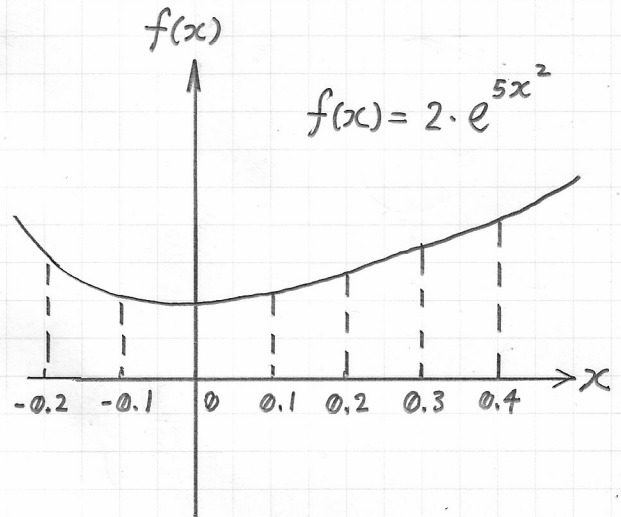


Integration with Stencil Tools

Say we want to perform integration on the function :-

$$I = \int_{-0.1}^{0.3} 2 \cdot e^{5x^2} dx$$

with intervals  $h = 0.1$



First, evaluate the function at required points

$$f(-0.2) = 1.63757, \quad f(-0.1) = 1.9024$$

$$f(0.0) = 2.00000, \quad f(0.1) = 2.1025$$

$$f(0.2) = 2.4428, \quad f(0.3) = 3.1366$$

$$f(0.4) = 4.4511$$

Refer attached stencil table

$$I = \int_{-0.1}^{0.3} f(x) dx = \frac{2(0.1)}{945} \left[ \begin{aligned} &(-4)(1.6375) + (171)(1.9024) + \\ &(612)(2.0000) + (332)(2.1025) + \\ &(612)(2.4428) + (171)(3.1366) + \\ &(-4)(4.4511) \end{aligned} \right]$$

$$I = 0.90 \#$$

