Evaluation of Proof Exercise

Following the instructions for (linked) *Evaluation of Proofs* exercises (which also are posted on the course homework page), evaluate the below justification of the given conjecture.

►. **Conjecture A**. If n is an odd integer, then $n+6$ is an odd integer.

hint. Symbolically written: $(\forall n \in \mathbb{Z})\ [\ n \text{ is odd} \implies n+6 \text{ is odd}\ ]$

Proposed Proof. For $n+6$ to be an odd integer, there must exist an integer k such that

$$n+6 = 2k+1.$$

By subtracting 6 from both sides of this equation, we obtain

$$\begin{aligned} n &= 2k-6+1 \\ &= 2(k-3)+1. \end{aligned}$$

By the closure properties of the integers, $(k-3)$ is an integer, and hence, the last equation implies that n is an odd integer. This proves that if n is an odd integer, then $n+6$ is an odd integer. □

Warning. If you provide a proof, you may **not** use the lemmas on the Ch. 1 Handout. So you can **not** use Lemma POO and friends. **Use** the definition of even/odd.

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