



Logical Reasoning

Foundations of Syllogisms and Blood Relations

| Mastery Roadmap

1. Syllogisms

Decoding deductive logic using Venn Diagrams. We explore standard qualifiers like "All", "Some", and modern variants like "Only a few".

- Basic Venn Diagram Patterns
- Possible vs. Definite Conclusions
- Complementary Pairs (Either-Or)

2. Blood Relations

Mapping human kinship through systematic family trees. Mastering the generational gap and relation-based decoding.

- Gender and Generation Notation
- Paternal vs. Maternal Lineages
- Coded and Pointer Problems

Section I: Syllogisms

The Art of Deductive Interpretation

| What is a Syllogism?



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Deductive Reasoning

A syllogism is a logical argument where a conclusion is drawn from two or more given premises. It tests your ability to interpret relationships between different sets of data.

Core Concept: Treat the statements as 100% true, even if they defy common knowledge (e.g., "All Cats are Dogs").

| The Four Standard Statements



All A is B

Universal Positive. Set A is a subset of Set B.



Some A is B

Particular Positive. Intersection exists between A and B.



No A is B

Universal Negative. Disjoint sets with zero overlap.



Some A is not B

Particular Negative. At least one part of A is outside B.

| Logic of "ALL"

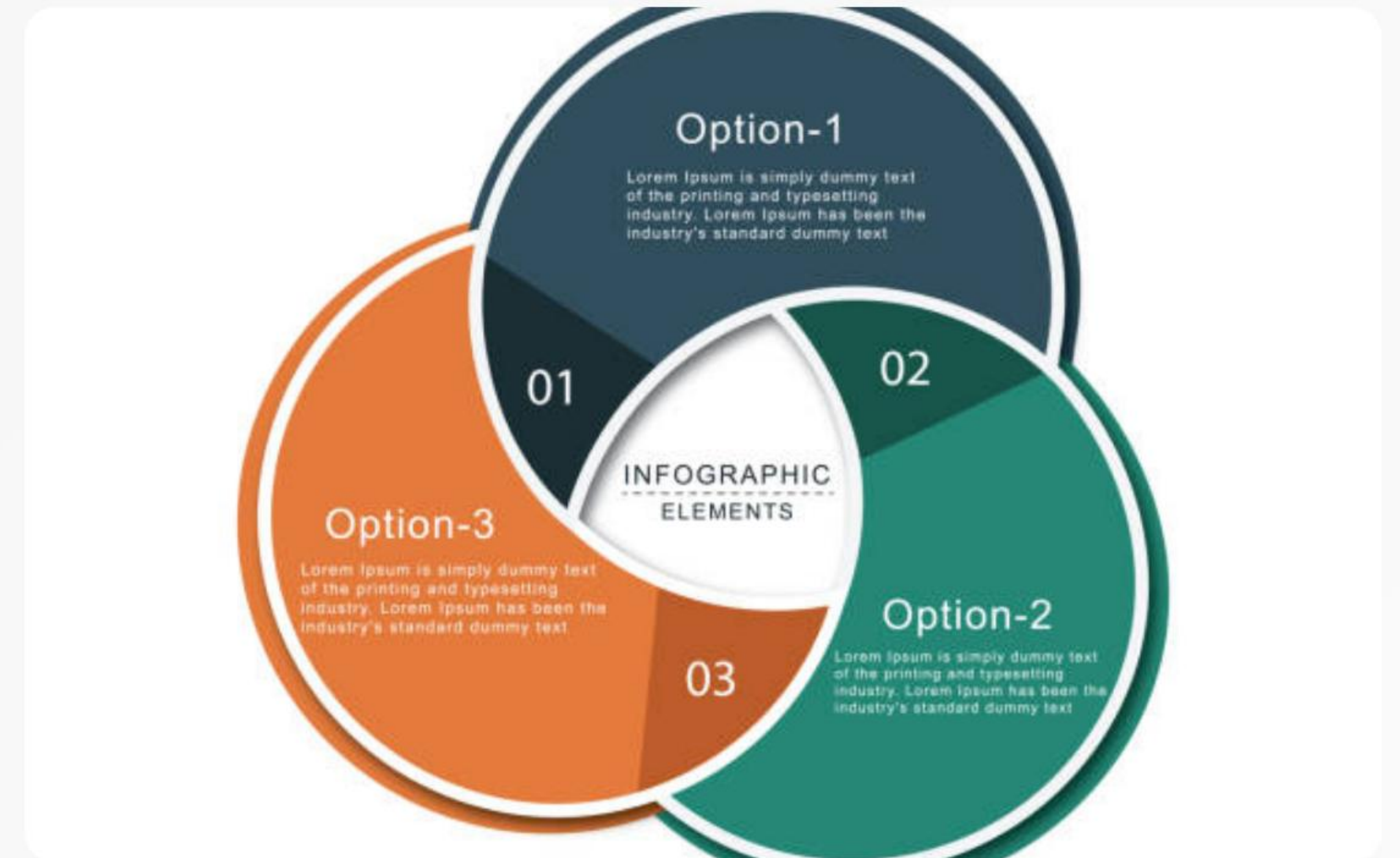
Universal Positive

Statement: **All Mangoes are Fruits.**

Interpretation: Every single element of the Mango set is contained within the Fruit set.

Valid Conclusion: Some Fruits are Mangoes.

Invalid Assumption: All Fruits are Mangoes (unless specified).



| Logic of "SOME"

The Intersection

Statement: **Some Doctors are Engineers.**

Interpretation: There is at least one common element between both sets.

Deep Insight: "Some" means "At least 1% and can be 100%". "Some" does not automatically imply "Some are not" in definite terms.



| Logic of "NO"

The Separation

Statement: **No Plastic is Metal.**

Venn Interpretation: Two separate circles with a cross line between them indicating zero interaction.

Definite Logic

