Extra Practice

You MUST use good notation and show appropriate work.

Math 102

(Section 2.4)

Name Key

2.4 Conditional and Biconditional

1. Complete the following truth tables. Circle your final answers.

(a)

p	q	$p \to q$	$\sim q \to \sim p$	$\sim p \vee q$	$p \wedge (\sim q)$	$\sim (p \leftrightarrow q)$
T	T	T	T F T	F T T	T F F	F T
T	F	F	T F F	F F F	T T T	T F
F	T	T	F T T	T T T	F F F	T F
F	F	T	T T T	T F F	F F T	F T

(b)

p	q	r	$(p \to q) \to r$	$(p \to q) \leftrightarrow \sim r$
T	T	T	T T T	T F F
T	T	F	T F F	T T T
T	F	T	F T T	F T F
T	F	F	F T F	F F T
F	T	T	T T T	T F F
F	T	F	T F F	T T T
F	F	T	T T T	T F F
F	F	F	T F F	T T T

2. Use truth tables to argue that $p \to (q \wedge r)$ is logically equivalent to $(p \to q) \wedge (p \to r)$.

p	q	r	$p \to (q \wedge r)$	$(p \to q) \wedge (p \to r)$
T	T	T	T T T	T T T
T	T	F	F F F	T F F
T	F	T	F F T	F F T
T	F	F	F F F	F F F
F	T	T	T T T	T T T
F	T	F	T F F	T T T
F	F	T	T F T	T T T
F	F	F	T F F	T T T

They are logically equivalent as the dominant columns ma