

Homework 2

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1 Knowledge Representation

1. It is not cloudy and it is not raining

Solution Let p = It is not cloudy, and let q = it is not raining, then $p \wedge q$

2. I like to eat apples and bananas

Solution Let p = I like to eat apple, and let q = bananas, then $p \wedge q$

3. Behind the clouds the sun is shining

Solution Let p = Behind the clouds, and let q = sun is shining, then $p \rightarrow q$

4. If a function is differentiable then the function is continuous.

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

5. I will study for the final otherwise I will fail.

Solution Let p = I will study for the final, and let q = I will fail, then $p \rightarrow q$

2 Equivalence in Propositional Logic

1. $p \wedge q$ and $p \vee \neg q$

no, the truth tables are not equal for both logical statements

p	q	$p \wedge q$	$p \vee \neg q$
0	0	0	1
0	1	0	0
1	0	0	1
1	1	1	1

2. $p \vee q$ and $\neg p \vee \neg q$

no, the truth tables are not equal for both logical statements

p	q	$p \vee q$	$\neg p \vee \neg q$
0	0	0	1
0	1	1	1
1	0	1	1
1	1	1	0

3. $p \rightarrow q$ and $\neg q \rightarrow \neg p$

No, the truth tables are not equal for both logical statements

p	q	$p \rightarrow q$	$\neg p \rightarrow \neg q$
0	0	1	1
0	1	1	0
1	0	0	1
1	1	1	1

4. $p \rightarrow q$ and $\neg p \vee q$

Yes, the truth tables are equal

p	q	$p \rightarrow q$	$\neg p \vee q$
0	0	1	1
0	1	1	1
1	0	0	0
1	1	1	1

5. $\neg(p \wedge q)$ and $\neg p \vee \neg q$

Yes, the truth tables are equal

p	q	$\neg(p \wedge q)$	$\neg p \vee \neg q$
0	0	1	1
0	1	1	1
1	0	1	1
1	1	0	0