MTH 447: Lecture 1

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Natural number Axioms (Peano Axioms):

1. $1 \in \mathbb{N}$
2. If $n \in \mathbb{N}$, then $n+1 \in \mathbb{N}$
3. 1 is not the successor of any number in $\mathbb{N}$
4. If m and n have the same successor, then $m = n$
5. If $x \subseteq N$ such that
6. (a) $1 \in X$
   (b) if $n \in X$ and $n+1 \in X$

   Then $X = \mathbb{N}$. This is the Principle of Induction.

Definition 0.1. *Induction. Given some property $P(n)$, then if $P(1)$ is true and $P(n) \implies P(n+1)$ for all $n \in \mathbb{N}$. Then for all $k \in \mathbb{N}$, $P(k)$.*