Rectangular rule, right or left rectangular rule:

We calculate the largest possible error of numerical calculating of the integral I =

using the rectangular rule IR.

We approximate our function f(x) with a constant at each small subinterval.

We must find the inequality for D = |I – IR|.

From 0 to h:

The straight line S(x) = sx + i goes through the points (x0, y0) and (x1, y1).

s = (y1 – y0)/h, i = y0. Here we take x0 = 0 and x1 = h.

d1 = |(y1 – y0)h/2 + hy0 – hy0| = |(y1 – y0)h/2| ≤ m1h2/2.

Here m1 is absolute maximum derivative f’(x) at the small interval [0, h].

S’(x) = s = (y1 – y0)/h.

Substituting h = (b – a)/n, we get d1 ≤ m1(b - a)2/(2n2) ≤ M1(b - a)2/(2n2).

There n small subintervals like [0, h].

D ≤ nM1(b - a)2/(2n2)

D = |I – IR| ≤ M1(b - a)2/(2n)

Here M1 is absolute maximum derivative f’(x) at the whole interval [a, b].