Mathematical Proof

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Assignment #1

1. a. $A \wedge B$
   b. Can be either:
      - $\neg A \wedge \neg B \wedge C$
      - $\neg(A \vee B) \wedge C$
   c. $(A \wedge C) \vee (B \wedge \neg C)$

2. a. Can be either:
      - Either Doug is tall and Eddie is short, or Doug is not tall.
      - Either Doug is not tall, or and Doug is tall and Eddie is short
      - Can be shortened to: Either Eddie is short or Doug is tall
   b. Future.

3.

G	H	L	$G \vee \neg H$	$\neg(G \wedge H)$	$(G \vee \neg H) \wedge \neg(G \wedge L)$
TRUE	TRUE	TRUE	TRUE	FALSE	FALSE
TRUE	TRUE	FALSE	TRUE	TRUE	TRUE
TRUE	FALSE	TRUE	TRUE	FALSE	FALSE
TRUE	FALSE	FALSE	TRUE	TRUE	TRUE
FALSE	TRUE	TRUE	FALSE	TRUE	FALSE
FALSE	TRUE	FALSE	FALSE	TRUE	FALSE
FALSE	FALSE	TRUE	TRUE	TRUE	TRUE
FALSE	FALSE	FALSE	TRUE	TRUE	TRUE

4.

future	table
T	F

5. a. regular

   b. contradiction

      - Because the only connective used is the and (i.e. $\wedge$) operator, the parentheses are unneccessary. When those are removed, it is apparent that all of the individual terms (i.e. $M, \neg N, \neg M, N$) need to be true. Therefore both M and $\neg M$, as well as, both N and $\neg N$ are required to provied an answer of True. Both of those are contradictions and therefore either of those would be enought to render the statement a contradiction.

   c.

tautology

6. a. $Q \wedge P$
   b. $P \wedge \neg R$