3.1.x. Exercise questions

1. Analyze each of the following sentences in as much detail as possible.
   a. *The soup was hot but not too hot, and thick but not too thick.*
   b. *The equipment isn't here and it's unlikely to arrive soon.*
   c. *No one answered the phone even though it rang 10 times.*
   d. *The alarm must have gone off, but Ted didn't hear anything.*
   e. *They won't both meet the deadline and stay within the budget.*
   f. *They won't meet the deadline, but they will stay within the budget.*
   g. *They won't meet the deadline, and they won't stay within the budget.*
   h. *Tod shut off the alarm without waking up.*
   i. *They won't meet the deadline without going over the budget.*
   j. *Larry joined in, but not without being coaxed.*
   k. *Ann liked the movie, but neither Bill nor Carol did.*

2. Restate each of the forms below, putting English notation into symbols and vice versa. Indicate the scope of connectives in the result by underlining.
   a. ¬ ¬ (A ∧ B)
   b. ¬ (¬ A ∧ B)
   c. both not A and both not B and C
   d. both not both A and B and not C

3. Synthesize idiomatic English sentences that express the propositions associated with the logical forms below by the intensional interpretations that follow them.
   a. C ∧ ¬ F
      [C: *it was cold*; F: *there was frost*]
   b. ¬ S ∧ (H ∧ I)
      [H: *Sue heard a crash*; I: *Sue went to investigate*; S: *someone saw the accident*]
   c. (D ∧ N) ∧ ¬ P
      [D: *it was a design*; N: *it was new*; P: *it pleased someone*]
   d. ¬ (I ∧ N)
      [I: *we'll win in Iowa*; N: *we'll win in New York*]
   e. ¬ I ∧ N
      [I: *we'll win in Iowa*; N: *we'll win in New York*]
   f. ¬ (I ∧ ¬ L)
      [I: *we'll win in Iowa*; L: *we'll lose in New York*]

4. Calculate truth values for all components of the forms below using the extensional interpretation provided in each case.

a. $\dfrac{A\ B\ C}{T\ F\ F}\Big| A \wedge \neg (B \wedge C)$

b. $\dfrac{A\ B\ C}{T\ F\ F}\Big| A \wedge (\neg B \wedge C)$

c. $\dfrac{A\ B\ C\ D}{F\ T\ T\ T}\Big| (\neg A \wedge \neg B) \wedge (\neg (A \wedge C) \wedge D)$