CNF/DNF corrected

Finding Disjunctive Normal Form

1. Read the true rows of the truth table

2. AND together all the settings in a given (true) row.

3. OR together the true rows.

Finding Conjunctive Normal Form

Find the DNF of $\neg G$

Negate the DNF

Apply DeMorgan's, the outer ORs become ANDs

Apply Demorgan's again, the inner ANDs become ORs **and** the atomic propositions are negated.

1. Read the false rows of the truth table (of the original function G)
2. Within a row, negate the setting of every variable
3. OR together all the (now negated) variables in each row.
4. AND together the false rows.

CNF via DNF

p	q	r	$G(p,q,r)$	$\neg G(p,q,r)$
T	T	T	T	F
T	T	F	T	F
T	F	T	F	T
T	F	F	T	F
F	T	T	T	F
F	T	F	F	T
F	F	T	F	T
F	F	F	T	F

Write the DNF of $\neg G$

$\neg[(p \wedge \neg q \wedge r) \vee (\neg p \wedge q \wedge \neg r) \vee (\neg p \wedge \neg q \wedge r)]$

$\neg(p \wedge \neg q \wedge r) \wedge \neg(\neg p \wedge q \wedge \neg r) \wedge \neg(\neg p \wedge \neg q \wedge r)$

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

CNF directly

p	q	r	$G(p,q,r)$
T	T	T	T
T	T	F	T
T	F	T	F
T	F	F	T
F	T	T	T
F	T	F	F
F	F	T	F
F	F	F	T

1. Read the false rows of the truth table (of the original function G)

2. Within a row, negate the setting of every variable

3. OR together all the (now negated) variables in each row.

4. AND together the false rows.

$\neg p \vee q \vee \neg r$ $p \vee \neg q \vee r$ $p \vee q \vee \neg r$

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

CNF both ways

p	q	r	$G(p, q, r)$	$\neg G(p, q, r)$
T	T	T	T	F
T	T	F	T	F
T	F	T	F	T
T	F	F	T	F
F	T	T	T	F
F	T	F	F	T
F	F	T	F	T
F	F	F	T	F

$$(\neg p \lor q \lor \neg r) \land (p \lor \neg q \lor r) \land (p \lor q \lor \neg r)$$

$$(\neg p \lor q \lor \neg r) \land (p \lor \neg q \lor r) \land (p \lor \neg q \lor r)$$