# Mathematics for Computer Science
# Week 1 Notes

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11/19/2025

# Reading

Chpater 1: Sections 1 - 3

# Definitions

**Proposition:** A proposition is a statement (communication) that is either true or false, but not both.

**Predicate:** a predicate can be understood as a proposition whose truth depends on the value of one more or more variables.

**Axioms:** a statement or proposition which is regarded as being established, accepted, or self-evidently true.

**Proofs:** A proof is a sequence of logical deductions from axioms and previously proved statemtns that concludes with the proposition in question.

**Theorem:** A theorem is a proposition that has been or needs to be proved on the basis of previously established statements,

**Lemmas:** A lemma is a proposition that is proved for use in the proof of another proposition.

**Corollary:** A corollary is a proposition that follows in just a few logical steps from a theorem.

# Math Symbols

- **::=** : means "equals by definition". It's always ok to write = instead of :=.
- $\forall$ **:** is read "for all" or "for every".
- $\mathbb{N}$ **:** is the set of natural numbers: $\{0, 1, 2, 3, \ldots\}$.
- $\in$ **:** means "is an element of" or "belongs to" or simply as "is in".
- $\mathbb{Z}^+$ **:** is the set of positive integers: $\{1, 2, 3, \ldots\}$.

- $P(n)$ **:** is a predicate with variable $n$. "note: $P(n)$ is not a proposition nor a function."
- $\exists$ **:** is read "there exists" or "there is at least one".
- $\wedge$ **:** is read "and".
- $\vee$ **:** is read "or".
- $\neg$ **:** is read "not".
- $\Rightarrow$ **:** is read "implies