CISC-102 WINTER 2020

HOMEWORK 9

Readings

Read sections 5.3 and chapter 4 of *Schaum's Outline of Discrete Mathematics*.
Read sections 3.1, 3.5, 3.6 of *Discrete Mathematics Elementary and Beyond*.

Problems

(1) Use a truth table to verify that the proposition $p \vee \neg(p \wedge q)$ is a tautology, that is, the expression is true for all values of p and q.
(2) Use a truth table to verify that the proposition $(p \wedge q) \wedge \neg(p \vee q)$ is a contradiction, that is, the expression is false for all values of p and q.
(3) Use a truth table to show that $p \vee q \equiv \neg(\neg p \wedge \neg q)$.
(4) Show that the following argument is valid.

$$p \rightarrow q, \neg q \vdash \neg p$$

(5) Let A = {1,2,3,4,5}. Determine the truth value of each of the following statements.
   (a) $(\exists x \in A)(x + 2 = 7)$
   (b) $(\forall x \in A)(x + 2 < 8)$
   (c) $(\exists x \in A)(x + 3 < 2)$
   (d) $(\forall x \in A)(x + 3 \leq 9)$