If No A is B, then definitely No B is A. Furthermore, Some A is not B is also definitely true.

| The "Some Not" Challenge

Statement Type	Definite Truth	Possible Assumption
Some A is not B	A part of A is outside B	All B can be A
Only A is B	All B is A	B cannot touch any other set
Only a few A is B	Some A is B + Some A is not B	All A can never be B

| Definite vs. Possible



Definite Conclusion

A conclusion that is true in EVERY possible Venn Diagram. If it fails in even one diagram, it is not definite.



Possibility (Can be)

A conclusion that is true in AT LEAST one possible diagram. It only fails if there is a direct contradiction in the statements.

| Golden Rules of Syllogisms

- ✓ Always draw the **Minimum Overlap** diagram first to check definite conclusions.
- ! Never assume relations between two variables unless a direct or indirect link exists in the statements.
- ✕ If two sets are separate but have no "No" relation, a "Possibility" relation between them is always true.
- ✕ Universal Positive statements do not allow negative conclusions.

| The "Either-Or" Logic

3

Conditions

Complementary Pairs

When two conclusions independently fail but together cover all possibilities.

- Same Subject and Predicate.
- Both conclusions must be false independently.
- Must form pairs like (Some + No) or (All + Some Not).

| Advanced: Only / Only a few

Modern Term	Logical Interpretation	Diagram Constraint
Only A is B	Reverse All (All B is A)	B is exclusive to A only.
Only a few A is B	Dual Relation (Some + Some Not)	Part of A cannot enter B.
Few / At least some	Treated as "Some"	Standard intersection.

| Syllogism Solving Strategy



1. Base Map

Draw the simplest diagram representing the statements.



2. Scan Conclusion

Distinguish between 'Is' (Definite) and 'Can be' (Possible).



3. Validate

Try to disprove definite conclusions with alternative diagrams.

Practical Case Study

Statements

1. Only a few Pens are Pencils.
2. All Pencils are Erasers.
3. No Eraser is Paper.

Conclusions

- A. All Pens can be Pencils. (**False** - 'Only a few' restricts this).
- B. Some Pens are not Paper. (**True** - Common part of Pen/Pencil is in Eraser, which isn't Paper).

