# Answer on Question #85418 – Math – Calculus

## Question

Find lower and upper integrals of $f$, defined on [ -1, 1], by $f(x) = \begin{cases} 1, \text{if x is rational} \\ 2, \text{if x is irrational} \end{cases}$

Hence check the integrability of $f$ on [ -1, 1].

## Solution

Lower integral is lower value multiplied by the length of the segment. It means that the lower integral (LI) is

$LI = 1 * 2 = 2.$

Similarly, the upper integral (UI) is

$UI = 2 * 2 = 4.$

The function can be considered integrable if for very small delta $LI$ and $UI$ tend to each other. This condition is not satisfied here, so the function is not integrable.