Analysis Chapter 1

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1. Prove the $\sqrt{2}$ is not rational.

2. Prove that the product of two odd integers is also odd.

3. Let $A = \{a, b, c\}$. List the elements of $P(A)$.

4. Use the Archimedeam Property of $\mathbf{R}$ to prove that

$$\inf\{1/n : n \in \mathbf{N}\} = 0$$

5. Show that the set of all finite subsets of $\mathbf{N}$ is countable set.

6. Given sets A and B, explain why $A \sim B$ is equivalent to asserting $B \sim A$

7. Show that the open interval

$$(0, 1) = \{x \in \mathbf{R} : 0 < x < 1\}$$

is uncountable.

8. Let E be the set of even numbers. Show that $E \sim N$