Quiz 1

1. Find an assignment to the atomic statements p, q, r such that the statement below is false. (3 pts.)

$$[(p \vee \neg r) \leftrightarrow (q \rightarrow r)] \vee r$$

2. Prove that the argument below is valid. (9 pts.)

$$\begin{array}{l} p \vee \ (q \rightarrow r) \\ \neg q \rightarrow \neg r \\ \hline \neg p \rightarrow (q \leftrightarrow r) \end{array}$$

3. True/false section. Circle one. No justification required. (2 pts. each)

True or False. For every real number x there exists a natural number n such that $n > x$.

True or False. There exists non-empty sets A, B such that $A \cap B \supseteq B$.

True or False. For every sets A, B, C we have $A \cap (B \cap C)^c = (A \cup B) \cap (A \cup C)$.

True or False. The statement $p \leftrightarrow q$ is false if p and q are both false.