Math 2002 Number Systems
Homework Set 1

Fall 2020

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Problem 1: Using truth tables determine which ones of the following propositional formulas is a tautology:

a) $(A \implies B) \iff (\neg A \vee B)$

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

c) $(A \vee B) \implies (A \wedge B)$

d) $(A \wedge B) \implies (A \vee B)$

(8P)

Problem 2: For each of the following statements, formulate a logically equivalent one using only A, B, $\neg$ and $\vee$. You may use as many parentheses as you need. Use a truth table or rules of mathematical logic to verify your claim.

a) $A \implies \neg B$

b) $\neg A \wedge \neg B$

c) $A \iff \neg B$

(6P)

Problem 3: For each of the following sentences formulate an English sentence that is its negation:

a) If you study hard you will do well in school.

b) I will pay my taxes and avoid going to jail.

c) Horses eat oates or horses eat hay.

(6P)