Section 1.1

Inductive specification is a method for specifying a set of values. For example, let's consider a set $S \subseteq \mathbb{N}$. We can define S as follows:

Definition 1. *A natural number $n \in S$ if and only if*

1. $n = 0$, *or*
2. $n - 3 \in S$.

We can write this definition another way:

Definition 2. *Define the set S to be the smallest set contained in $\mathbb{N}$ and satisfying the following two properties:*

1. $0 \in S$, *and*
2. *if $n \in S$, then $(n + 3) \in S$.*

And also...

Definition 3.

$$\frac{}{0 \in S} \qquad \frac{n \in S}{(n+3) \in S}$$

The first definition is called the top down definition of S. We call it such because