Problem 1

p	q	$(p \to q)$	$\neg q$	$\neg p$	$(\neg q \to \neg p)$	$((p \to q) \leftrightarrow (\neg q \to \neg p))$
T	T	T	F	F	T	T
T	F	F	T	F	F	T
F	T	T	F	T	T	T
F	F	T	T	T	T	T

Problem 2

Problem 3

Yes it is true. $F(b)$ is false according to our model. By the definition of implication, a false antecedent yields a true expression regardless of the value of consequent.

Problem 4