

Answer Key - Truth Tables #6-20

Two-Variable Expressions (#6-14)

6. $A \&\& !B$

A	B	Result
F	F	F
F	T	F
T	F	T
T	T	F

7. $!(A \&\& B)$

A	B	Result
F	F	T
F	T	T
T	F	T
T	T	F

8. $!A \parallel !B$

A	B	Result
F	F	T
F	T	T
T	F	T
T	T	F

9. $!(A \parallel B)$

A	B	Result
F	F	T
F	T	F
T	F	F
T	T	F

10. $!A \&\& !B$

A	B	Result
F	F	T
F	T	F
T	F	F
T	T	F

11. **A || (A && B)**

A	B	Result
F	F	F
F	T	F
T	F	T
T	T	T

12. **A && A**

A	B	Result
F	F	F
F	T	F
T	F	T
T	T	T

13. **A || A**

A	B	Result
F	F	F
F	T	F
T	F	T
T	T	T

14. **!!A**

A	B	Result
F	F	F
F	T	F
T	F	T
T	T	T

Three-Variable Expressions (#15-20)

15. **A && (B || C)**

A	B	C	Result
F	F	F	F
F	F	T	F
F	T	F	F
F	T	T	F
T	F	F	F
T	F	T	T
T	T	F	T

A	B	C	Result
T	T	T	T

16. $(A \ \&\& \ B) \ || \ (A \ \&\& \ C)$

A	B	C	Result
F	F	F	F
F	F	T	F
F	T	F	F
F	T	T	F
T	F	F	F
T	F	T	T
T	T	F	T
T	T	T	T

17. $A \ || \ (B \ \&\& \ C)$

A	B	C	Result
F	F	F	F
F	F	T	F
F	T	F	F
F	T	T	T
T	F	F	T
T	F	T	T
T	T	F	T
T	T	T	T

18. $(A \ || \ B) \ \&\& \ (A \ || \ C)$

A	B	C	Result
F	F	F	F
F	F	T	F
F	T	F	F
F	T	T	T
T	F	F	T
T	F	T	T
T	T	F	T
T	T	T	T

19. $!(A \ \&\& \ B \ \&\& \ C)$

A	B	C	Result
F	F	F	T

A	B	C	Result
F	F	T	T
F	T	F	T
F	T	T	T
T	F	F	T
T	F	T	T
T	T	F	T
T	T	T	F

20. $(\neg A \vee \neg B \vee \neg C)$

A	B	C	Result
F	F	F	T
F	F	T	T
F	T	F	T
F	T	T	T
T	F	F	T
T	F	T	T
T	T	F	T
T	T	T	F

Notes

Equivalent pairs demonstrating boolean algebra laws:

- **De Morgan's laws:** #7-8 $(\neg(A \&\& B)) = (\neg A \vee \neg B)$, #9-10 $(\neg(A \vee B)) = (\neg A \&\& \neg B)$, #19-20 $(\neg(A \&\& B \&\& C)) = (\neg A \vee \neg B \vee \neg C)$
- **Distributive laws:** #15-16 $(A \&\& (B \vee C)) = ((A \&\& B) \vee (A \&\& C))$, #17-18 $(A \vee (B \&\& C)) = ((A \vee B) \&\& (A \vee C))$
- **Absorption law:** #11 $(A \vee (A \&\& B)) = (A)$
- **Idempotent laws:** #12 $(A \&\& A) = (A)$, #13 $(A \vee A) = (A)$
- **Double negation:** #14 $(\neg\neg A) = (A)$