Truth table practice

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1. Construct truth tables for the following:

   (a) $\neg(p \wedge q)$;

   (b) $\neg(p \vee q)$;

   (c) $\neg p \vee \neg q$;

   (d) $\neg p \wedge \neg q$;

   (e) $\neg p \vee p$;

   (f) $\neg p \wedge p$.

2. Negate the following:

   (a) p is true or q is false;

   (b) p is false and q is true;

   (c) p is true or q is true;

   (d) p is true and q is true.

3. Construct truth tables for the following:

   (a) $p \wedge (q \vee r)$;

   (b) $(p \wedge q) \vee r$;

   (c) $\neg(p \vee q) \wedge r$.

1. (a)

p	q	$p \wedge q$	$\neg(p \wedge q)$
T	T	T	F
T	F	F	T
F	T	F	T
F	F	F	T

(b)

p	q	$p \vee q$	$\neg(p \vee q)$
T	T	T	F
T	F	T	F
F	T	T	F
F	F	F	T

(c)

p	q	$\neg p$	$\neg q$	$\neg p \vee \neg q$
T	T	F	F	F
T	F	F	T	T
F	T	T	F	T
F	F	T	T	T

(d)

p	q	$\neg p$	$\neg q$	$\neg p \wedge \neg q$
T	T	F	F	F
T	F	F	T	F
F	T	T	F	F
F	F	T	T	T

(e)

p	$\neg p$	$\neg p \vee p$
T	F	T
F	T	T

(f)

p	$\neg p$	$\neg p \wedge p$
T	F	F
F	T	F

2. (a)

p	q	$\neg q$	$p \vee \neg q$	$\neg(p \vee \neg q)$
T	T	F	T	F
T	F	T	T	F
F	T	F	F	T
F	F	T	T	F

(b) p is false and q is true; $\neg(\neg p \wedge q)$

p	q	$\neg p$	$\neg p \wedge q$	$\neg(\neg p \wedge q)$
T	T	F	F	T
T	F	F	F	T
F	T	T	T	F
F	F	T	F	T

(c)

p	q	$p \vee q$	$\neg(p \vee q)$
T	T	T	F
T	F	T	F
F	T	T	F
F	F	F	T

(d)

p	q	$p \wedge q$	$\neg(p \wedge q)$
T	T	T	F
T	F	F	T
F	T	F	T
F	F	F	T

3. (a)

p	q	r	$q \vee r$	$p \wedge (q \vee r)$
T	T	T	T	T
T	T	F	T	T
T	F	T	T	T
T	F	F	F	F
F	T	T	T	F
F	T	F	T	F
F	F	T	T	F
F	F	F	F	F

(b)

p	q	r	$p \wedge q$	$(p \wedge q) \vee r$
T	T	T	T	T
T	T	F	T	T
T	F	T	F	T
T	F	F	F	F
F	T	T	F	T
F	T	F	F	F
F	F	T	F	T
F	F	F	F	F

(c)

p	q	r	$p \vee q$	$\neg(p \vee q)$	$\neg(p \vee q) \wedge r$
T	T	T	T	F	F
T	T	F	T	F	F
T	F	T	T	F	F
T	F	F	T	F	F
F	T	T	T	F	F
F	T	F	T	F	F
F	F	T	F	T	T
F	F	F	F	T	F

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