15-151 EXCEL

Topic: **Exam reflection. Integer properties. Induction.**
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Academic Development
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Agenda

1) Exam reflection
2) Properties of integers
    - Parity and divisions
    - Naturals
    - The Fibonacci numbers
3) The concept of induction
    - The principle
    - Examples

Principle of mathematical induction (weak)

Let $p(n)$ be logical formula with free variable $n \in \mathbb{N}$, and let $n_0 \in \mathbb{N}$. If

i) $p(n_0)$ is true; and

ii) For all $n \geq n_0$, if $p(n)$ is true, then $p(n+1)$ is true;

then $p(n)$ is true for all $n \geq n_0$.

[Instruction] Identify the following concepts in the principle.

Base case _____

Induction step _____

Induction hypothesis _____

Induction goal _____

Prove the following formula on $n \in \mathbb{N}, n \geq 1$.

$$\sum_{i=1}^{n} i^2 = \frac{1}{6} n(n+1)(2n+1)$$