

# LaTeX and Discrete Math Cheatsheet

## Special Sets

- $\emptyset$  – The empty or aka null. `\emptyset`.
- $\mathbb{U}$  – The universe set. The set will all the elements. `\mathbb{U}`
- $\mathbb{N}$  – The set of natural numbers.  $\mathbb{N} = \{1, 2, ..\}$ . `\mathbb{N}`
- $\mathbb{Z}$  – The set of integers. Positives.  $\mathbb{Z}^+ = \{1, 2, 3, ..\}$ ; Negatives  $\mathbb{Z}^- = \{.., -3, -2, -1\}$ . `\mathbb{Z}`
- $\mathbb{Q}$  – The set of rational numbers. (a number that can be express as the ratio of two integers). `\mathbb{Q}`
- $\mathbb{R}$  – The set of real numbers. Combining the set of rational numbers and the set of irrational numbers. `\mathbb{R}`
- $\mathcal{P}(A)$  – The power set of any set A is the set of all subsets of A. `\mathcal{P}`

## Set Theory Notation

- $\{, \}$  – To enclose the elements of the set.
- $:$  – "such that"; For example  $\{x : x > 2\}$  reads as, for  $x$  such that  $x$  is greater than two.
- $\in$  – An element of;  $2 \in \{1, 2, 3\}$  asserts that 2 is an element of the set  $\{1, 2, 3\}$ . `\in`
- $\notin$  – Is not an element of;  $4 \notin \{1, 2, 3\}$  asserts that 4 is not an element of the set  $\{1, 2, 3\}$ . `\notin`
- $\subseteq$  – Is a subset of;  $A \subseteq B$  asserts that every element in A is an element in B. `\subseteq`
- $\subset$  – Is a proper subset of;  $A \subset B$  asserts that every element in A is an element in B but  $A \neq B$ . `\subset`

- $\cap$  – **Intersection** ("and", "both true");  $A \cap B$  is the intersection of A and B. `\cap`
- $\cup$  – **Union** ("or");  $A \cup B$  says we have a union of A and B. `\cup`
- $\times$  – **Cartesian Product**; For  $A = \{1, 2\}$  and  $B = \{3, 2\}$ , we'll have  $A \times B$  as  $\{1, 3\}, \{1, 2\}, \{2, 3\}, \{2, 2\}$ . `\times`
- $\setminus$  – **Set-minus**;  $A \setminus B$  says that we have set with all elements of A minus B. `\setminus`
- $\overline{A}$  – **The complement set of A**; a set of every element which is not in set A. `\overline{A}`
- $|A|$  – **Cardinality** (size) of A; The number of elements in the set A. `\in`

## Logical Connectives

- $\wedge$  – **Conjunction**. Similar as "and". `\wedge`
- $\vee$  – **Disjunction**. Similar as "or". `\vee`
- $\Rightarrow$  – **Implication**. Similar as "if-then". `\Rightarrow`
- $\neg$  – **Negation**. simply "not". `\neg`
- $\iff$  – **Equivalent**. "If and only if".

## Qualifiers

- $\exists$  – **Existential qualifier**. Reads "there is";  $\exists x(x < 0)$  reads as "there is number  $x$  that is less than zero". `\exists`
- $\forall$  – **Universal qualifier**. Reads "for all" or "every";  $\forall x(x > 0)$  reads as "for every number  $x$  that is more than zero". `\forall`

To use `\mathbb` notations please first add the package **amsmath** at the top of your document.