Homework 2

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Knowledge Representation:

1. It is not cloudy and it is not raining.
Let p = It is cloudy and q = it is raining, then $\neg p \wedge \neg q$.

2. I like to eat apples and bananas.
Let p = I like to eat apples and q = I like to eat bananas, then $p \wedge q$.

3. Behind the clouds the sun is shining.
Let p = The sun is behind the clouds and q = The sun is shining, then $p \wedge q$.

4. If a function is differentiable then the function is continuous.
Let p = A function is differentiable and let q = a function is continuous, then $p \rightarrow q$.

5. I will study for the final otherwise I will fail.
Let p = I study for the exam and q = I will fail, then $p \rightarrow q$.

Equivalence in Propositional Logic

1. $p \wedge q$ and $p \vee \neg q$
The propositions are not equivalent, as the first statement only has one condition for which it is true (T T) whereas the second has three conditions for which it can be true (T T, T F, F T).

2. $p \vee q$ and $\neg p \vee \neg q$
The propositions are not equivalent, as the first and second statement's are flipped.

3. $p \rightarrow q$ and $\neg q \rightarrow \neg p$
The propositions are not equivalent, as the first and second statement's are flipped.

4. $p \rightarrow q$ and $\neg p \vee q$
The statements are the same as statement 1 (T F T T) and statement 2 (T F

T T) are the same.

5. $\neg(p \wedge q)$ and $\neg p \vee \neg q$
The statements are the same as statement 1 (F T T T) and statement 2 (F T T T) are the same.