

Introduction to L^AT_EX: and midterm review

Math 2001 class

September 30, 2019

1 Introduction

This document will be an introduction to L^AT_EX, where we discuss some of the basic formatting and tricks in typing. This sentence will be the end of the paragraph.

To start a new paragraph, skip a line. We will also discuss what we covered so far in class. Let me make this paragraph slightly longer.

2 Preliminaries

There are two ways to add math into our document. There is inline, where it keeps the math in the text, so for example $x^2 + 1 = 5$. Alternatively, we can display math in it's own line, as in

$$\sum_{k=0}^n \binom{n}{k} = 2^n. \tag{2.1}$$

And we can do some fancier stuff,

$$\left[\frac{\sqrt{x^{e^x+1} - 5x}}{\prod_{n=5}^{\infty} |\{a \in A \mid a \in B \cap C\}|} \right].$$

We can also do lemmas,

Lemma 2.1. For $n \in \mathbb{Z}_{\geq 0}$,

$$|\mathcal{P}(\{1, 2, \dots, n\})| = |\{0, 1\}^n|.$$

For main results, this document has a number of environments.

Theorem 2.2. The real number $\sqrt{2} \notin \mathbb{Q}$.

Proof. Suppose $\sqrt{2} = m/n$ where $m, n \in \mathbb{Z}$ with $n \neq 0$ and m/n reduced. □

Recall, we stated (2.1). We can also reference theorems, such as Theorem 2.2, or citations such as [1].

3 Main results

We've done a number of things in this class.

Basic set theory. Cardinality, subset (\subseteq), elements (\in), operations such as intersection (\cap), union (\cup), complement (\overline{A}), and difference ($B - A$), DeMorgan's laws, power sets, and the sizes of power sets.

Basic logic. Truth tables, grammar ($\vee, \wedge, \sim, \implies$ or \Rightarrow), and quantifiers (\forall, \exists), logical equivalence, conditional and biconditional statements, negation.

Basic proofs. Two types of proofs:

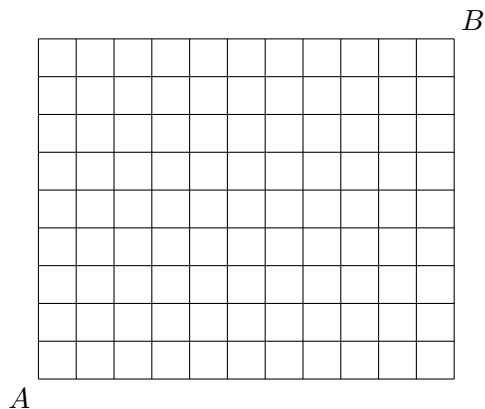
- Direct
- Indirect: contrapositive and contradiction.

Basic Counting. Subset counting ($\binom{n}{k}$), principles of counting arithmetic (OYC) and (ATY).

4 Appendix

For matrices,

$$\left[\begin{array}{ccc|c} \pi & 0 & 0 & -1 \\ 5 & \sqrt{2} & 11 & x^{15} \\ \hline 0 & 0 & 1 & 5 \end{array} \right]$$



References

- [1] Anon, *Sample bibliographic entry*, Universe University Press, 2020.