

Assignment 6

MA1124 2024.

Q1. Given what the least upper bound axiom says, formulate the greatest lower bound axiom for $\mathbb{R}$ and prove that both of these are equivalent.

Q2. Define $d(a, b) = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$
for $a = (x_1, y_1)$, $b = (x_2, y_2) \in \mathbb{R}^2$.
Define $B_\epsilon(a) = \{b : d(a, b) < \epsilon\}$.
What is the shape of the set $B_\epsilon(a)$?
As in $\mathbb{R}$, define a is an interior point of a subset $A \subset \mathbb{R}^2$ means
 $\exists \epsilon > 0$ s.t. $B_\epsilon(a) \subset A$. Define
 A is open if every $a \in A$ is interior.
Given 6 examples of open sets. Make them as different as possible.