Solutions for Quiz #1

August 26, 2003

1. { 6 points } **Determine whether the following pair of statement forms are logically equivalent. Justify your answer using a truth table.**

$$p \wedge (q \vee r) \qquad \text{and} \qquad (p \wedge q) \vee (p \wedge r)$$

The statement forms are logically equivalent.

p	q	r	$q \vee r$	$p \wedge (q \vee r)$	$p \wedge q$	$p \wedge r$	$(p \wedge q) \vee (p \wedge r)$
T	T	T	T	**T**	T	T	**T**
T	T	F	T	**T**	T	F	**T**
T	F	T	T	**T**	F	T	**T**
T	F	F	F	**F**	F	F	**F**
F	T	T	T	**F**	F	F	**F**
F	T	F	T	**F**	F	F	**F**
F	F	T	T	**F**	F	F	**F**
F	F	F	F	**F**	F	F	**F**

2. { 4 points } **Use De Morgan's laws to write negations of the following statements.**

Sam swims on Thursdays and Kate plays tennis on Saturdays.

Sam doesn't swim on Thursdays or Kate doesn't play tennis on Saturdays.

The train is late or my watch is fast.

The train is not late and my watch is not fast.