Peter Smith, *Introduction to Formal Logic* (CUP, 2nd edition)

Exercises 12: Truth functions and truth tables

Give truth tables for the following wffs of a PL language – i.e. calculate the value of the wff for every assignment of values to the atoms. Use the usual shortcuts, i.e. if a conjunct is false, ignore the other conjunct, as you know the conjunction must be false; if a disjunct is true, ignore the other disjunct, as you know the disjunction must be true; etc.

(1) $(P \wedge \neg(P \wedge Q))$

(2) $((R \vee Q) \vee \neg P)$

(3) $(\neg(P \wedge \neg S) \wedge \neg\neg R)$

(4) $((P \wedge Q) \vee (\neg P \vee \neg Q))$

(5) $\neg((P \wedge \neg Q) \vee (\neg R \vee \neg(P \vee Q)))$

(6) $(((P \vee \neg Q) \wedge (Q \vee R)) \vee \neg\neg(Q \vee \neg R))$

(7) $(\neg(\neg P \vee \neg(Q \wedge \neg R)) \vee \neg\neg(Q \vee \neg P))$

(8) $(\neg((R \vee \neg Q) \wedge \neg S) \wedge \neg((\neg P \wedge Q) \wedge S))$

(9) $(\neg(\neg(P \wedge Q) \wedge \neg(R \wedge S)) \vee \neg(S \wedge (Q \vee R)))$