CS360 Homework 1

What is AI?

1) On the slide "A different view: What is AI?", one of the quadrants is labeled "Systems that think rationally." Explain what this means and what the obstacles are to this approach.

Propositional Logic

2) Translate the following Propositional Logic to English sentences.
Let:

- E=Liron is eating
- H=Liron is hungry

(a) $E \Rightarrow \neg H$

(b) $E \wedge \neg H$

(c) $\neg(H \Rightarrow \neg E)$

3) Translate the following English sentences to Propositional Logic.
Propositions: (R)aining, Liron is (S)ick, Liron is (H)ungry, Liron is (HA)appy, Liron owns a (C)at, Liron owns a (D)og

(a) It is raining if and only if Liron is sick

(b) If Liron is sick then it is raining, and vice versa

(c) It is raining is equivalent to Liron is sick

(d) Liron is hungry but happy

(e) Liron either owns a cat or a dog

4) Which of the following propositions are tautologies? Which are contradictions? Why?

(a) Three is a prime number.

(b) It is raining or it is not raining.

(c) It is raining (P) and it is not raining ($\neg P$).

5) Which of the following propositions are tautologies? Why?

(a) P

(b) $P \Rightarrow P$

(c) $(P \Rightarrow P) \Rightarrow P$

(d) $P \Rightarrow (P \Rightarrow P)$

6) Which of the two following propositions are equivalent in the sense that one can always be substituted for the other one in any proposition without changing its truth value? Why?

(a) first proposition:$P \Rightarrow Q$ second proposition: $\neg P \vee Q$

(b) first proposition: $\neg P$ second proposition: $P \Rightarrow False$

(c) first proposition: $\neg P$ second proposition: $False \Rightarrow P$

(d) first proposition: $\neg P$ second proposition: $\neg P \vee Q$