Quiz 1

Answer the following questions **TRUE** of **FALSE**. Please be careful. No justification is required. *(Grading: correct: +5; incorrect: -5; no answer: 0)*

1. If the well-formed formula ϕ is a tautology then ϕ is satisfiable.

2. If $\sqrt{2}$ is rational then π is rational.

3. The n-ring Towers of Hanoi problem can be solved in n^2 moves.

4. A circuit of a AND gates, b OR gates, and c NOT gates can be replaced by a logically equivalent circuit of $2a + 3b + c$ NAND gates.

5. If A and B are finite sets then $|A \cup B| = |A| + |B|$.

6. For any finite set A it is the case that $|\mathcal{P}(A)| > |A|$.

Complete the following. *(Grading: fully correct: 5; blank: 0; wrong: -5.)*

- Compactness theorem. Let S be a set of well-formed formulaes. Suppose that every finite subset of S is satisfiable. Then

- For every integer $i \geq 0$, let $A_i = [-i, i]$. Then $\bigcap_{i \geq 1} A_i =$

  (Provide a simple-looking answer. Remember that $[a, b] = \{x \in \mathsf{R} : a \leq x \leq b\}$.)