11. $AA = A$
$A + A = A$

Idempotence

For $AA = A$:

A	AA	A
0	0	0
1	1	1

This means (AA) evaluates to (A) for all values of (A).

0 = F, 1 = True

$A + A = A$

A	A + A	A
0	0	0
1	1	1

This means ($A + A$) evaluates to (A) for all values of (A)

Commutativity

($AB = BA$)

A	B	AB	BA
0	0	0	0
0	1	0	0
1	0	0	0
1	1	1	1

The table confirms $AB = BA$.

0 = F
1 = True

($A + B = B + A$)

A	B	A + B	B + A
0	0	0	0
0	1	1	1
1	0	1	1
1	1	1	1

The table confirms $A + B = B + A$.

Associativity.

$A(BC) = (AB)C = ABC$

A	B	C	$A(BC)$	$(AB)C$	ABC
0	0	0	0	0	0
0	0	1	0	0	0
0	1	0	0	0	0
0	1	1	0	0	0
1	0	0	0	0	0
1	0	1	0	0	0
1	1	0	0	0	0
1	1	1	1	1	1

This shows $A(BC)=(AB)C$
$= ABC$
for all values of A, B, C

$A+(B+C) = (A+B)+C = A+B+C$

A	B	C	$A+(B+C)$	$(A+B)+C$	$A+B+C$
0	0	0	0	0	0
0	0	1	1	1	1
0	1	0	1	1	1
0	1	1	1	1	1
1	0	0	1	1	1
1	0	1	1	1	1
1	1	0	1	1	1
1	1	1	1	1	1

This shows $A+(B+C) = (A+B)+C$
$= A+B+C$

Distributivity:

$A(B+C) = AB + AC$

A	B	C	AB	AC	
0	0	0	0	0	0
0	0	1	0	0	0
0	1	0	0	0	0
0	1	1	0	0	0
1	0	0	0	0	0
1	0	1	1	1	1
1	1	0	1	1	1
1	1	1	1	1	1

This table shows:
$A(B+C) = AB + AC$

~~0 = True~~
~~1 = False~~

0 = False
1 = True

$A+(BC) = (A+B)(A+C)$

A	B	C	A+B	A+C	
0	0	0	0	0	0
0	0	1	0	1	0
0	1	0	1	0	0
0	1	1	1	1	1
1	0	0	1	1	1
1	0	1	1	1	1
1	1	0	1	1	1
1	1	1	1	1	1

The table shows
$A+(BC) = (A+B)(A+C)$

Duality

if $C = AB$ then $\overline{C} = \overline{A} + \overline{B}$

A	B	AB	$\overline{A}$	$\overline{B}$	$\overline{A} + \overline{B}$
F	F	F	F	F	F
F	T	F	F	T	T
T	F	F	T	F	T
T	T	T	T	T	T

C = F, F, F, T

$\overline{C}$ = F, T, T, T

This makes sense as C vs $\overline{C}$ show the opposite values.

if $D = A + B$ then $\overline{D} = \overline{A}\,\overline{B}$

A	B	$A + B$
T	T	T
T	F	T
F	T	T
F	F	F

$\overline{A}$	$\overline{B}$	$\overline{AB}$
T	T	T
T	F	F
F	T	F
F	F	F

D vs $\overline{D}$ shows the correct table values.