Discrete Math
Quiz 5

Name:_____

You have 10 minutes to complete this quiz. If you have a question raise your hand and remain seated. In order to receive full credit your answer must be **complete**, **legible** and **correct**. Show your work, and give adequate explanations.

1. Write down the contrapositive, the converse, and the inverse of "If it is raining, then the ground is wet." $(p \to q)$

(a) Contrapositive: "If the ground is not wet, then it is not raining."
$((\neg q) \to (\neg p))$

(b) Converse: "If the ground is wet, then it is raining."
$(q \to p)$

(c) Inverse: "If it is not raining, then the ground is not wet."
$((\neg p) \to (\neg q))$

2. Show that $p \leftrightarrow q$ is logically equivalent to $(p \to q) \wedge (q \to p)$.

It suffices to observe that the column for $p \leftrightarrow q$ (3rd column) equals the column for $(p \to q) \wedge (q \to p)$ (6th column).

p	q	$p \leftrightarrow q$	$p \to q$	$q \to p$	$(p \to q) \wedge (q \to p)$
0	0	1	1	1	1
0	1	0	1	0	0
1	0	0	0	1	0
1	1	1	1	1	1