QUADRATURE v1.1

This program calculates the approximate definite integral for a given function using the following methods: Trapezoidal Rule, Simpson 1/3 Rule, Simpson 3/8 Rule and Gauss-Legendre Quadrature.

Example:

Use the Newton-Cotes Methods with the indicated values of *n* to approximate the following integral:

$$\int_{-0.5}^{0.5} \mathrm{x} \times \ln(\mathrm{x}+1)\,\mathrm{dx}, n = 6$$

- Identify the necessary data:

  $\mathrm{f(x)} = \mathrm{x} \times \ln(\mathrm{x}+1)$

  lower limit: $\mathrm{a} = -0.5$

  upper limit: $\mathrm{b} = 0.5$

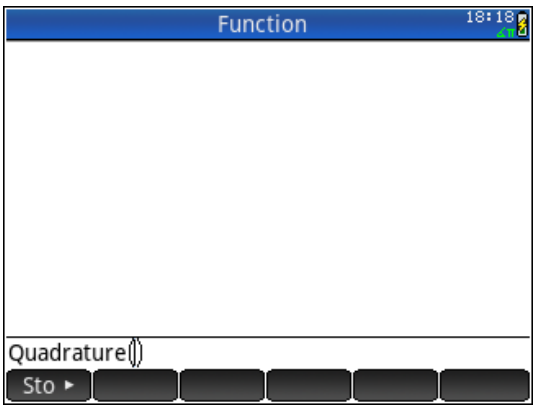
  segments size: $\mathrm{h} = \frac{0.5-(-0.5)}{6} = 0.1666667$

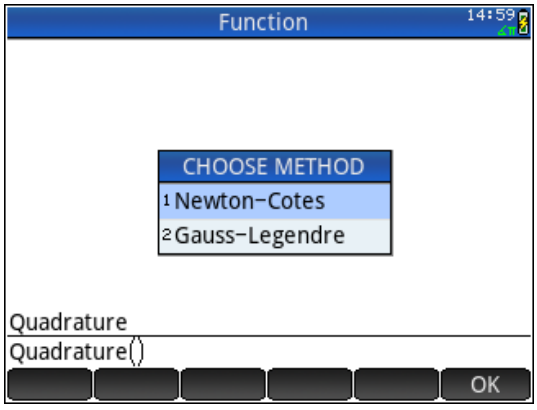
  number of segments: $n = 6$

  number of base points: $\mathrm{N} = 6 + 1 = 7$

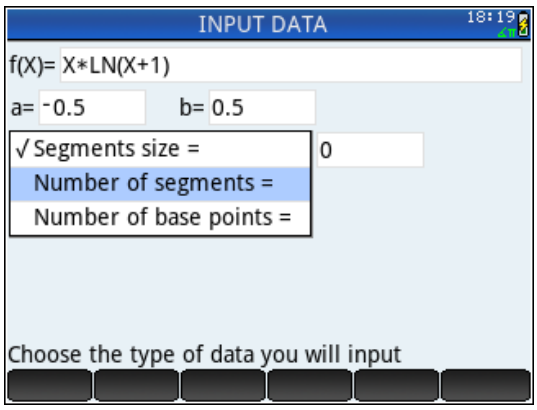
How to use the program:

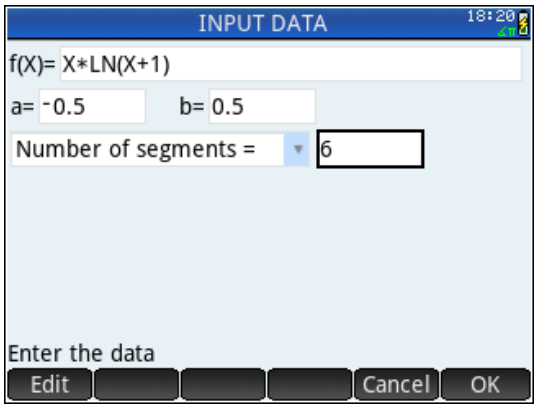
- Run the program in the HOME window and choose "Newton-Cotes".





