Name _____ Date _____

Compound Expressions and Truth Tables

Example

For $A = 1, B = 0$: $A \wedge \neg B = 1 \wedge \neg 0 = 1 \wedge 1 = 1$

Remember

Order: brackets first, then negation ¬, then conjunction ∧, and disjunction ∨ last. For a long expression, add helper columns step by step.

1 ON YOUR OWN Complete the truth table.

A	B	$\neg B$	$A \wedge \neg B$	$A \vee B$	$\neg(A \vee B)$
0	0				
0	1				
1	0				
1	1				

2 ON YOUR OWN Complete the table. When is the expression true? Describe it in words.

A	B	$A \vee B$	$\neg A$	$(A \vee B) \wedge \neg A$
0	0			
0	1			
1	0			
1	1			

Names (pair) _____ Date _____

3 IN PAIRS **Three variables.** Why does the table have 8 rows? Look at the order of the combinations and complete the table.

A	B	C	$A \wedge B$	$(A \wedge B) \vee C$
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

4 IN PAIRS **Exclusive OR.** $A \oplus B$ is true when **exactly one** statement is true. Complete and compare with $A \vee B$.

A	B	$A \vee B$	$A \oplus B$
0	0		
0	1		
1	0		
1	1		

In which row do they differ?

_____

_____

5 ON YOUR OWN What does $A \vee B \wedge C$ mean? Circle and work it out for $A = 1, B = 0, C = 0$.

$(A \vee B) \wedge C$ or $A \vee (B \wedge C)$ →

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Expression mode: type an expression such as $(A \vee B) \wedge \neg A$ and check your truth table.

★ ON YOUR OWN **Exit card.** How many rows does a truth table with 4 variables have?