MATH 3503: Tashfeen's Discrete Mathematics

Homework 1

Question 1. Please read chapters 0 and 1 of Chartrand et al. and write a couple sentences about a topic/example/concept that you found difficult or interesting and why?

Question 2. Let P, Q and R be statements. Determine whether the following is true.

$$P \oplus (Q \oplus R) \equiv (P \oplus Q) \oplus R. \quad \text{Use a truth table.}$$

Question 3. Let P, Q and R be statements. Determine whether the following is true.

$$P \vee (Q \oplus R) \equiv (P \vee Q) \oplus (P \vee R). \quad \text{Use a truth table.}$$

Question 4. For an integer n, consider the open sentences

$$P(n) : n(n+1)(2n+1)/6 \text{ is even.} \quad Q(n) : (n+1)^2(n+2)^2/4 \text{ is even.}$$

Determine whether the biconditionals $P(1) \iff Q(1)$ and $P(2) \iff Q(2)$ are true or false.

Question 5. For statements P and Q, determine whether the compound statement

$$(P \wedge (\sim Q)) \Rightarrow (P \vee Q)$$

is a tautology, a contradiction or neither.

Question 6. Each of the following statements is an implication $P \Rightarrow Q$. For each statement, indicate what P and Q are.

(a) I'm going to my class reunion only if I lose weight.
(b) To win a free $20 gift certificate, I must spend $100 at the store.
(c) To win the game, it is necessary that we score a touchdown.
(d) It is necessary to do research to be promoted to professor.
(e) I'll get an A on this exam if I'm lucky.
(f) All I need is a B on the final exam to get an A in the course.

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