# Laws of Algebra of Propositions

**Identity:**

p V p ≡ p p Λ p ≡ p p → p ≡ T p ↔ p ≡ T

p V T ≡ T p Λ T ≡ p p → T ≡ T p ↔ T ≡ p

p V F ≡ p p Λ F ≡ F p → F ≡ ~p p ↔ F ≡ ~p

 T → p ≡ p

 F → p ≡ T

**Commutative:**

p V q ≡ q V p

p Λ q ≡ q Λ p

p → q ≠ q → p

p ↔ q ≡ q ↔ p

**Complement:**

p V ~p ≡ T

p Λ ~p ≡ F

p → ~p ≡ ~p p ↔ ~p ≡ F

 ~p → p ≡ p

**Double Negation:**

~(~p) ≡ p

**Associative:**

p V (q V r) ≡ (p V q) V r

p Λ (q Λ r) ≡ (p Λ q) Λ r

**Distributive:**

p V (q Λ r) ≡ (p V q) Λ (p V r)

p Λ (q V r) ≡ (p Λ q) V (p Λ r)

**Absorbtion:**

p V (p Λ q) ≡ p

p Λ (p V q) ≡ p

**De Morgan’s:**

~(p V q) ≡ ~p Λ ~q

~(p Λ q) ≡ ~p V ~q

**Equivalence of Contrapositive:**

p → q ≡ ~q → ~p

**Others:**

p → q ≡ ~p V q

p ↔ q ≡ (p → q) Λ (q → p)