

Question 8

For an increasing function on $[0, 3]$, suppose

$$L_6 = 7.2, \quad R_6 = 8.7.$$

Find T_6 and bound the integral.

Question 8 – Solution

Step 1: Use the trapezoidal-average identity. With equal-width subintervals,

$$T_n = \frac{L_n + R_n}{2}.$$

Thus

$$\begin{aligned} T_6 &= \frac{7.2 + 8.7}{2} \\ &= \frac{15.9}{2} = 7.95. \end{aligned}$$

Step 2: Use monotonicity to bound the integral. Because f is increasing, left endpoints underestimate and right endpoints overestimate:

$$L_6 \leq I \leq R_6.$$

Therefore,

$$7.2 \leq I \leq 8.7.$$

$7.2 \leq I \leq 8.7, \quad T_6 = 7.95$
