Math Homework

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Problem 1

Proof:

> Assume there exists an $a \in \mathbb{N}$ such that $\forall a \in \mathbb{N}$ for all $b \in \mathbb{N}$.

> $a - 1 \in \mathbb{N}$, so it is not true that $a \in \mathbb{N}$ for all $b \in \mathbb{N}$. Therefore, the assumption is false. ■

Problem 2

a)

$2 + 4 = 6$

b)

$40\%3 = 1$

Problem 3

a)

i)

The set of states is $\mathbb{N} \times \mathbb{N} : \{(h, t) \mid h, t \in \mathbb{N}^{\geq 2}\}$, where (h, t) represents the state with h heads and t tails.

ii)

The start state is $(40, 4)$.

b)

Proof:

> $P(n) := a_n \leq c \cdot 2^n$

> This is a sample proof! ■