Use the Golden Section Search Method to locate the maximum of the function

$$f(x) = -x^6 - 2x^4 - 3x^1 + 1$$

between $x = -1$ and $x = 0.5$. There is only one such maximum. Do this by filling out the following table up to the number of rows indicated, either by hand or electronically by downloading the LaTeX template.

Solution

Step	a	$x_1 = b - Rh$	$x_2 = a + Rh$	b	h	next
0	-1.0	$x = -0.4271$ $f = 2.2086$	$x = -0.0729$ $f = 1.2188$	0.5	$1.5R^0$ $= 1.5$	$f_1 > f_2$ $\implies$ $[a, x_2]$
1	-1.0	$x = -0.6459$ $f = 2.5170$	$x = -0.4271$ $f = 2.2086$	-0.0729	$1.5R^1$ $= 0.9271$	$f_1 > f_2$ $\implies$ $[a, x_2]$
2	-1.0	$x = -0.7812$ $f = 2.3716$	$x = -0.6459$ $f = 2.5170$	-0.4271	$1.5R^2$ $= 0.5729$	$f_1 < f_2$ $\implies$ $[x_1, b]$
3	-0.7812	$x = -0.6459$ $f = 2.5170$	$x = 0.5623$ $f = 2.4554$	-0.4271	$1.5R^3$ $= 0.3541$	$f_1 > f_2$ $\implies$ $[a, x_2]$
4	-0.7812	$x = -0.6976$ $f = 2.5039$	$x = 0.6459$ $f = 2.5170$	-0.5623	$1.5R^4$ $= 0.2188$	$f_1 < f_2$ $\implies$ $[x_1, b]$
5	-0.6976	$x = -0.6459$ $f = 2.5170$	$x = -0.6140$ $f = 2.5041$	-0.5623	$1.5R^5$ $= 0.1353$	$f_1 > f_2$ $\implies$ $[a, x_2]$
6	-0.6976	$x = -0.6656$ $f = 2.5173$	$x = -0.6459$ $f = 2.5170$	-0.6141	$1.5R^6$ $= 0.0836$	$f_1 > f_2$ $\implies$ $[a, x_2]$