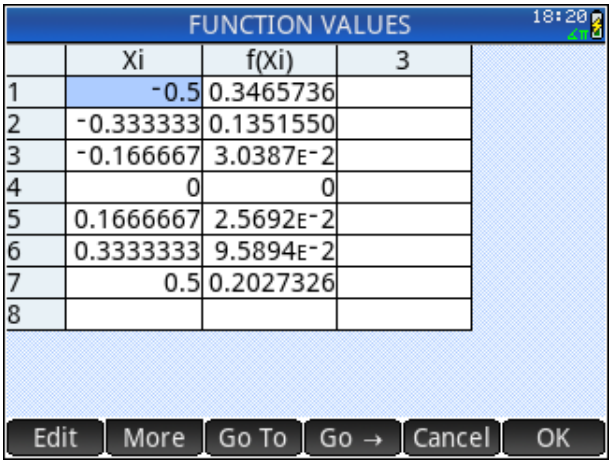
- Input the necessary data: function, lower limit, upper limit, plus an extra data which can be: segments size, number of segments or number of base points (notice that there's a box in which you can choose what data to enter).



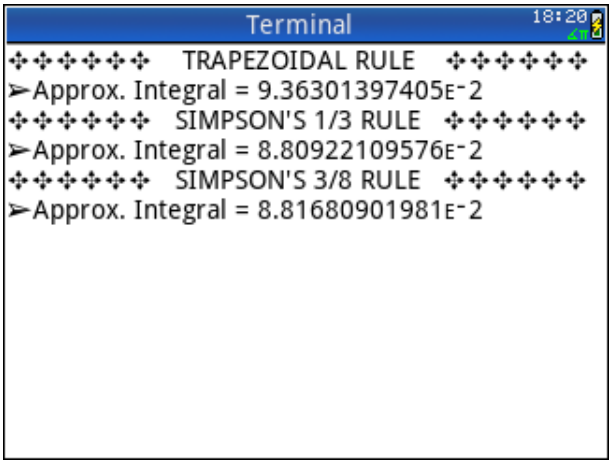


Results:

- Function values.



- Approximate integral.



NEW (v1.1): Gauss-Legendre Quadrature

Example:

Repeat exercise 1 using Gaussian quadrature with *n*=3.

$$\int_{-0.5}^{0.5} x \times \ln(x+1)\, dx$$

- Identify the necessary data:

