

## Identity Law

**AND form:**  $1A=A$

DUALITY CHANGE CONSTANTS AND CHANGE OPERATOR ALSO TRUE

**OR form:**  $0+A=A$

A	R
0	0
1	1

## Null Law

**AND form:**  $0A=0$

A	R
0	0
1	0

**OR form:**  $1+A=1$

A	R
0	1
1	1

## Idempotent Law

**AND form:**  $AA=A$

A	R
0	0
1	1

**OR form:**  $A+A=A$

A	R
0	0
1	1

## Inverse Law

**AND form:**  $A \& \sim A = 0$

A	R
0	0
1	0

**OR form:**  $A + \sim A = 1$

A	R
0	1
1	1

## Commutative Law

**AND form:**  $A \& B = B \& A$

$A \& B = R$

A	B	R
0	0	0
0	1	0
1	0	0
1	1	1

$B \& A = R$

A	B	R
0	0	0
0	1	0
1	0	0
1	1	1

**OR form:**  $A + B = B + A$

$A + B = R$

A	B	R
0	0	0
0	1	1
1	0	1
1	1	1

$$B+A=R$$

A	B	R
0	0	0
0	1	1
1	0	1
1	1	1

## Associative Law

**AND form:**  $(AB)C=A(BC)$

$$(AB)C=R$$

A	B	C	R
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

$$A(BC)=R$$

A	B	C	R
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

**OR form:**  $(A+B)+C = A+(B+C)$

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

A	B	C	R
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

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

A	B	C	R
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

## Distributive Law

$$\text{AND form: } A+B\&\&C=(A+B)(A+C)$$

$$A+B\&\&C=R$$

A	B	C	R
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

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

A	B	C	R
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

**OR form:**  $A(B+C)=AB+AC$

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

A	B	C	R
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

$$AB+AC=R$$

A	B	C	R
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

## Absorption Law

**AND form:**  $A(A+B)=A$

A	B	R
0	0	0
0	1	0
1	0	1
1	1	1

R does equal A

**OR form:**  $A+AB=A$

A	B	R
0	0	0
0	1	0
1	0	1
1	1	1

R does equal A

## De Morgan's Law

**AND form:**  $!(A \& B) = A' + B'$

$!(A \& B) = R$

A	B	R
0	0	1
0	1	1
1	0	1
1	1	0

$!A + !B = R$

A	B	R
0	0	1
0	1	1
1	0	1
1	1	0

**OR form:**  $!(A + B) = !A \& !B$

$!(A + B) = R$

A	B	R
0	0	1
0	1	0
1	0	0
1	1	0

$!A \& !B$

A	B	R
0	0	1
0	1	0
1	0	0
1	1	0

## XOR LAWS

$$A \wedge 0 = A$$

A	R
0	0
1	1

$$A \wedge 1 = !A$$

A	R
0	1
1	0

$$A \wedge A = 0$$

A	R
0	0
1	0

$$A \wedge !A = 1$$

A	R
0	1
1	1

$$(A + !A \& \& B = A + B)$$

$$A + !A \& \& B = R$$

A	B	R
0	0	0
0	1	1
1	0	1
1	1	1

$$A + B = R$$

A	B	R
0	0	0
0	1	1
1	0	1
1	1	1

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

$$(A+B) \& \& (A+C) = R$$

A	B	C	R
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

$$A+B \& \& C = R$$

A	B	C	R
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1