

Selected Solutions

3 Let φ denote the given formula $a \leftrightarrow ((p \rightarrow q) \wedge (\neg p \rightarrow r))$. We have

$$\varphi \equiv (a \vee p \vee \neg r) \wedge (a \vee \neg p \vee \neg q) \wedge (\neg a \vee \neg p \vee q) \wedge (\neg a \vee p \vee r)$$

This equivalence can be verified by comparing truth tables:

a	p	q	r	φ	$(a \vee p \vee \neg r)$	$(a \vee \neg p \vee \neg q)$	$(\neg a \vee \neg p \vee q)$	$(\neg a \vee p \vee r)$
T	T	T	T	T	T	T	T	T
T	T	T	F	T	T	T	T	T
T	T	F	T	F	T	T	F	T
T	T	F	F	F	T	T	F	T
T	F	T	T	T	T	T	T	T
T	F	T	F	F	T	T	T	F
T	F	F	T	T	T	T	T	T
T	F	F	F	F	T	T	T	F
F	T	T	T	F	T	F	T	T
F	T	T	F	F	T	F	T	T
F	T	F	T	T	T	T	T	T
F	T	F	F	T	T	T	T	T
F	F	T	T	F	F	T	T	T
F	F	T	F	T	T	T	T	T
F	F	F	T	F	F	T	T	T
F	F	F	F	T	T	T	T	T