum_{i=1.}^{n} \left(h\cdot \mathbf{f1}(a+i\cdot h)\right) | h=\frac{b-a}{n}$

Disp "midpoint =", $\sum_{i=1}^{n} \left(h\cdot \mathbf{f1}(a+(i-.5)\cdot h)\right) | h=\frac{b-a}{n}$

Disp "trapezoid=", $\sum_{i=1}^{n} \left(\frac{1}{2.}\cdot h\cdot \left(\mathbf{f1}(a+(i-1)\cdot h)+\mathbf{f1}(a+i\cdot h)\right)\right) | h=\frac{b-}{n}$

Disp "Simpson =", $\frac{h}{3.}\cdot \sum_{i=0}^{n-1} \left(\mathbf{f1}(a+2\cdot i\cdot h)+4\cdot \mathbf{f1}(a+(2\cdot i+1)\cdot h)+\mathbf{f1}(\right.$

Disp "∫ =",approx$\left(\int_{a}^{b} \mathbf{f1}(x)\,dx\right)$

EndPrgm