Numbers and Functions Tutorial Week 2 Handout

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1 Introduction

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My notes on *Basic Set Theory* and *Real Analysis* may be helpful for this course - they can be found on my site `http://www.p-adic.com`.

2 Notation

2.1 Set Theoretic Symbols

An alternative to the 'subset of' symbol $\subset$ is $\subseteq$ which helps in reducing ambiguity. You can think of this as an equivalent of $\leq$: $A \subseteq B$ means that A is either a **proper** subset of B or is equal to B. In this convention, we use $\subsetneq$ to denote proper inclusion: $A \subsetneq B$ means that A is a proper subset of B.

2.2 Logical Symbols

$\exists!$ is sometimes used to mean "there exists a **unique**..."

3 Set Theory

3.1 Sets

The set declaration notation in the following example

$$A = \{\, n \in \mathbb{N} \mid n \geq 0 \,\}$$

is often referred to as **set-builder notation** with the statement after the '|' or ':' being called the **entrance requirement** or **entry condition**.

The convention on whether or not $\mathbb{N}$ contains 0 is not widely accepted. Most pure mathematicians agree that $\mathbb{N}$ contains 0 since that is what most constructions of $\mathbb{N}$ yield.

3.2 Intervals

For those of you coming from the French system (or have experience in it), you may recognise $]a, b[$ for open intervals. This convention is not used very much, if at all, in the English system.