Name: Charlie Meyer
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Problem 1: Identify G:

$G = \{\text{"Charlie Meyer"}\}$

Problem 2:

$\exists_c \in C \,.\, \forall_s \in G \,.\, N(s,c) = T$

$\forall_c \in C \,.\, \exists_s \in G \,.\, N(s,c) = \bot$

$\forall_s \in G \,.\, E_c \in C \,.\, N(s,c) = T$

$\exists_s \in G \,.\, \forall_c \in C \,.\, W(s,c) = \bot$

Problem 3: Complete Truth Table

B	T	F	$\neg T$	$\neg B \to \neg F$			$B \to T$
0	0	0	1	1	1	1	1
0	0	1	1	1	0	0	1
0	1	0	0	1	1	1	1
0	1	1	0	1	0	0	1
1	0	0	1	0	1	1	0
1	0	1	1	0	1	0	0
1	1	0	0	0	1	1	1
1	1	1	0	0	1	0	1

Problem 4: Name that rule: modus tolens

Problem 5: Prove $((B \to T) \wedge \neg T) \to \neg B \equiv \text{True}$

Symbol	Expression	Rule
	$((B \to T) \wedge \neg T) \to \neg B$	Given
	$((\neg B \vee T) \wedge \neg T) \to \neg B$	Def. imp
	$((\neg B \wedge \neg T) \vee (\neg T \wedge T)) \to \neg B$	distributive
	$((\neg B \wedge \neg T) \vee \bot) \to \neg B$	Simp.
	$(\neg B \wedge \neg T) \to \neg B$	Simp.
	$\neg(\neg B \wedge \neg T) \vee \neg B$	def. imp
	$(\neg\neg B \vee \neg\neg T) \vee \neg B$	demorgan's
	$(B \vee T) \vee \neg B$	double negation
	$(T \vee B) \vee \neg B$	commutativity
	$T \vee (B \vee \neg B)$	associativity
	$T \vee (\text{True})$	Simp
	True	Simp

Problem 6:

So consider A = nathan good @ b.ball and
B = nathan is tall.

$((A \oplus B) \wedge B)$ is true when Nathan is good at basketball but not tall.
When this is true, then $\neg A$ (Nathan is not tall) is also true. So therefore $((A \oplus B) \wedge B) \vdash \neg A$

Problem 7:

SKIP

Problem 8: Mrs. Peacock

So we know
$\neg M \to \neg W$
Since $\neg W$, then S
Since S, then P