



Bilkent University

Quiz # 07
Math 101-Section 05 Calculus I
9 November 2023 Thursday
Instructor: Ali Sinan Sertöz



Name & Lastname:

Department:

Student ID:

Q-1) Let $f(x) = x^4$ on the interval $[0, 1]$. Subdivide this interval into n equal subintervals as

$0 = x_0 < x_1 < \dots < x_n = 1$. For this function and for this partition we define $L_n = \sum_{i=0}^{n-1} \frac{1}{n} f(x_i)$,

$U_n = \sum_{i=1}^n \frac{1}{n} f(x_i)$, $R_n = \sum_{i=1}^n \frac{1}{n} f(x_i^*)$, where each $x_i^* \in [x_{i-1}, x_i]$ is an arbitrarily chosen points.

(a) Calculate $\lim_{n \rightarrow \infty} L_n$.

(b) Calculate $\lim_{n \rightarrow \infty} U_n$.

(c) Calculate $\lim_{n \rightarrow \infty} R_n$.

Hint: $1^4 + \dots + n^4 = \frac{1}{5}n^5 + \frac{1}{2}n^4 + \frac{1}{3}n^3 - \frac{1}{30}n$.

Grading: 3+3+4=10 points

Solution: (Grader: taha.yigit@ug.bilkent.edu.tr)