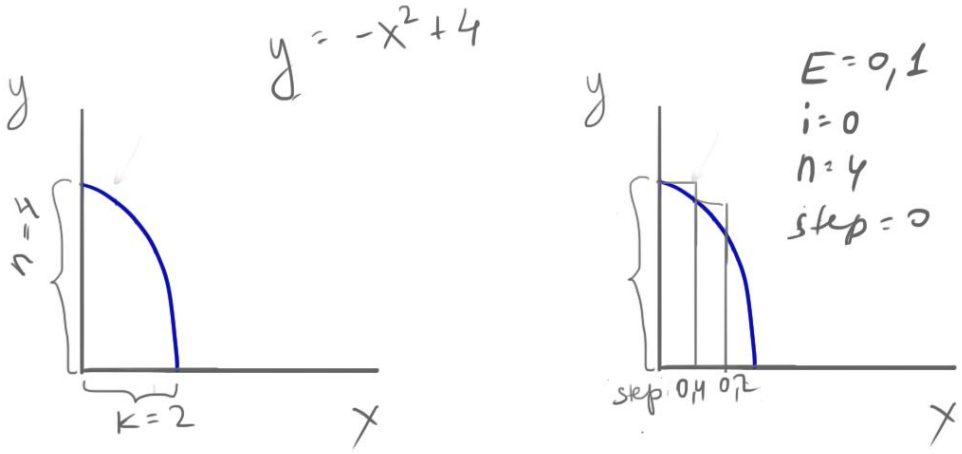
ADAPTIVE AREA CALCULATOR (Numerical)

Estimates the area under the graph of quadratic function adapting the step based on the slope of the curve.

Main working pronciple:

N = value of the function at the start of a step.

F(step) = value of the function at the end of a step



n – f(step) > E ?

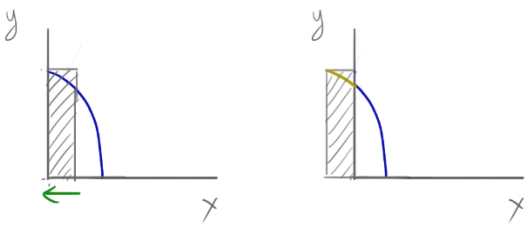
no:

step+=E; //continue

increasing the step variable

yes:

S+=n*step //add the calculated value to the existing area, then shift the graph to the left to discard the calculated part



Recommended E = 0.01

Tested functions:

-x^2+4	Output S = 10.675084	Actual Area = 10.6667
2*x^2-2*x-4	Output S = 8.994038	Actual Area = 9
x^2-4*x-1	Output S = 14.916087	Actual Area = 14.9072
-2*x^2+4*x+1	Output S = 4.88	Actual Area = 4.89

(Actual area calculated via WolframAlpha)