Math Thinking
Activity Questions
Week-1

Contents

1 2.2 Cantors diagonalization argument

1.

2 2.5 The least upper bound property

1. Let $S = \{\frac{(-1)^n}{2^n} | n \in \mathbb{N}\}$. Find the $Sup(S)$.
   Answer: 0.25

3 2.6 Mathematical logic and statements

2. Which of the following statements is equivalent to the statement "not(For all real numbers satisfying $a < b$, there exists an $n \in \mathbb{N}$ such that $a + \frac{1}{n} < b$')"?

   (a) There exist real numbers satisfying $a < b$ where $a + \frac{1}{n} < b$ for all $n \in \mathbb{N}$.

   (b) For some real numbers $a < b$, there exists an $n \in \mathbb{N}$ such that $a + \frac{1}{n} < b$'.

   (c) For all real numbers satisfying $a < b$ where $a + \frac{1}{n} < b$ for all $n \in \mathbb{N}$.

   (d) For some real numbers $a < b$ where $a + \frac{1}{n} < b$ for some $n \in \mathbb{N}$.

   Answer: (a)