MA 1971 Bridge to Higher Mathematics **Name:** Solutions

Quiz 1 **D Term, 2021**

I affirm that I have not consulted my text, notes or any reference, paper or electronic, or any person once I opened and/or looked at this quiz.

Signature: _____

Show all work needed to reach your answers.

1. (10 points) Please complete the following truth table.

1 point each no partial credit

A	B	C	$A \wedge C$	$\neg B$	$\neg(A \Rightarrow C)$	$((\neg A) \vee B)) \wedge C$	$(B \Rightarrow (A \vee C)) \Leftrightarrow ((C \vee (\sim B)) \Rightarrow A)$
T	F	T	T	T	F	F	T
F	T	T	F	F	F	T	F

2. (10 points) Let $A, B, C \subset U$ for some universe U. Please show that $C - (A \cup B)$ is a subset of $A^c - B$.

Let $x \in C - (A \cup B)$. (+2) Then $x \in C$ and $x \notin (A \cup B)$. (+2) Thus $x \in C$ and $x \in (A \cup B)^c = A^c \cap B^c$. (+1, +2) But $A^c \cap B^c = A^c - B$, so $x \in A^c - B$. (+1, +2)
(That $x \in C$ too is not needed.)
Thus $C - (A \cup B) \subset A^c - B$

$C - (A \cup B) \overset{(+3)}{=} C \cap (A \cup B)^c$
$\overset{(+2)}{=} C \cap (A^c \cap B^c)$
$\overset{(+3)}{\subset} A^c \cap B^c$
$\overset{(+2)}{=} A^c - B$
Thus $C - (A \cup B) \subset A^c - B$

Not intersecting with C makes the set larger.

either

3. (5 points) Suppose that A and B are statements. Is $B \implies A$ the same as $A \vee \neg B$? Please explain why or why not.

Truth Table:

Something like this (+4)

A	B	$B \Rightarrow A$	$\neg B$	$A \vee \neg B$
T	T	T	F	T
T	F	T	T	T
F	T	F	F	F
F	F	T	T	T

Since these columns the same
"$B \Rightarrow A$" $\equiv$ "$A \vee \neg B$" (+1)

Notice that
$\neg(B \Rightarrow A) \equiv B \wedge \neg A \equiv \neg(\neg B \vee A)$ (+1, +1, +1)
$\equiv \neg(A \vee \neg B)$ (+1)
So negating both sides, one finds (+1)
"$B \Rightarrow A$" $\equiv$ "$A \vee \neg B$"

either