TDT4136 16.12.21 10390
Task: 1

①

a	b	c	¬a	b => c	¬a => (b => c)	a ∨ c	b => (a ∨ c)
1	1	1	0	1	1	1	1
1	1	0	0	0	1	1	1
1	0	1	0	1	1	1	1
1	0	0	0	1	1	1	1
0	1	1	1	1	1	1	1
0	1	0	1	0	0	0	0
0	0	1	1	1	1	1	1
0	0	0	1	1	1	0	1

¬a => (b => c) and b => (a ∨ c) are logically equivalent (by looking at the table.

¬a => (b => c) is satisfiable, but not valid.

②

A <=> B

(A => B) ∧ (B => A) bidirectional elimination

((¬A ∨ B) ∧ (¬B ∨ A) contraposition

(¬A ∨ B) ∧ ¬B ∨ (¬A ∨ B) ∧ A distribute ∧ over ∨

¬B ∧ (¬A ∨ B) ∨ A ∧ (¬A ∨ B) assosiativity of ∧

(¬B ∧ ¬A ∨ ¬B ∧ B) ∨ (A ∧ ¬A ∨ A ∧ B) distr. ∧ over ∨

(¬B ∧ ¬A) ∨ (1 ∧ B) distr. ∧ over ∨

¬(B ∨ A) ∨ (A ∧ B) Demorgan

¬(A ∨ B) ∨ (A ∧ B) assosiativity of ∨

(A ∨ B) => (A ∧ B) implication elimination

A <=> B ≡ (A ∨ B) => (A ∧ B)