

Quiz: Tautologies, Contradictions and Contingent Statements

No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remain marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. (3 marks) WITHOUT USING A TRUTH TABLE: Show that the following statement is not a tautology.

$$(\neg A \wedge B) \rightarrow \neg(A \vee B)$$

lets find a valuation that makes the statement true.

if $(\neg A \wedge B)$ is true and $\neg(A \vee B)$ is false then the statement is false. For the antecedent to be true, both conjunct need to be true, so we assign $\neg A$ to be true, so A is false and B is true. It follows that with the following valuation the consequent is false since $\neg(A \vee B) = \neg(F \vee T) = \neg T = F$.

Question 2. (3 marks) WITHOUT USING A TRUTH TABLE: Show that the following statement is not a contradiction.

$$(\neg A \vee B) \rightarrow \neg(A \wedge B)$$

Lets find a valuation that makes the statement true.

if $(\neg A \vee B)$ is false then the statement is true. For it to be false, both disjuncts need to be false. In order for $\neg A$ to be false, A needs to be true and we let B be false.