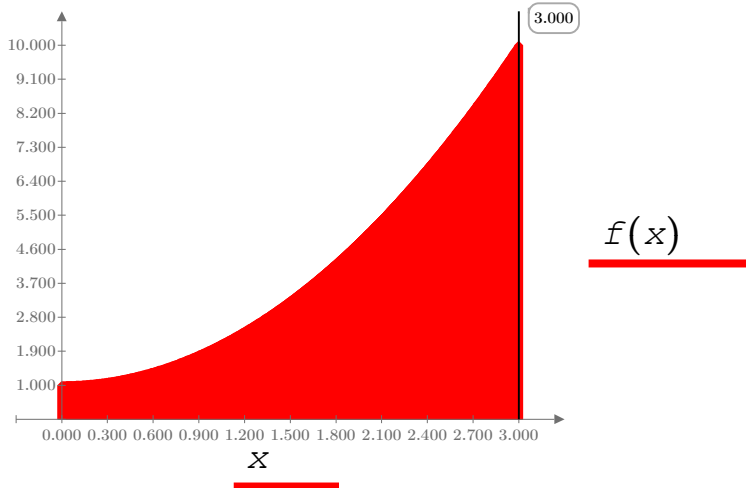


Definite Integrals

Consider the problem of determining the area under the curve $f(x) := x^2 + 1$, with x between $a := 0$ and $b := 3$. This is done by approximation method.

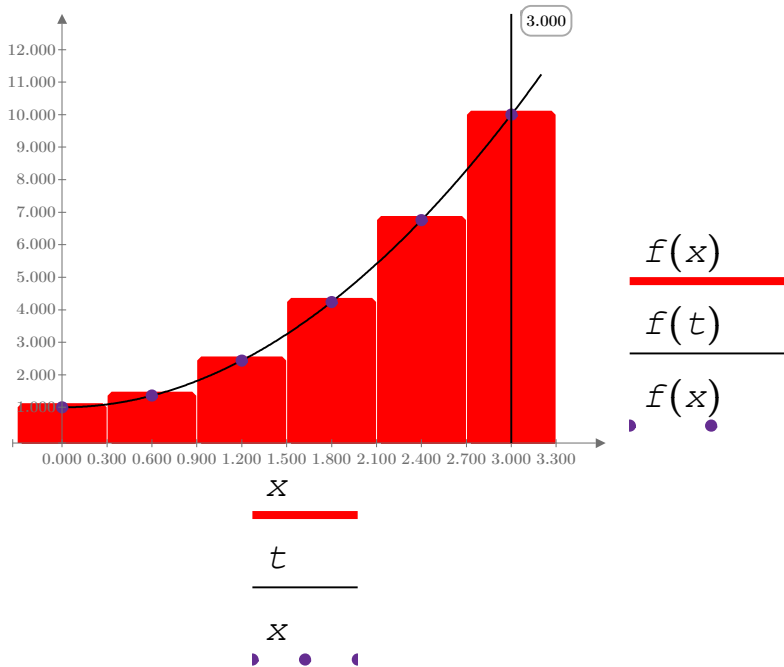


$$N := 5$$

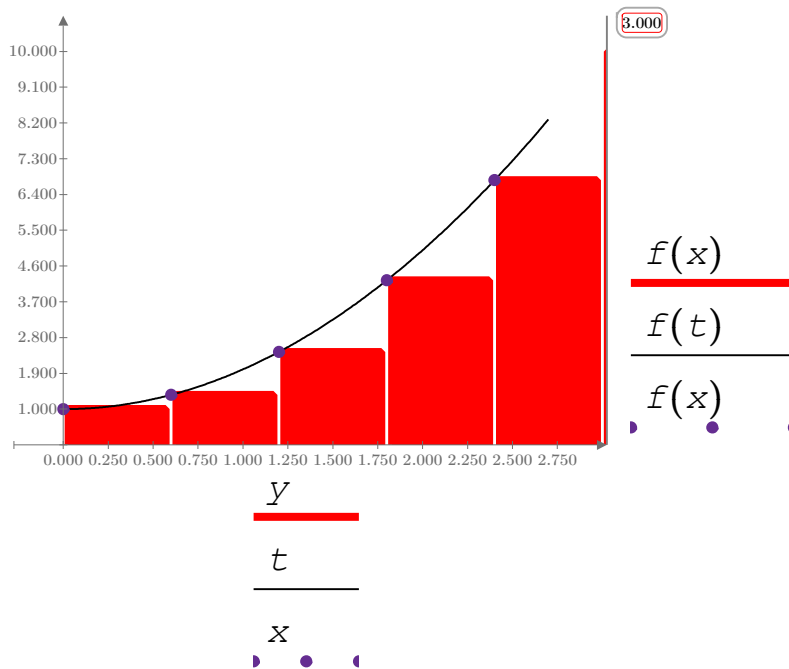
$$h := \frac{b-a}{N}$$

$$i := 1, 2 \dots N$$

$$x_0 := 0 \quad x_i := i \cdot h$$



$$y_0 := 0 + \frac{h}{2} \quad y_i := (i + .5) \cdot h$$



$$\sum_{i=0}^{N-1} h \cdot f(x_i) = 9.480$$

$$\sum_{i=1}^N h \cdot f(x_i) = 14.880$$

$$\int_a^b f(x) dx \rightarrow 12$$

$$\sum_{i=0}^{N-1} h \cdot f\left(x_i + \frac{h}{2}\right) = 11.910$$

References:

1. **G.Simmons.** Calculus With Analitic Geometry (1996): 6.1, 6.4.
2. **MIT** lection 03.19.2013.