

(QI) Prove that the function $f(x) = \begin{cases} x+5 & \text{if } x \in \mathcal{Q} \\ 0 & \text{if } x \notin \mathcal{Q} \end{cases}$ is not Riemann integrable on $[1, 2]$. 3

(QII) Prove that every continuous function on $[a, b]$ is Riemann integrable. 4

(QIII) Let $f(x) = x^2$ for $x \in [0, 4]$. Calculate the upper and lower Riemann sums for the partition $P = \{0, 1, 2, 3, 4\}$. 3