MAT 200
SOLUTIONS TO HOMEWORK 1

Section 2.1: Problems 1, 3, 4, 10

(1) Solution is trivial and left to students.

(3) In this problem, the solution is straightforward (truth tables) and left to the students; only answers are given.
  - (a) Neither.
  - (b) Tautology.
  - (c) Tautology.
  - (d) Neither.
  - (e) Tautology.
  - (f) Neither.

(4) In this problem, the solution is straightforward (truth tables) and left to the students; only answers are given.
  - (a) equivalent
  - (b) equivalent
  - (c) not equivalent
  - (d) equivalent

(10)
  - (a) **Atomic Statements:**
    O: I need to go to Oxford.
    L: I need to go to Lompoc.
    Symbolic Translation:
    $O \wedge L$
  - (b) **Atomic Statements:**
    E: A number is even.
    B: A number is bigger than 2.
    P: A number is prime.
    Symbolic Translation:
    $(E \wedge B) \rightarrow \sim P$
  - (c) **Atomic Statements:**
    D: You are damned.
    O: You do.
    Symbolic Translation:
    $(O \rightarrow D) \wedge (\sim O \rightarrow D)$

(d) **Atomic Statements:**

O: You order from the dinner menu.
S: You get a soup.
A: You get a salad.
E: You get a entree.
B: You get a beverage.
D: You get a desert.

Symbolic Translation:

$O \rightarrow [(S \veebar A) \wedge E \wedge (B \veebar D)]$

Note: The exclusive or operator, "$\veebar$," was used to reflect the fact that you cannot get both a soup and a salad. This can be written without using $\veebar$ as

$O \rightarrow [(S \vee A) \wedge \sim (S \wedge A) \wedge E \wedge (B \vee D) \wedge \sim (B \wedge D)]$

(e) **Atomic Statements:**

R: It rains next week.
V: We will have vegetables.
F: We will have flowers.

Symbolic Translation:

$[\sim R \rightarrow \sim (V \vee F)] \wedge (R \rightarrow F)]$

Section 2.2: Problem 6

(6) (a) If you don't stop that right now, then I'll call the police.
(b) You can watch TV if and only if you clean your room.
(c) If you eat your cake, then you can't have it.
(d) If a day is Thanksgiving, then it is a Thursday.
(e) If you don't ask for it, then you can't get what you want.