Math 14/3
p. 45 #4
Expanded Version

FRI 9-13-13

In logic notation, if P and Q denote statements then DeMorgan's Laws tell us that

(i) $\sim(P \vee Q) \equiv \sim P \wedge \sim Q$
(ii) $\sim(P \wedge Q) \equiv \sim P \vee \sim Q$

a) DeMorgan's Laws also apply to set theory. Let A, B be sets in universe U. Then DeMorgan's Laws tell us that

(i) $\overline{A \cup B} =$ _____
(ii) $\overline{A \cap B} =$ _____

} Fill in the blanks

b) Prove the logic forms of DeMorgan's laws (with truth tables).

c) Show the reasonable-ness of DeMorgan's laws for set theory by Venn Diagrams.

d) Prove DeMorgan's first law (for $\overline{A \cup B}$) by double inclusion. (This is a good test question.)

e) DeMorgan's Laws extend to 3 or more sets. Complete these statements:

(i) $\overline{A \cup B \cup C} =$ _____
(ii) $\overline{u \cap v \cap w \cap x} =$ _____

f) see book