

1.1

1.

- a) Let R stand for "having a reading assignment"  
H stand for "having HW problems"  
T stand for "having a test"

$$(R \vee H) \wedge \neg (H \wedge T)$$

- b) Let S stand for "you will go skiing"  
C stand for "there will be snow"

$$\neg S \vee (S \vee \neg C)$$

- c) Let P stand for " $\sqrt{2} < 2$ "  
Q stand for " $\sqrt{2} = 2$ "

$$\neg P \wedge \neg Q \quad \text{or} \quad \neg (P \vee Q)$$

3.

- Let A stand for "Alice is in room"  
B stand for "Bob is in room"

a)  $\neg(A \wedge B)$

b)  $\neg A \wedge \neg B$

c)  $\neg A \vee \neg B$  (equivalent to  $\neg(A \wedge B)$ )

d)  $\neg(A \vee B)$  (equivalent to  $\neg A \wedge \neg B$ )

- 5.
- a, c are well-formed
  - b, d are not well-formed

- 7.
- a) Either both Steve and George are happy, or both Steve and George are not happy
  - b) Either Steve is happy or George is ~~not~~ happy and Steve is not happy, or George is not happy
  - c) Either Steve is happy, or George is happy and both Steve and George are not happy

9. a) Let J stand for "Jane wins math prize"

P stand for "Pete wins math prize"

C stand for "Pete wins Chemistry prize"

Premises  $\neg(J \wedge P)$

$P \vee C$   
J

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Conclusion C

b) Let B stand for "Main course is Beef"

F stand for "Main course is fish"

P stand for "Vegetable is peas"

C stand for "Vegetable is corn"

Premises

$B \vee F$   
 $P \vee C$

$\neg(F \wedge C)$

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Conclusion  $\neg(B \wedge P)$

c) Let  $J$  stand for "John is telling the truth"

$B$  stand for "Bill is telling the truth"

$S$  stand for "Sam is telling the truth"

premises  $J \vee B$   
 $\neg S \vee \neg B$   

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Conclusion  $J \vee \neg S$

d) Let  $S$  stand for "Sales go up"  
 $B$  stand for "Boss is happy"  
 $E$  stand for "expenses go up"

premise  $(S \wedge B) \vee (E \wedge \neg B)$   

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Conclusion  $\neg(S \wedge E)$