Practice Problem Set 2

Use the 18 rules of inference to derive the conclusion of the following arguments.

a.
1. K V (S • N)
2. ~(K • ~Q)
3. ~(N • ~Q)　　　　　/ Q

b.
1. M ⊃ (R • E)
2. (E V H) ⊃ G　　　　/ M ⊃ G

c.
1. ~(O ⊃ R) ⊃ S
2. O ⊃ ~S　　　　/ ~O v R

d.
1. ~I ⊃ (K ⊃ ~R)
2. I ⊃ (K ⊃ A)
3. A ⊃ M
4. K • ~M　　　　/ ~(R v I)

e.
1. ~I ⊃ (K ⊃ ~R)
2. I ⊃ (K ⊃ A)
3. A ⊃ M
4. K • ~M　　　　/ ~(R v I)

Handwritten solution (problem a):

1. K ∪ (S • N)
2. ~(K • ~Q)
3. ~(N • ~Q)
4. ~K ∪ ~~Q　2 DM
5. ~N ∪ ~~Q　2 DM
6. (~K ∪ Q)　4 DN
7. ~N ∪ Q　5 DN
8. K ⊃ Q　6 MI
9. N ⊃ Q　7 MI
10. (K⊃Q) • (N⊃Q)　8,9 Conj
11. (K∪S) • (K∪N)　[Dist]
12. K ∪ N　11 Simp
13. Q∪Q　10 V CD
14. Q　13 taut

Handwritten solution (problem b):

1. M ⊃ (R • E)
2. (E∪H) ⊃ G
3. ~M ∪ (R • E)　1 Imp
4. (~M∪R) • (~M∪E)　3 Dist
5. ~M∪R　4 Simp
6. ~M∪E　4 Simp
7. ~(E∪H)∪G　2 Imp
8. (~E•~H)∪G　7 DM
9. (G∪~E) • (G∪~H)　8 Dist
10. G∪~E　9 Simp
11. M ⊃ E　6 Imp
12. ~G⊃~E　10 DN
13. ~G⊃~E　12 Imp
14. ~~E⊃~~G　13 Trans
15. E ⊃ G　14 DN
16. M ⊃ G　11,15 HS

Top screenshot:

Use the 18 rules of inference to derive the conclusion of the following arguments.

a.
1. K V (S • N)
2. ~(K • ~Q)
3. ~(N • ~Q)   / Q

b.
1. M ⊃ (R • E)
2. (E V H) ⊃ G   / M ⊃ G

c.
1. ~(O ⊃ R) ⊃ S
2. O ⊃ ~S   / ~O v R

d.
1. ~I ⊃ (K ⊃ ~R)
2. I ⊃ (K ⊃ A)
3. A ⊃ M
4. K • ~M   / ~(R v I)

e.
1. ~I ⊃ (K ⊃ ~R)
2. I ⊃ (K ⊃ A)
3. A ⊃ M
4. K • ~M   / ~(R v I)

Handwritten (left column):
1. ~I ⊃ (K ⊃ ~R)
2. I ⊃ (K ⊃ A)
3. A ⊃ M
4. K • ~M
5. K   4 Sim
6. ~M   4 Sim
7. ~A   3,6 MT
8. (~I • K) ⊃ ~R   1 Exp
9. (I • K) ⊃ A   2 Exp
10. ~(I • K)   7,9 MT
11. ~I v ~K   10 DM
12. ~(~I • K) v ~R   8 imp
13. ~~I v ~K v ~R   13 DM
14. (I v ~K) v ~R   13 DN
15. (~K v I) v ~R   14 com

Handwritten (right column):
16. ~K v (I v ~R)   assc
17. ~(~K)   DN
18. I v ~R   16,17 DS
19. I ⊃ (~K)   11 imp
20. ~I   17,19 MT
21. K v ~R   1,20 MP
22. ~R   5,21 MP
23. ~R • ~I   20,22 conj
24. ~(R v I)   23 DM
25.

Bottom screenshot:

Handwritten (left column):
1. ~(O ⊃ R) ⊃ S
2. O ⊃ ~S
3. ~(~R ⊃ ~O) ⊃ S   trans
4. ~(~~R v ~O) ⊃ S   3 imp
5. (~R • O) ⊃ S   4 DM/DN
6. ~O v ~S   2 MI
7. ~~S ⊃ ~O   2 trans
8. S ⊃ ~O   7 DN
9. (~R • O) ⊃ ~O   5,8 HS
10. ~(~R • O) v ~O   9 MI
11. (~~R v ~O) v ~O   10 DM
12. R v (~O v ~O)   11 DN, assc
13. R v ~O   12 taut

Handwritten (right column):
14. ~O v R   13 comm
15.
16.

Use the 18 rules of inference to derive the conclusion of the following arguments.