MATH301 Lecture 1

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Textbook chapters 1.1-1.5

1 Sets

A set is collection of objects. A set is like a bag of certain objects. The objects within a set are referred to as elements.

1.1 Notation

To refer to a set we generally use capital letters.
Given a set A and an alement a we use the notation $a \in A$
To describe the contents of a set we use braces as such

$$A = \{1, 2, 3, 4, 5\}$$

To talk about a subset we use the following notation:

$$\{1, 2, 3\} \subseteq A$$

Order of elements does not matter when describing a set. Repitition of elements does not matter when describing a set.
Some important sets within mathematics:

$$\mathbb{N} = \{1, 2, 3, 4, ...\} \text{ Natural Numbers}$$

$$\mathbb{Z} = \{..., -2, -1, 0, 1, 2, ...\} \textbf{ The integers}$$

$$\mathbb{E} = \{..., -4, -2, 0, 2, 4, ...\} \textbf{The even numbers}$$

$$\emptyset = \{\} \textbf{The empty set}$$

1.2 Set builder Notation

$$\mathbb{E} = \{2k | k \in \mathbb{Z}\}$$

The format for set builder notation is the following

$$\textbf{Set} = \{\textbf{formula} | \textbf{Criterion}\}$$

The Cardinality of a set is the number of elements in that set

$$\textbf{Let S be a set } S = \{a, b, c\}, |S| = 3$$