Section II: Blood Relations

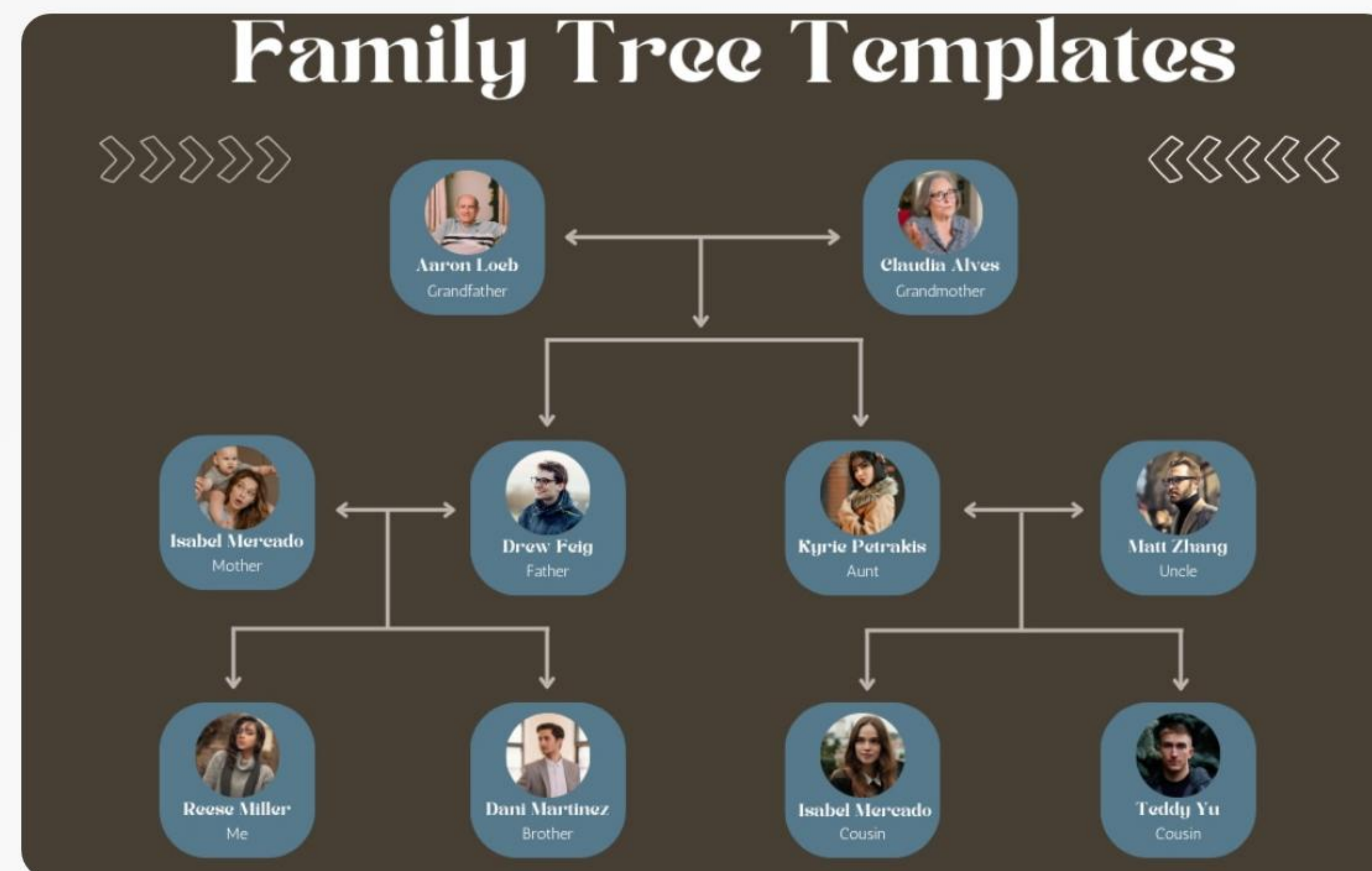
Decoding the Complexity of Kinship

Kinship Fundamentals

Logical Genealogy

Blood relation problems test your ability to translate linguistic descriptions into structural kinship maps (Family Trees).

Success Metric: Speed and accuracy in identifying the "Subject-Predicate" relation through generational gaps.



| The Notation Tool-Kit



Male

Represented by a Square
or (+) symbol.



Female

Represented by a Circle
or (-) symbol.



Couples

Linked by a double
horizontal line (=).



Generation

Represented by a vertical
line.

Direct Relationship Matrix

Relationship	Definition	Example
Sibling	Children of same parents	Brother / Sister
Spouse	Marriage partner	Husband / Wife
Niece / Nephew	Sibling's child	Brother's daughter
Cousin	Uncle/Aunt's child	Father's brother's son

| The "In-Law" Matrix

Brother-in-Law

1. Wife's brother
2. Husband's brother
3. Sister's husband

Sister-in-Law

1. Wife's sister
2. Husband's sister
3. Brother's wife

| Lineage Specialization

Paternal Side

Relations derived from the **Father's** side.

- Paternal Grandfather: Father's Father
- Paternal Uncle: Father's Brother

Maternal Side

Relations derived from the **Mother's** side.

