

#1. The logical operator " $\leftrightarrow$ " is read "if and only if."
 $P \leftrightarrow Q$ is defined as being equivalent to $(P \rightarrow Q) \wedge (Q \rightarrow P)$. Based on this definition, show that $P \leftrightarrow Q$ is logically equivalent to $(P \vee Q) \rightarrow (P \wedge Q)$. By using truth tables.

#2. Let p and q be the propositions "Swimming at the New Jersey shore is allowed" and "Sharks have been spotted near the shore," respectively. Express each of these compound propositions as an English sentence.

a) $\neg q$

b) $p \wedge q$

c) $\neg p \vee q$

d) $p \rightarrow \neg q$

Good Luck!