

BOOLEAN THEOREMS

From Tocci Widmer and Moss 10th Ed.

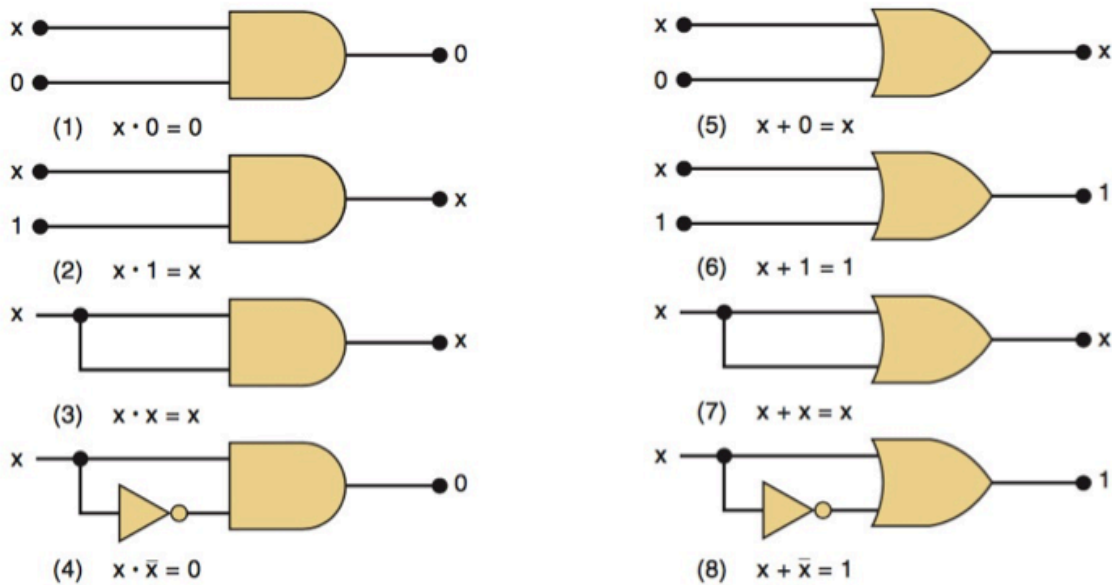


FIGURE 3-25 Single-variable theorems.

Multivariable Theorems

- (9) $x + y = y + x$
- (10) $x \cdot y = y \cdot x$
- (11) $x + (y + z) = (x + y) + z = x + y + z$
- (12) $x(yz) = (xy)z = xyz$
- (13a) $x(y + z) = xy + xz$
- (13b) $(w + x)(y + z) = wy + xy + wz + xz$
- (14) $x + xy = x$
- (15a) $\bar{x} + \bar{x}y = \bar{x} + y$
- (15b) $\bar{x} + xy = \bar{x} + y$

DEMORGAN'S THEOREMS

- (16) $\overline{(x + y)} = \bar{x} \cdot \bar{y}$
- (17) $\overline{(x \cdot y)} = \bar{x} + \bar{y}$

Use this sheet to solve all problems in Logic Simplification. This is the equivalent of the analogue equation sheet.

from other sources

Boolean Theorem

- Basic Rules

- | | |
|----------------------|-------------------------------|
| 1. $A + 0 = A$ | 7. $A \cdot A = A$ |
| 2. $A + 1 = 1$ | 8. $A \cdot \bar{A} = 0$ |
| 3. $A + A = A$ | 9. $\bar{\bar{A}} = A$ |
| 4. $A + \bar{A} = 1$ | 10. $A + AB = A$ |
| 5. $A \cdot 0 = 0$ | 11. $A + \bar{A}B = A + B$ |
| 6. $A \cdot 1 = A$ | 12. $(A + B)(A + C) = A + BC$ |

We will look at two methods.

1. Boolean Algebra simplification rules

1. $A + \bar{A} = 1$	2. $A + A = A$
3. $A \cdot A = A$	4. $A \cdot \bar{A} = 0$
5. $A \cdot (B + C) = A \cdot B + A \cdot C$	6. $A + 0 = A$
7. $A + 1 = 1$	8. $A \cdot 1 = A$
9. $A \cdot 0 = 0$	10. $A \cdot B = B \cdot A$
11. $A + B = B + A$	12. $B \cdot (A + \bar{A}) = B$
13. $A + A \cdot B = A$	14. $A \cdot (A + B) = A$
15. $A + \bar{A} \cdot B = A + B$	16. $A \cdot (\bar{A} + B) = A \cdot B$
17. $\overline{A + B} = \bar{A} \cdot \bar{B}$	18. $\overline{A \cdot B} = \bar{A} + \bar{B}$