TU/CODL/MMS/SPR/2020

TEZPUR UNIVERSITY
Assignment (Spring) 2020
MMS 103: Real Analysis

Total Marks: 30

The figures in the right-hand margin indicate marks for the individual question.
All questions are compulsory.
Answers should be concise and entire answer to a question should be together. State assumptions wherever made.

1. Prove that $\partial(A) = \bar{A} \setminus Int(A)$, where $\partial(A)$ denotes the boundary of the set A. Hence or otherwise show that $\partial(A)$ is a closed set. **6**
2. Show that every open set in the real line is disjoint union of countably many open sets. **6**
3. Define continuity of a function at a point of a metric space. If X and Y be two metric spaces, then show that $f : X \to Y$ is continuous at a point $x_0 \in X$ if and only if for any open set V containing $f(x_0)$ in Y, there exists an open set U containing x_0 in X such that $f(U) \subseteq V$. **2+6**
4. Examine whether arbitrary union and intersection of compact sets are compact or not. What can be said about connectedness? **2+4+2+2**

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