

1. Write a formal definition for the *greatest lower bound* of a set $A \subset \mathbb{R}$

2. Identify the supremum and infimum of each set of real numbers

$$A = [1, 3), \quad B = \left\{ -\frac{3}{k} \mid k \in \mathbb{N} \right\}, \quad C = \{x \in \mathbb{R} \mid x^2 < 2\}$$

3. Let $S = \{r \in \mathbb{Q} \mid r^2 < 2\}$

Explain how S demonstrates that \mathbb{Q} does not satisfy AOC.

That is, S is a non-empty set of rational numbers that is bounded above, but S does not have a least upper bound that is rational.