Don't always blindly follow guidance and step-by-step instructions; you might run into something interesting - Georg Cantor

1 Review Topics

Logical operators, methods of proofs, set operations

2 Exercises

2.1 Negate the following statements

- Every math book is either funny or hard to read.

- Some economists like fishing.

- If it rains tomorrow, then I will join the circus.

2.2 Prove that if n is odd, then n^2 is odd.

2.3 Prove that any real number a satisfying $a^2 = 2$ must be irrational

2.4 Let $x, y > 0$, be real numbers. Prove that if $x \neq y$, $\log x \neq \log y$, both by contradiction and by proving the contrapositive.

2.5 Prove that the sum of the first n natural numbers is $\frac{n(n+1)}{2}$.

2.6 Let X be a set with n elements. Prove that the power set 2^X has 2^n elements.

2.7 Let A, B, and C be sets. Prove that $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.

2.8 Let A, B, and C be sets. Prove that if $A \subset B$, then $A \cup C \subset B \cup C$.