

MATH1081 notes

Nira (z5417727)

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1 1.1: Introduction

1. addition, multiplication, division and subtraction
2. Mainly dealing with finite sets

2 1.2: Sets and subsets

A set is a well defined collection of distinct objects

Example: $S = \{1, a, 3\}$, $A = \{\Pi, 1\}$.

1. $e \notin A$; it is not in A
2. For example, if A is a set of all integers; $\{\text{all even integers}\} = \{n \in \mathbb{R} | n \text{ is even}\}$.
3. We can remove superfluous items (elements that occur more than one).
 $A = \{1, 2, 3, 3\}$ where 3 can be removed.

Example:

$A = \{1, 2, 3\}$, $B = \{2, 3, 1\}$, $C = \{1, 2, 3, 3\}$, $D = \{1, 3\}$.

Here, D is a proper subset of A, B, C; A, B, C are supersets of D.

\subseteq : Subset (proper subset), \supseteq : Superset.

1. To prove if a set is a proper subset; do the following:

For example, if $D \in A$, then check if $e \in D$

If $e \in D$, then $e \in A$. Thus, it would be a proper subset (here, e is just an element).

2. To prove that two sets are equal;

For example, if $A = B$, prove:

- i) $A \subseteq B$; if an element is in A, then the element is in B.
- ii) $B \subseteq A$; if an element is in B, then the element is in A.

3 1.3: Power Sets and Stability