

Homework 1 Solutions

Exercise 1.4.1

Part (3)

(1) $E \rightarrow F$	
(2) $\neg G \rightarrow \neg F$	
(3) $H \rightarrow I$	
(4) $E \vee H$	
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(5) $F \rightarrow G$	(2), Contrapositive
(6) $E \rightarrow G$	(1), (5), Hypothetical Syllogism
(7) $G \vee I$	(3), (4), (6), Constructive Dilemma

Part (4)

(1) $L \rightarrow M$	
(2) $(M \vee N) \rightarrow (L \rightarrow K)$	
(3) $\neg P \wedge L$	
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(4) L	(3), Simplification
(5) M	(1), (4), Modus Ponens
(6) $M \vee N$	(5), Addition
(7) $L \rightarrow K$	(2), (6), Modus Ponens
(8) K	(4), (7), Modus Ponens

Part (5)

This argument is invalid. If P is false, Q is false, R is false, S is false, and T is true, then all four of the premises are true, but the conclusion is false.

Part (6)

(1) $\neg A \rightarrow (B \rightarrow \neg C)$	
(2) $C \rightarrow \neg A$	
(3) $(\neg D \vee A) \rightarrow \neg\neg C$	
(4) $\neg D$	
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(5) $\neg D \vee A$	(4), Addition
(6) $\neg\neg C$	(3), (5), Modus Ponens
(7) C	(6), Double Negation
(8) $\neg A$	(2), (7), Modus Ponens
(9) $B \rightarrow \neg C$	(1), (8), Modus Ponens
(10) $\neg B$	(6), (9), Modus Tollens