# Homework 5-1:

① Count the graph points to get the left and right endpoint approach.

② $L_n = f(t_0)\Delta t + f(t_1)\Delta t \cdots f(t_{n-1})\Delta t$

$R_n = f(t_1)\Delta t + f(t_2)\Delta t \cdots f(t_n)\Delta t$

refer to the table:

$n=4$: $L_n = 6(39+38+35+31)$

$R_n = 6(38+35+31+29)$

$n=2$: $L_n = 12(39+35)$ ?

$R_n = 12(35+29)$

③ $v(t) = \frac{8}{2+t}$: $\Delta t = 0.2$

0 0.2 0.4 0.6 0.8 1

$L_n = 0.2\left(\frac{8}{2} + \frac{8}{2.2} + \frac{8}{2.4} + \frac{8}{2.6} + \frac{8}{2.8}\right)$

$R_n = 0.2\left(\frac{8}{2.2} + \frac{8}{2.4} + \frac{8}{2.6} + \frac{8}{2.8} + \frac{8}{3}\right)$

$L_n \approx 8.88$; $R_n \approx 8.11$; $A \approx 8.24$

④ $f(x) = \frac{17}{x}$; $\Delta t = 0.5$; $[2,4]$

$L_n = 0.5\left(\frac{17}{2} + \frac{17}{2.5} + \frac{17}{3} + \frac{17}{3.5}\right) \approx 12.912$

it is an overestimate

$R_n = 0.5\left(\frac{17}{2.5} + \frac{17}{3} + \frac{17}{3.5} + \frac{17}{4}\right) \approx 10.787$

it is an underestimate

⑤ $f(x) = \sqrt{6x}$; $\Delta t = 1$; $[0,4]$

$L_n = 1\left(\sqrt{6} + \sqrt{12} + \sqrt{18} + \sqrt{0}\right) \approx 10.156$

underestimate

$R_n = 1\left(\sqrt{6} + \sqrt{12} + \sqrt{18} + \sqrt{24}\right) \approx 15.056$

overestimate

$M_4 = 1\left(\sqrt{6(.5)} + \sqrt{6(1.5)} + \sqrt{6(2.5)} + \sqrt{6(3.5)}\right)$

$\approx 13.1876$

⑥ $\lim_{n\to\infty} \sum_{i=1}^{n} \frac{\pi}{6n} \tan\left(\frac{i\pi}{24n}\right)$

$f(x) = \tan\left(\frac{x}{4}\right)$

$A = 0$; $B = \pi/6$

⑦ $\lim_{n\to\infty} \sum_{i=1}^{n} \frac{7}{n}\sqrt{2+\frac{7i}{n}}$; easy elim

$f(x) = \sqrt{2+x}$

$A = 0$; $B = 7$