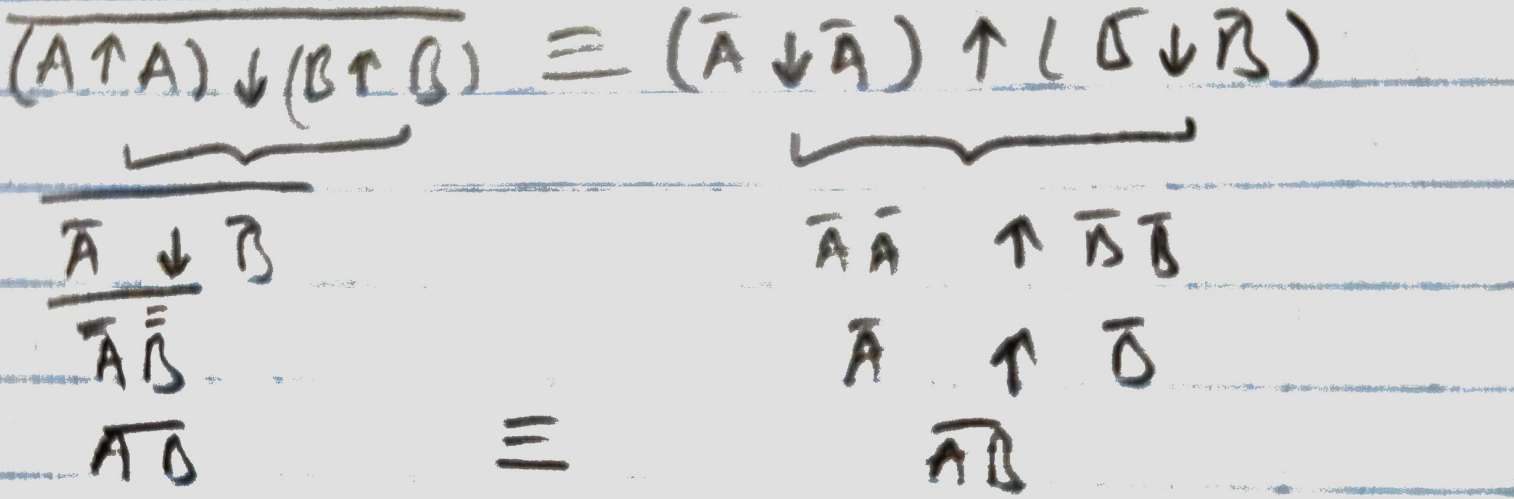
$$(A \uparrow A) \uparrow (((A \uparrow B) \uparrow (A \uparrow B)) \uparrow ((A \uparrow B) \uparrow (A \uparrow B))) = A$$

$$\overline{A} \uparrow (\overline{AB} \uparrow \overline{AB}) \uparrow (\overline{AB} \uparrow \overline{AB})$$

$$\overline{A} \uparrow (AB \uparrow AB)$$

$$\overline{A} \uparrow \overline{AB}$$

$$A + AB = A$$


(A↑A)↓(B↑B) ≡ (Ā↓Ā)↑(B̄↓B̄)
A↓B
Ā B̄
A B
≡
Ā Ā ↑ B̄ B̄
Ā ↑ B̄
A B

10)

A, B	TT	TF	FT	FF
$f_1(A,B)$	T	f	F	f
$f_2(A,B)$	F	T	f	f
$f_3(A,B)$	F	f	T	f
$f_4(A,B)$	f	F	f	T

$f_1(A,B) + f_2(A,B) + f_4(A,B) \equiv A \Rightarrow B$

$f_1(T,T) + f_2(T,T) + f_4(T,T) = T$

$f_1(T,F) + f_2(T,F) + f_4(T,F) = F$

$f_1(F,T) + f_2(F,T) + f_4(F,T) = T$

$f_1(F,F) + f_2(F,F) + f_4(F,F) = T$

$A \Rightarrow B$	
(T,T)	T
(T,F)	F
(F,T)	T
(F,F)	T

$\therefore f_1(A,B) + f_2(A,B) + f_4(A,B) \equiv A \Rightarrow B$

11)

$(A \Rightarrow B)$		$\bar{B} \Rightarrow \bar{A}$	
(T,T)	T	(T,T)	T
(T,F)	F	(T,F)	F
(F,T)	T	(F,T)	T
(F,F)	T	(F,F)	T

$\therefore A \Rightarrow B \equiv \bar{B} \Rightarrow \bar{A}$