Practice Problems

Problem 1:

1. (D ∧ E) ⊃ ¬F
2. F ∨ (G ∧ W)
3. D ⊃ E Derive: D ⊃ G

Problem 2:

1. B ⊃ (F ∨ D)
2. ¬(A ⊃ F)
3. A ⊃ ¬(C ∨ D) Derive: ¬(A ⊃ B)

Problem 3:

1. A ∨ B
2. ¬A ∨ ¬B Derive: ¬(A ≡ B)

Problem 4:

1. Derive: ((p ⊃ q) ⊃ p) ⊃ p

Solutions:

Problem 1:

1. (D ∧ E) ⊃ ¬F
2. F ∨ (G ∧ W)
3. D ⊃ E Derive: D ⊃ G

1.	(D ∧ E) ⊃ ¬F		Pr
2.	F ∨ (G ∧ W)		Pr
3.	D ⊃ E		Pr
4.		D	Assp for CP
5.		E	MP 3,4
6.		D ∧ E	Conj 4, 5
7.		¬F	MP 1, 6
8.		G ∧ W	DS 2, 7
9.		G	Simp 8
10.	D ⊃ G		CP 4-9

Problem 2:

Hint: Suppose (A ⊃ B) for IP. Then derive (A ⊃ F). Then let your contradiction be (A ⊃ F) ∧ ¬(A ⊃ F).

1. B ⊃ (F ∨ D)
2. ¬(A ⊃ F)
3. A ⊃ ¬(C ∨ D) Derive: ¬(A ⊃ B)

1.	B ⊃ (F ∨ D)	Pr
2.	¬(A ⊃ F)	Pr
3.	A ⊃ ¬(C ∨ D)	Pr
4.	A ⊃ B	Assp for IP
5.	A	Assp for CP
6.	¬(C ∨ D)	MP 3, 6
7.	¬C ∧ ¬D	DeM 6
8.	B	MP 4,5
9.	F ∨ D	MP 8, 1
10.	¬D	Simp 7
11.	F	DS 9, 10
12.	A ⊃ F	CP 5, 11
13.	(A ⊃ F) ∧ ¬(A ⊃ F)	Conj 2, 12
14.	¬(A ⊃ B)	IP 4-13

Problem 3:

1. A ∨ B
2. ¬A ∨ ¬B Derive: ¬(A ≡ B)

1.	A ∨ B			Pr
2.	¬A ∨ ¬B			Pr
3.		(A ≡ B)		Assp for IP
4.		(A ⊃ B) ∧ (B ⊃ A)		BE 3
5.		A ⊃ B		Simp 4
6.		B ⊃ A		Simp 4
7.			A	Assp for IP
8.			¬¬A	DN 7
9.			¬B	DS 2, 8
10.			B	MP 7, 5
11.			B ∧ ¬B	Conj 10, 9
12.		¬A		IP 7-11
13.		B		DS 1, 12
14.		A		MP 6, 13
15.		A ∧ ¬A		Conj 14, 12
16.	¬(A ≡ B)			IP 3-15

Problem 4:

1. Derive: ((p ⊃ q) ⊃ p) ⊃ p

Hint: Assume (p ⊃ q) ⊃ p for CP. Then assume ¬p for IP.

1.		(p ⊃ q) ⊃ p		Assp for CP
2.			¬p	Assp for IP
3.			¬(p ⊃ q)	MT 1,2
4.			¬(¬p ∨ q)	CE 3
5.			¬¬p ∧ ¬q	DeM 4
6.			¬¬p	Simp 5
7.			¬p ∧ ¬¬p	Conj 2, 6
8.		¬¬p		IP 2-7
9.		p		DN 8
10.	((p ⊃ q) ⊃ p) ⊃ p			CP 1-9