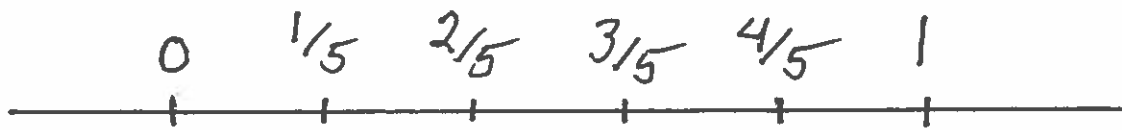


Example: Find T_5 , the Trapezoidal Estimate with $n=5$, for $\int_0^1 \ln(x+1) dx$.



$$h = \frac{1-0}{5} = \frac{1}{5} \quad \text{and} \quad f(x) = \ln(x+1),$$

$$T_5 = \frac{h}{2} \left[f(0) + 2f\left(\frac{1}{5}\right) + 2f\left(\frac{2}{5}\right) + 2f\left(\frac{3}{5}\right) + 2f\left(\frac{4}{5}\right) + f(1) \right]$$

$$= \frac{1/5}{2} \left[\overset{0}{\cancel{\ln 1}} + 2\ln\left(\frac{1}{5}+1\right) + 2\ln\left(\frac{2}{5}+1\right) + 2\ln\left(\frac{3}{5}+1\right) + 2\ln\left(\frac{4}{5}+1\right) + \ln(1+1) \right]$$

$$= \frac{1}{10} \left[2\ln\left(\frac{6}{5}\right) + 2\ln\left(\frac{7}{5}\right) + 2\ln\left(\frac{8}{5}\right) + 2\ln\left(\frac{9}{5}\right) + \ln 2 \right]$$

$$\approx 0.3846$$

Exact Value (Calculator):

$$\int_0^1 \ln(x+1) dx \approx 0.3862943611$$

Absolute % Error :

$$\frac{|0.3846 - 0.3862943611|}{0.3862943611}$$

$$\approx 0.00439$$

$$= 0.439 \%$$