Practice Examination 2

CS 313H

1. [15] Prove that $((\exists x)Px \wedge A)$ follows from $(\exists x)(Px \wedge A)$.

2. [10] For any sets A and B, prove that $A \sim (A \sim B) = A \cap B$.

3. [20] Using induction prove for $n \geq 2$, that $\prod_{k=2}^{n}(1-\frac{1}{k^2}) = \frac{n+1}{2n}$.

4. [10] For any sets A and B, prove that $P(A \cap B) = P(A) \cap P(B)$.

5. [10] Given a set A and two symmetric relations R and S on A, prove or disprove with a simple counter-example: $R \circ S$ is symmetric.

6. [20] Consider the relation R on $\mathbb{Z}$, the set of integers: $R = \{(x, y) : x + y \text{ is even}\}$. Prove that R is an equivalence relation.