hw-3 (2023/09/26)　　姓名:　　学号:

*p15*: 11-(a)　Show, using Proposition 1.14 and 1.17, that the statement form $((\neg(p \vee (\neg q))) \rightarrow (q \rightarrow r))$ is logically equivalent to each of the following.

(a) $((\neg(q \rightarrow p)) \rightarrow ((\neg q) \vee r))$

..... *Recall that*: .....

**Proposition 1.14**: If $\mathscr{B}_1$ is a statement form arising from the statement form $\mathscr{A}$ by substituting the statement form $\mathscr{B}_1$ for one or more occurrences of the statement form $\mathscr{A}$ in $\mathscr{A}_1$, and if $\mathscr{B}$ is logically equivalent to $\mathscr{A}$, then $\mathscr{B}_1$ is logically equivalent to $\mathscr{A}_1$.

**Proposition 1.17 (De Morgan's Laws)**: Let $\mathscr{A}_1, \mathscr{A}_2, \cdots \mathscr{A}_n$ be any statement forms. Then:

1. $(\bigvee_{i=1}^{n}(\neg\mathscr{A}_i))$ is logically equivalent to $(\neg(\bigwedge_{i=1}^{n}\mathscr{A}_i))$.
2. $(\bigwedge_{i=1}^{n}(\neg\mathscr{A}_i))$ is logically equivalent to $(\neg(\bigvee_{i=1}^{n}\mathscr{A}_i))$.

.....

**Your answer**: