CSE 2321: HOMEWORK 1

Due Monday 8/26 at the start of class.

Submit solutions on separate paper, stapling together multiple pages.

1. Which of the following sentences are propositions? What are the truth values of those that are propositions? (5 points)
   a) $2 + 3 = 5$.
   b) $5 + 7 = 10$.
   c) $x + 2 = 11$.
   d) Answer this question.
   e) $x + y = y + x$ for every pair of real numbers $x$ and $y$.

2. Which of the following are propositions? What are the truth values of those that are propositions? (4 points)
   a) Do not pass go.
   b) What time is it?
   c) There are no black flies in Maine.
   d) $4 + x = 5$.

3. What is the negation of each of the following propositions? (4 points)
   a) Today is Thursday.
   b) There is no pollution in New Jersey.
   c) $2 + 1 = 3$.
   d) The summer in Maine is hot and sunny.

4. Let $P$ and $Q$ be propositions
   
   $P$: I bought a lottery ticket this week.
   $Q$: I won the million dollar jackpot on Friday.

   Express each of the following propositions as an English sentence. (3 points)
   a) $\neg P$
   b) $P \lor Q$
   c) $P \land Q$
5. Let $P$ and $Q$ be propositions

\[ P : \text{It is below freezing.} \]
\[ Q : \text{It is snowing.} \]

Write the following propositions using $P$ and $Q$ and logical connectives. (4 points)

a) It is below freezing and snowing.

b) It is below freezing but not snowing.

c) It is not below freezing and it is not snowing.

d) It is either snowing or below freezing (or both).