Math 3345 Homework 1

**Problem 1.**
(a) Section 2 Exercise 1 from Falkner.
(b) Section 2 Exercise 2 from Falkner.

**Problem 2.** Section 2 Exercise 5 from Falkner.

**Problem 3.** Section 2 Exercise 9 from Falkner.

**Problem 4.** Section 2 Exercise 11 from Falkner.

**Problem 5.** Section 4 Exercise 1 from Falkner.

*Below are optional problems which need not be turned in. They will not be graded.*

**Optional problem 1.**
(a) Show that if the truth values of \( P, Q \) are 1, 0 instead of \( T, F \) respectively, then the logical connectives and, or, and not are given by the functions \((P, Q) \mapsto PQ, (P, Q) \mapsto \max(P, Q), \) and \( P \mapsto 1 - P. \)
   
   *Hint: Compare the truth tables for and, or, and not to the values of these functions on the possible values for \( P \) and \( Q. \)*

(b) Find a function for \( \Rightarrow. \)

**Optional problem 2.** Section 2 Exercise 12 from Falkner.