Question 4 Griffin Lehrer

Use trapezoid rule with $h = \frac{1}{8}$ to compute

$$\int_0^1 \ln(1+x)\,dx$$

$$T_n(f) = \frac{h}{2}\left[f(x_0) + 2f(x_1) + 2f(x_2) + 2f(x_3) + f(x_4)\right]$$

$x_0 = 0 \quad x_1 = \frac{1}{4} \quad x_2 = \frac{1}{2} \quad x_3 = \frac{3}{4} \quad x_4 = 1$

$$T_4(f) = \frac{1}{8}\left[\ln(1+0) + 2\ln\left(1+\tfrac{1}{4}\right) + 2\ln\left(1+\tfrac{1}{2}\right) + 2\ln\left(1+\tfrac{3}{4}\right) + \ln(1+1)\right]$$

$$T_4(f) = \frac{1}{8}\left(\ln(1) + 2\ln\left(\tfrac{5}{4}\right) + 2\ln\left(\tfrac{3}{2}\right) + 2\ln\left(\tfrac{7}{4}\right) + \ln(2)\right)$$

$$T_4(f) = 0.383699509409$$