1. a) A: Det snør
B: Det blåser

$A \wedge B$

A	B	A ∧ B
T	T	T
T	F	F
F	T	F
F	F	F

kontingent

b) $B \vee \neg B$

B	B ∨ ¬ B
T	T F
F	T T

↖ tautologi

c) $(A \rightarrow (A \wedge \neg B))$

A	B	A → (A ∧ ¬B)
T	T	F F F
T	F	T T T
F	T	T F F
F	F	T F T

↖ kontingent

d) ~~$(A \wedge B)$~~

$((A \wedge B) \wedge (\neg A \vee \neg B))$

A	B	(A∧B) ∧ (¬A ∨¬B)
T	T	T F F F F
T	F	F F F T T
F	T	F F T T F
F	F	F F T T T

↖ kontradiksjon

e) A: Det er glatt
B: Vi strør fortauet

$(A \wedge (B \rightarrow \neg A))$

A	B	A ∧ (B → ¬ A)
T	T	F F F
T	F	T T F
F	T	F T T
F	F	F T T

↖ kontingent

2. a) $(A \wedge \neg A) \Longleftrightarrow (A \rightarrow A)$?

A	$A \wedge \neg A$		$A \rightarrow A$
T	F	F	T
F	F	T	T

ikke ekvivalente.

b) $(A \rightarrow B) \Longleftrightarrow (\neg A \vee B)$?

A	B	$A \rightarrow B$	$\neg A$	$\vee$	B
T	T	T	F	T	
T	F	F	F	F	
F	T	T	T	T	
F	F	T	T	T	

ekvivalente

c) $(A \wedge (B \wedge C)) \Longleftrightarrow (A \rightarrow (B \rightarrow \neg C))$?

A	B	C	$A \wedge (B \wedge C)$		$A \rightarrow (B \rightarrow \neg C)$		
T	T	T	T	T	F	F	F
T	T	F	F	F	T	T	T
T	F	T	F	F	T	T	F
T	F	F	F	F	T	T	T
F	T	T	F	T	T	F	F
F	T	F	F	F	T	T	T
F	F	T	F	F	T	T	F
F	F	F	F	F	T	T	T

ikke ekvivalente

d) $(A \rightarrow (B \vee C)) \Longleftrightarrow (\neg A \vee (\neg B \rightarrow C))$

A	B	C	$A \rightarrow (B \vee C)$		$\neg A$	$\vee$	$(\neg B \rightarrow C)$	
T	T	T	T	T	F	T	F	T
T	T	F	T	T	F	T	F	T
T	F	T	T	T	F	T	T	T
T	F	F	F	F	F	F	T	F
F	T	T	T	T	T	T	F	T
F	T	F	T	T	T	T	F	T
F	F	T	T	T	T	T	T	T
F	F	F	T	F	T	T	T	F

ekvivalente

3 a) $A \to B$
A
$\therefore B$

A	B	A → B
T	T	T
T	F	F
F	T	T
F	F	T

← gyldig

b) $A \vee B$
$\neg A$
$\therefore B$

A	B	A ∨ B	¬A
T	T	T	F
T	F	T	F
F	T	T	T
F	T	F	T

← gyldig

c) B
$B \to A$
$\therefore \neg\neg A$

A	B	B → A	¬¬A
T	T	T	T
T	F	T	T
F	T	F	F
F	F	T	F

← gyldig

d) $A \vee \neg A$
$A \to B$
$\neg A \to B$
$\therefore B$

A	B	A ∨ ¬A	A → B	¬A → B
T	T	T	T	T
T	F	T	F	T
F	T	T	T	T
F	F	T	T	F

← gyldig

e) A
$\neg(A \wedge \neg B)$
$\therefore B$

A	B	¬	(A	∧	¬	B)
T	T	T		F	F	
T	F	F		T	T	
F	T	T		F	F	
F	F	T		F	T	

← gyldig

f) gyldig, men gyldigheten kan ikke bevises i setningslogikk.

A	B	C
T	T	T
T	T	F
⋮	⋮	⋮

4. a) $(A \vee B)$
$\neg B$
$\therefore (A \to B)$

A	B	$A \vee B$	$\neg B$	$A \to B$	
T	T	T	F	T	
T	F	T	T	F	← ikke gyldig
F	T	T	F	T	
F	F	F	T	T	

b) $(\neg A \to B)$
$\therefore (A \to B)$

A	B	$\neg A \to B$	$A \to B$	
T	T	T	T	
T	F	T	F	← ikke gyldig
F	T	T	T	
F	F	F	T	

c) $(A \to B)$
$(B \to C)$
$\neg C$
$\therefore \neg A$

A	B	C	$A \to B$	$B \to C$	$\neg C$	$\neg A$	
T	T	T	T	T	F	F	
T	T	F	T	F	T	F	
T	F	T	F	T	F	F	
T	F	F	F	T	T	F	
F	T	T	T	T	F	T	
F	T	F	T	F	T	T	
F	F	T	T	T	F	T	
F	F	F	T	T	T	T	← gyldig

5. a) $((A \wedge B) \vee \neg(A \vee B))$ ikke tautologi

A	B	C	$(A \wedge B)$	$\vee$	$\neg$	$(A \vee B)$
T	F		T	F	F	T T F

b) $((A \to B) \wedge \neg(A \wedge B))$ ikke kontradiksjon

A	B	$(A \to B)$	$\wedge$	$\neg$	$(A \wedge B)$
F	F	F	T	T	F F F

c) $(A \leftrightarrow B) \not\Leftrightarrow (\neg A \wedge \neg B)$

A	B	$A \leftrightarrow B$	$\neg A$	$\wedge$	$\neg B$
T	T	T	F	F	T

d) $((A \vee B) \to (C \wedge \neg B))$
$(\neg C \to (A \vee (\neg B \to \neg A)))$
$\therefore C$
ugyldig

A	B	C	$(A \vee B)$	$\to$	$(C \wedge \neg B)$	$\neg C \to$

5.

a) $\not\models ((A \wedge B) \vee \neg(A \vee B))$

A B	(A ∧ B) ∨ ¬ (A ∨ B)
T F	T F F F F T T F
	=

b) $((A \to B) \wedge \neg(A \wedge B)) \not\models \bot$

A B	(A → B) ∧ ¬ (A ∧ B)
F F	F T F T T F F F
	=

c) $(A \leftrightarrow B) \not\Leftrightarrow (\neg A \wedge \neg B)$

A B	A ↔ B	¬ A ∧ ¬ B
T T	T T T	F T F F T
	=	=

d) $((A \vee B) \to (C \vee B))$
$(\neg C \to (A \wedge (\neg B \to \neg A)))$

$\therefore C$

ikke gyldig

A B C	(A ∨ B) → (C ∨ B)	¬ C → (A ∧ (¬ B → ¬ A))
T T F	T T T T F T T	T F T T T F T T F T
=	=	=