

11.8 Fundamental Laws and Theorems of Boolean Algebra:

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|-----|--|---|--------------------------|
| 1. | $X + 0 = X$ | } | OR operations |
| 2. | $X + 1 = 1$ | | |
| 3. | $X + X = X$ | | |
| 4. | $X + \overline{X} = 1$ | | |
| 5. | $X \cdot 0 = 0$ | } | AND operations |
| 6. | $X \cdot 1 = X$ | | |
| 7. | $X \cdot X = X$ | | |
| 8. | $X \cdot \overline{X} = 0$ | | |
| 9. | $\overline{\overline{X}} = X$ | | Double complement |
| 10. | $X + Y = Y + X$ | } | Commutative laws |
| 11. | $XY = YX$ | | |
| 12. | $(X + Y) + Z = X + (Y + Z)$ | } | Associative laws |
| 13. | $(X \cdot Y) \cdot Z = X \cdot (Y \cdot Z)$ | | |
| 14. | $X(Y + Z) = XY + XZ$ | | Distribution Law |
| 15. | $X + Y \cdot Z = (X + Y) \cdot (X + Z)$ | | Dual of Distributive Law |
| 16. | $X + XZ = X$ | } | Laws of absorption |
| 17. | $X(X + Z) = X$ | | |
| 18. | $X + \overline{X}Y = X + Y$ | } | Identity Theorems |
| 19. | $X(\overline{X} + Y) = X \cdot Y$ | | |
| 20. | $\overline{X + Y} = \overline{X} \cdot \overline{Y}$ | } | De Morgan's Theorems |
| 21. | $\overline{X \cdot Y} = \overline{X} + \overline{Y}$ | | |