MATH 205 L01   Winter 2002
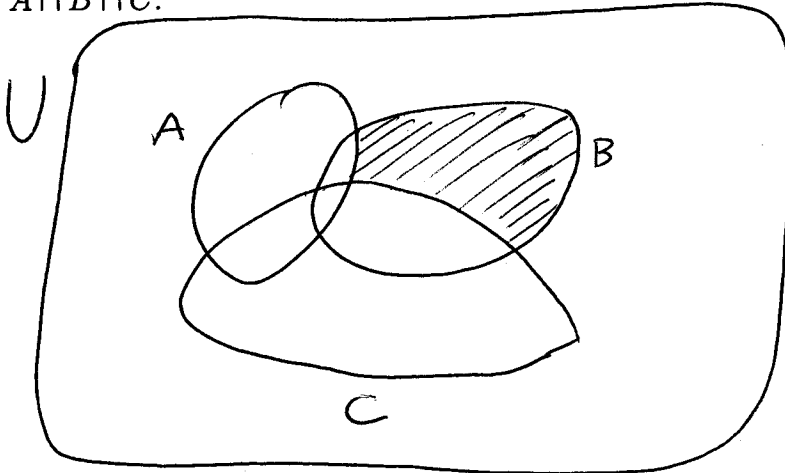
Quiz 5 B01,   B03
30 Minutes

NAME: _____ KEY _____   ID: _____

No Calculators

1. For sets A, B, C, draw a Venn diagram that illustrates the set
   $\overline{A} \cap B \cap \overline{C}$.   [25]

No partial credit

2. A class consists of 34 students who are over 19 years old, and 35 students who are under 23 years old. If the number of students who are over 19 *and* under 23 is 17, how many students are in the class?   [25]

$$n = 34 + 35 - 17 = 34 + 18 = \boxed{52}$$ *No partial credit*

3. Construct a truth table for $(\sim p \lor q) \rightarrow (p \land \sim q). \equiv S$ [25]

p	q	$\sim p \lor q$	$p \land \sim q$	S
T	T	T	**F**	F
T	F	F	T	T
F	T	T	F	F
F	F	T	F	F

(-5) for each
error in last column

4. Simplify the expression $\sim [p \land (\sim q \lor \sim r)]. \equiv T$ [25]

$$T \equiv \sim \left[(p \land \sim q) \lor (p \land \sim r) \right] \leftarrow \text{(10)}$$

$$\equiv \sim (p \land \sim q) \land \sim (p \land \sim r) \leftarrow \text{(20)}$$

$$\equiv \boxed{(\sim p \lor q) \land (\sim p \lor r)} \text{ (25)} \quad \text{OK here, or can}$$
further simplify to

$$\equiv (\sim p \land \sim p) \lor (\sim p \land r) \lor (q \land \sim p) \lor (q \land r)$$

$$\equiv \sim p \lor (\sim p \land r) \lor (\sim p \land q) \lor (q \land r)$$

$$\equiv \boxed{\sim p \lor (q \land r)} \text{ (30)} \quad \text{bonus of 5 pts if}$$
they can simplify to this.

So max score is 105.