  $f(x) = x \times \ln(x+1)$

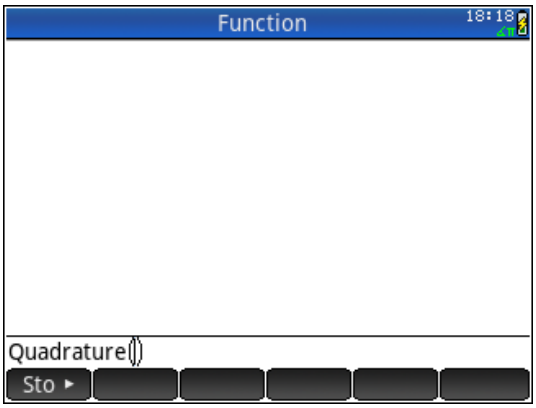
  lower limit: $a = -0.5$

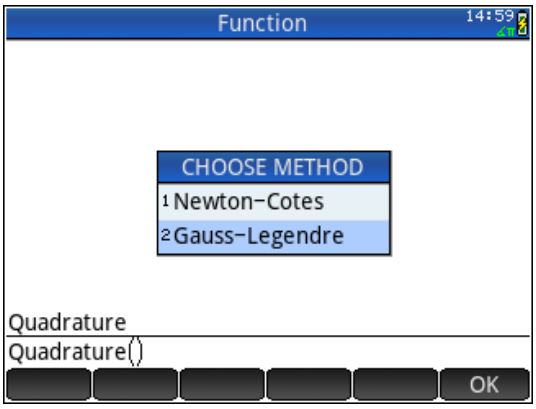
  upper limit: $b = 0.5$

  number of base points: $n = 3$

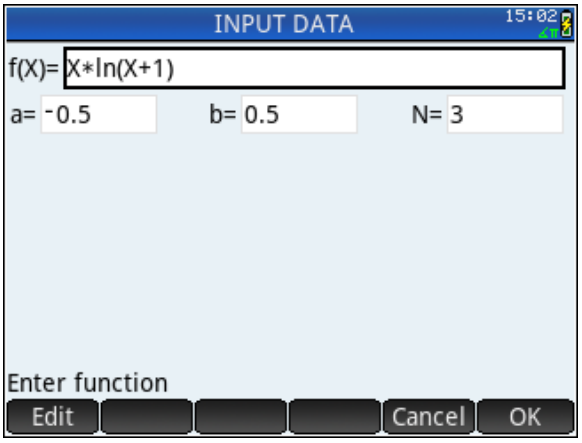
How to use the program:

- Run the program in the HOME window and choose "Gauss-Legendre".



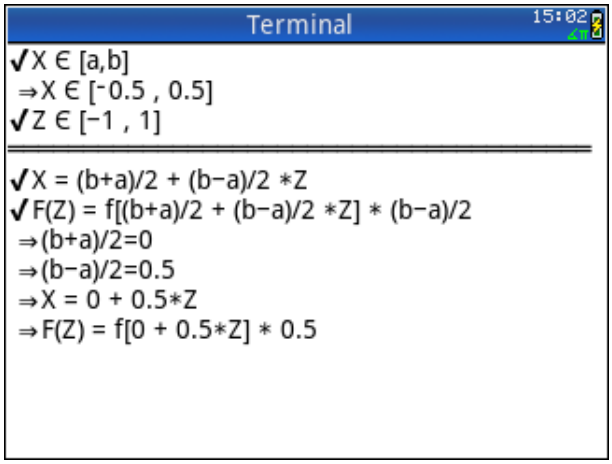


- Input the necessary data: function, lower limit, upper limit and number of base points.

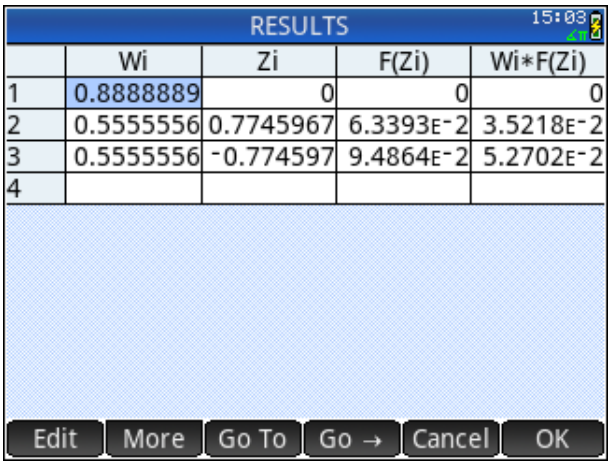


Results:

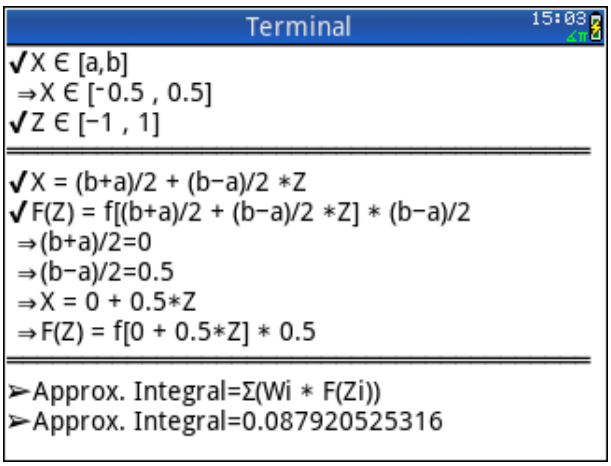
- Change of variables.



- Results: Weighting factors, function arguments and function values.



- Approximate Integral.



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