- Maternal Grandfather: Mother's Father
- Maternal Aunt: Mother's Sister

| Generational Mapping

- ↑ Gen +2: Grandparents (Maternal/Paternal).
- ^ Gen +1: Parents, Uncles, Aunts, Parents-in-law.
- Gen 0: Self, Siblings, Cousins, Spouse, Brother/Sister-in-law.
- ✓ Gen -1: Children, Nieces, Nephews, Son/Daughter-in-law.



Pointer/Portrait Logic

In these problems, a person describes another (usually in a photo). The best strategy is to solve **Backwards** from the phrase "My...".

Example: "The only daughter of the father of my mother."

Logic: My Mother → Her Father (Grandfather) → His only daughter (Mother). The person is the mother.



MICHAEL CARR
PHOTOGRAPHY

Coded Blood Relations

+

$A + B$

Means A is the father of B.

—

$A - B$

Means A is the sister of B.

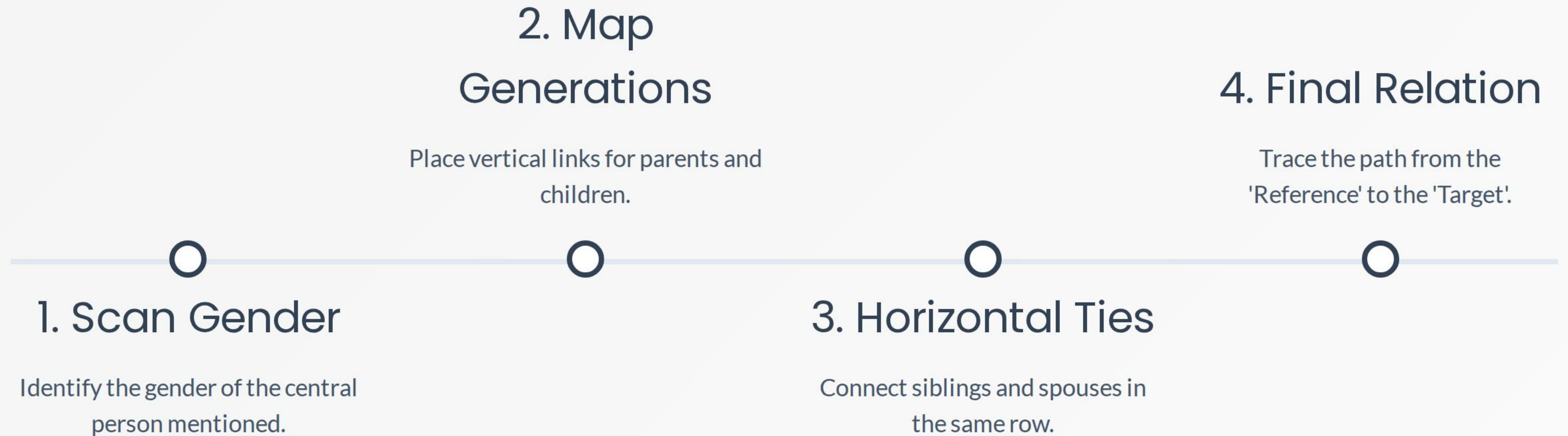


$A * B$

Means A is the husband of B.

Key Tip: Check Gender and Generation Gap first to eliminate options without drawing the full tree.

| The 4-Step Solution



| Case Study: The Portrait

The Problem

Pointing to a man, Neha says: "He is the son of the only child of my grandfather."

How is the man related to Neha?

The Logic

1. Grandfather's only child = Father.
2. Son of the father = Brother.

Answer: The man is Neha's brother.

Coded Relation Puzzle

Expression	Question	Path Calculation
P @ Q # R % S	How is P related to S?	P is father of Q (Gen +1), Q is brother of R (Gen 0), R is wife of S (Gen 0).
Final Result:		P is the Father-in-law of S.

*"Logical reasoning is not just about finding
the right answer, but about eliminating
every possibility of being wrong."*

— Advanced Logic Principle

Mastery comes from understanding **Why** a conclusion is invalid.

| Logic Summary Table

Topic	Key Rule	Common Pitfall
Syllogisms	Use Minimum Overlap Venn	Assuming "Some" means "Some not"
Blood Relations	Map Generations Vertically	Assuming gender based on names
Possibility	True if no direct clash	Confusing 'Can be' with 'Is'



Questions & Answers

Building logical interpretation skills through practice.

Refine your logic | master-the-basics.edu

Image Sources



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