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LOGICAL REASONING ULTIMATE CHEAT SHEET

1. Propositional Logic

- **Negation** (*egp*): Not p .
- **Conjunction** ($p \wedge q$): True only if *both* p and q are True.
- **Disjunction** ($p \vee q$): True if *at least one* is True.
- **Conditional** ($p \rightarrow q$): False *only* when p is T and q is F.
- **Biconditional** ($p \leftrightarrow q$): True if both have identical truth values.

Truth Table Summary

p	q	$\neg p$	$p \wedge q$	$p \vee q$	$p \rightarrow q$
T	T	F	T	T	T
T	F	F	F	T	F
F	T	T	F	T	T
F	F	T	F	F	T

2. Logical Transformations

For a conditional statement $p \rightarrow q$:

- **Converse:** $q \rightarrow p$
- **Inverse:** $\neg p \rightarrow \neg q$
- **Contrapositive:** $\neg q \rightarrow \neg p$ (Equivalent to $p \rightarrow q$)

De Morgan's Laws

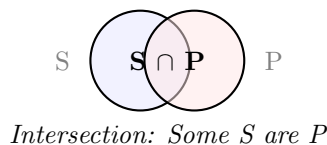
$$\neg(p \wedge q) \equiv \neg p \vee \neg q$$

$$\neg(p \vee q) \equiv \neg p \wedge \neg q$$

3. Categorical Syllogisms

Standard categorical propositions:

- **A (Universal Affirmative):** All S are P.
- **E (Universal Negative):** No S are P.
- **I (Particular Affirmative):** Some S are P.
- **O (Particular Negative):** Some S are not P.



4. Blood Relations

Standard structural representation:

- **Generations:** Vertical lines (||).
- **Siblings:** Horizontal line (—).
- **Spouse:** Double horizontal line (=).

- **Male / Female:** [Male] / (Female).

Key Relationships:

- Father's/Mother's Brother $\rightarrow$ Uncle
- Father's/Mother's Sister $\rightarrow$ Aunt
- Brother's/Sister's Son $\rightarrow$ Nephew
- Brother's/Sister's Daughter $\rightarrow$ Niece

5. Clocks & Calendars

Clock Formulas

- Angle between hands at H hours and M minutes:

$$\theta = |30H - \frac{11}{2}M|$$

- Minute hand speed = $6^\circ/\text{min}$
- Hour hand speed = $0.5^\circ/\text{min}$

Calendar Odd Days

- Ordinary Year (365 days) = 1 Odd Day
- Leap Year (366 days) = 2 Odd Days
- 100 Years = 5 Odd Days
- 400 Years = 0 Odd Days

6. Seating Arrangements

- **Circular Facing Center:**
Right *arrow* Anti-clockwise — Left *arrow* Clockwise
- **Circular Facing Outside:**
Right *arrow* Clockwise — Left *arrow* Anti-clockwise
- **Linear Row Facing North:**
Right *arrow* East — Left *arrow* West

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