

Simplifying Boolean Expressions  
(Minterm Expressions & Karnaugh Maps)  
in-class worksheet #1

For each of the following truth tables, write the unsimplified boolean expression:

A	B	Y
0	0	1
0	1	1
1	0	0
1	1	1

*table 1*

A	B	Y
0	0	0
0	1	1
1	0	0
1	1	1

*table 2*

expression: \_\_\_\_\_

expression: \_\_\_\_\_

A	B	C	Y
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

*table 3*

A	B	C	Y
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	1

*table 4*

expression: \_\_\_\_\_

expression: \_\_\_\_\_

A	B	C	D	Y
0	0	0	0	1
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	0
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	0
1	1	0	0	0
1	1	0	1	1
1	1	1	0	0
1	1	1	1	1

*table 5*

A	B	C	D	Y
0	0	0	0	1
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	1
0	1	0	1	0
0	1	1	0	1
0	1	1	1	0
1	0	0	0	1
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	1
1	1	1	1	0

*table 6*

expression: \_\_\_\_\_

expression: \_\_\_\_\_

## Karnaugh Maps

For each of the unsimplified Minterm expressions on the other side, fill-in the K-Map tables and then write the simplified boolean expression:

	$\bar{B}$	$B$
$\bar{A}$		
$A$		

*table 1*

	$\bar{B}$	$B$
$\bar{A}$		
$A$		

*table 2*

simplified expression: \_\_\_\_\_

simplified expression: \_\_\_\_\_

Now, **Prove** that your simplified expression is the same as the original unsimplified expression.

Proof:

A	B				
0	0				
0	1				
1	0				
1	1				

A	B				
0	0				
0	1				
1	0				
1	1				

	$\bar{C}$	$C$
$\bar{A}\bar{B}$		
$\bar{A}B$		
$AB$		
$A\bar{B}$		

*table 3*

	$\bar{C}$	$C$
$\bar{A}\bar{B}$		
$\bar{A}B$		
$AB$		
$A\bar{B}$		

*table 4*

simplified expression: \_\_\_\_\_

simplified expression: \_\_\_\_\_

	$\bar{C}\bar{D}$	$\bar{C}D$	$CD$	$C\bar{D}$
$\bar{A}\bar{B}$				
$\bar{A}B$				
$AB$				
$A\bar{B}$				

*table 5*

	$\bar{C}\bar{D}$	$\bar{C}D$	$CD$	$C\bar{D}$
$\bar{A}\bar{B}$				
$\bar{A}B$				
$AB$				
$A\bar{B}$				

*table 6*

simplified expression: \_\_\_\_\_

simplified expression: \_\_\_\_\_