Reading Questions 10

page 149 Principle 5.1.1

page 149 Problem 3

1. The Principle of Mathematical Induction can be used to prove a statement is true for all positive integers.
2. The Principle of Mathematical Induction could be used to prove a statement is true for all integers in the set $\{21, 22, 23, 24, \dots\}$.
3. What is the value of $\sum_{i=1}^{3}(2i-1)$?

Section 5.1 Mathematical Induction (Part 1)

Principle of Mathematical Induction

P 1. Prove that $1 + 5 + 9 + \cdots + (4n-3) = 2n^2 - n$ is true for all positive integers n.

P 2. Prove that $1^2 + 2^2 + 3^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}$ for $n \geq 1$.

P 3. Compute $\sum_{i=0}^{3} 2i + 1$ and $\sum_{i=0}^{3} 1$.

P 4. Prove that $\sum_{i=1}^{n}(i+1)2^i = n2^{n+1}$ for $n \in \mathbb{N}$.

P 5. Suppose a rectangle is subdivided into regions by means of straignt lines each extending from one border of the rectangle to another. Prove that the regions of the "map" so obtained can be colored with just two colors in such a way that bordering "countries" have different colors.