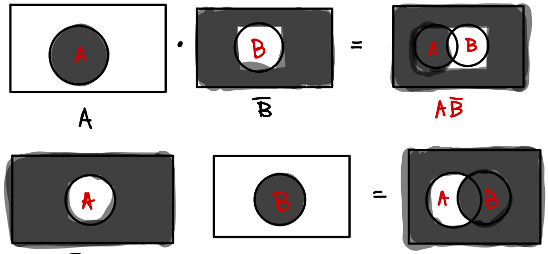
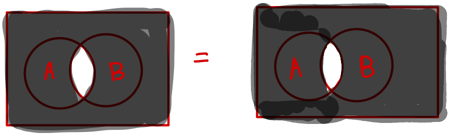
1.



$A \cdot \bar{B} = A\bar{B}$

$\bar{A} + B = \bar{A}+B$

2.



$\bar{A} + \bar{B} = \overline{AB}$

3.

A	$A+\bar{A}$	A	$\bar{A}$	$A\bar{A}$
T	T	T	F	F
F	T	F	T	F

4.

A	B	f_1 AB	f_2 $A\bar{B}$	f_3 $\bar{A}B$	f_4 $\overline{AB}$
T	T	T	F	F	F
T	F	F	T	F	F
F	T	F	F	T	F
F	F	F	F	F	T

5.

A	B	f_1 AB	f_2 $A\bar{B}$	f_3 $\bar{A}B$	f_4 $\overline{AB}$	f_5 $A\bar{B}+\overline{AB}$	f_6 $AB+\bar{A}B+\overline{AB}$
T	T	T	F	F	F	F	T
T	F	F	T	F	F	T	F
F	T	F	F	T	F	F	T
F	F	F	F	F	T	T	T

6.

$A \uparrow B = \overline{AB} = \bar{A} + \bar{B}$

$A \uparrow A = \overline{AA} = \bar{A}$

7. since $A \uparrow A = \overline{AA} = \bar{A}$

then, $\overline{A \uparrow A} = AA = A$

and $\overline{B \uparrow B} = BB = B$

therefore $\overline{(A \uparrow A) \downarrow (B \uparrow B)} = A \downarrow B$

$\bar{A} \downarrow \bar{A} \equiv \overline{(\bar{A} \downarrow \bar{A})} = \bar{\bar{A}} = A$

$\bar{B} \downarrow \bar{B} = \overline{(\bar{B} \downarrow \bar{B})} = \bar{\bar{B}} = B$

so $(\bar{A} \downarrow \bar{A}) \uparrow (\bar{B} \downarrow \bar{B}) = A \uparrow B$

$\hookrightarrow A \downarrow B \equiv A \uparrow B$

8. $(A\uparrow A)\uparrow\big(\underbrace{((A\uparrow B)\uparrow(A\uparrow B))}\uparrow\underbrace{((A\uparrow B)\uparrow(A\uparrow B))}\big)=A$

$\downarrow$

$\bar{A} \uparrow (AB \uparrow AB) = A$