Homework 2 1.3: 1, 3, 7, 8, 11(c), 21(e)

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Homework

1. A)

p	q	p ∧ q are lying	¬p (A is lying)
T	T	T	F
T	F	F	F
F	T	F	T
F	F	F	T

The only answer that can explain this is that A is lying, because Row 3 is the only row that is consistent with all the demands.

1. B)

p	q	r	¬ p ∨ ¬ q	¬ r	p ∧ q
T	T	T	F	F	T
T	T	F	T	T	F
T	F	T	T	F	T
T	F	F	T	T	F
F	T	T	F	F	F
F	T	F	T	T	F
F	F	T	T	F	F
F	F	F	T	T	F

We can only know that A is telling the truth. We know that either B or C is truthful, but with this truth table we can not tell which. This is shown in the fact that row 2 and 3 are consistent within the table.

1. C)

p	q	r	¬ p ∨ ¬ q	¬ r	p ∧ q
T	T	T	F	F	F
T	T	F	F	T	T
T	F	T	F	F	T
T	F	F	T	T	T
F	T	T	F	T	T
F	T	F	F	T	T
F	F	T	F	T	T
F	F	F	T	T	T

Because of row 5, we can see that A is lying and both B and C are telling the truth. This is because that row is the only consistent row within the truth table.

3. A)

¬ p ∨ q

3. B)

p ∧ q

3. C)

p ∧ ¬ q

7. A)

t ∧ d ∧ h

7. B)

t ∧ d ∧ ¬ h

7. C)

(t ∨ h)∧ ¬ (t ∧ h)

7. D)

¬ t ∧ ¬ h

8. A)

Bill is tall OR dark OR handsome AND he is NOT tall AND dark AND handsome

8. B)

Bill is NOT tall and NOT dark

8. C)

Bill is dark AND NOT tall AND NOT dark

8. D)

Bill is tall AND dark OR NOT tall AND dark

11. C)

p	q	$p \vee q$	$\neg p \vee q$	$(p \vee q) \wedge (\neg p \vee q)$
T	T	T	T	T
T	F	T	F	F
F	T	T	T	T
F	F	F	T	F

21. E)

p	q	r	$(p \vee q) \wedge (q \vee r)$	$(p \wedge r) \vee q$
T	T	T	T	T
T	T	F	T	T
T	F	T	T	T
T	F	F	F	F
F	T	T	T	T
F	T	F	T	T
F	F	T	F	F
F	F	F	F	F