

Chapter 6 – Rules of deductive inference

Getting familiar with . . . basic rules of inference

For each of the following sets of premises, use simplification, conjunction, *modus ponens*, and/or *modus tollens* to derive the indicated conclusion.

1.

1. A
2. $(A \supset B)$ $\therefore B$

2.

1. A
2. B
3. C
4. D $\therefore (A \& D)$

3.

1. $(P \& Q)$
2. $(R \& S)$ $\therefore P$

4.

1. $(P \& Q)$
2. $(R \& S)$ $\therefore (P \& R)$

5.

1. $((R \vee S) \& Q)$
2. $(\sim Q \vee S)$
3. T $\therefore (Q \& T)$

6.

1. $((D \supset E) \& R)$
2. $(D \supset E)$
3. D $\therefore (D \& R)$

7.

1. $((A \supset B) \supset (C \vee D))$
2. $\sim (C \supset D)$ $\therefore \sim (A \supset B)$

8.

1. $((A \& \sim C) \& (D \supset E))$
2. $\sim E$ $\therefore (\sim D \& \sim C)$

9.

1. $((P \supset Q) \& (S \supset R))$
2. $(\sim Q \& \sim R)$ $\therefore (\sim P \& \sim S)$

10.

1. $(S \supset (Q \& R))$
2. $\sim(Q \& R)$
3. T $\therefore (\sim S \& T)$

11.

1. $((P \& Q) \& W)$
2. $R \quad \therefore W$

12.

1. $((A \vee B) \supset C)$
2. $(F \& D)$
3. $(A \vee B) \quad \therefore (F \& C)$

13.

1. A
2. $(B \vee C)$
3. $((A \& (B \vee C)) \supset D) \quad \therefore D$

14.

1. $(B \& D)$
2. $(D \supset (E \supset F))$
3. $\sim F \quad \therefore (\sim E \& B)$

15.

1. $((P \vee Q) \supset (W \& \sim Y))$
2. $(\sim Q \& W)$
3. $(X \supset Y)$
4. $(P \vee Q) \quad \therefore (\sim X \& \sim Q)$

16.

1. P
2. $(P \supset Q)$
3. $(Q \supset R)$
4. $(R \supset S) \quad \therefore S$

17.

1. $\sim P$
2. $(S \supset R)$
3. $(R \supset Q)$
4. $(Q \supset P) \quad \therefore \sim S$

18.

1. A
2. B
3. $((A \& B) \supset \sim(C \vee D))$
4. $((E \vee F) \supset (C \vee D)) \quad \therefore (E \vee F)$

19.

1. $\sim(B \vee D)$
2. $(A \supset (B \vee D))$
3. $(H \supset ((E \& F) \& G))$
4. $H \quad \therefore (\sim A \& E)$

20.

1. $\sim\sim P$
2. $(Q \supset \sim P)$
3. $\sim R \quad \therefore (\sim R \& \sim Q)$