Tutorial 2

CSCI2110/MATH2080: Discrete Mathematics

1.3 - Propositional Equivalence

1.4 - Predicates and Quantifiers

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Question 1 - Find Errors in Proof

(Rosen 24/80) Identify the error or errors in this argument that supposedly shows that if $\forall x(P(x) \vee Q(x))$ is true then $\forall x P(x) \vee \forall x Q(x)$ is true.

1. $\forall x(P(x) \vee Q(x))$ Premise
2. $P(c) \vee Q(c)$ Universal instantiation from (1)
3. $P(c)$ Simplification from (2)
4. $\forall x P(x)$ Universal generalization from (3)
5. $Q(c)$ Simplification from (2)
6. $\forall x Q(x)$ Universal generalization from (5)
7. $\forall x P(x) \vee \forall x Q(x)$ Conjugation from (4) and (6)

Question 2 - Proof by Contradiction

Prove that there are infinitely-many prime numbers. (Note: This is a challenging problem!)