Task 1 & 2

Consider function $f(x) = \sin x$ in a period [a, b], then approximate f(x) by piecewise function

Task 1

- Step1: Draw the diagram of f(x)
- Step2: Cut [a,b] into a set of N intervals $I_j=[x_j,x_{j+1}]$
 - $\bullet \ \ x_0=a, x_N=b$
 - $j = 0, 1, 2, \dots, N$
 - Set a = -10, b = 10
- Step3: Plot piecewise functions $\tilde{f}(x)$
 - $ilde{f}(x)=f(x_{j+rac{1}{2}})$
 - $x \in [x_j, x_{j+1}]$
- Step4:

$$k \, N_x \, e_k = \sum_{j=0}^{n-1} \int_{x_j}^{x_{j+1}} | ilde{f}(x) - f(x)| \, log_2(rac{e_k}{e_{k-1}})$$

- 1 10
- 2 20
- 3 40
- 4 80

Task 2

- Step1: Draw the diagram of f(x)
- Step2: Cut [a,b] into a set of N intervals $I_j = [x_j,x_{j+1}]$
 - $\bullet \quad x_0=a, x_N=b$
 - $j = 0, 1, 2, \dots, N$
 - $\triangle x = \frac{b-a}{N}$
 - Set a = -10, b = 10
- Step3: Plot piecewise functions $\overline{f}(x)$
 - $ullet f(x) = rac{1}{ riangle x} \int_{I_j} f(x) dx$
 - $ullet x \in [x_j,x_{j+1}]$
- Step4:

$$k \ N_x \ e_k = \sum_{j=0}^{n-1} \int_{x_j}^{x_{j+1}} |\overline{f}(x) - f(x)| \ log_2(rac{e_k}{e_{k-1}})$$

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- 2 20
- 3 40
- 4 80