

Quiz 3 – MATH 4580 Spring 2023

- Two sets are **disjoint** or **mutually exclusive** if neither contains a point of the other.
- Two sets are **mutually separated** if neither contains either a point or a limit point of the other.
- A set is **not connected** if it can be expressed as the union of two non-null mutually separated sets.
- A set is **connected** if it is not the union of any two non-null mutually separated sets.

1. Is the empty set connected? Why or why not?

2. If $A \subset \mathbb{R}$ is connected and $B \subset \mathbb{R}$ is also connected, then must the intersection $A \cap B$ be connected? Why or why not? (an intuitive explanation is ok, a whole proof not necessary)

3. Draw a picture of two sets A and B in the plane \mathbb{R}^2 such that $A \cap B$ is not connected.