Lecture 6: Mathematical Statements

Learning Objectives

- Identify and provide mathematical Statements and their negations
- Determine if a statement is quantified

Mathematical Statements

Q: What is the goal when proving a mathematical statement?

A: To show that the statement is true

Example:

Statement: $2 + 2 = 4$

Proof: $2 + 2 = 4 \rightarrow 4 = 4 \rightarrow$ True

Negation: $2 + 2 \neq 4$

Statement: The Earth has one moon.

Proof: The Earth has one moon $\rightarrow$ The Earth has one moon $\rightarrow$ True

Negation: The Earth does not have one moon.

Statement: Find the smallest integer.

Proof: This is not a mathematical statement because it is not true or false.

Statement: $\pi + 2 \leq 5$

Proof: $\pi + 2 \leq 5 \rightarrow 5 \leq 5 \rightarrow$ True

Negation: $\pi + 2 > 5$

Definitions

Mathematical Statement: A sentence that is either true or false, but not both.

Negation: The negation of a statement P is the statement $\neg P$ that is true when P is false and false when P is true.