Section 1.4: Mathematical Induction

**Theorem 1.16 The First Principle of Mathematical Induction [PMI.1]** Let $S$ be a collection of natural numbers that satisfies the following conditions:

(i) $S$ contains the natural number, $b$, and
(ii) If $i$ is in S, then $i+1$ is in $S$.

Then $S$ contains all natural numbers, $n$, with $n \geq b$.

**Theorem 1.17 The Second Principle of Mathematical Induction [PMI.2]** Let $S$ be a collection of natural numbers that satisfies the following conditions:

(i) $S$ contains the natural number, $b$, and
(ii) If $b, b+1, \ldots, i$ are in S, then $i+1$ is in $S$.

Then $S$ contains all natural numbers, $n$, with $n \geq b$.