

# The Categorical Proposition

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A Proposition is a potential elementary part of an argument that has the property of being true or false.

A categorical proposition is a proposition that relates classes.

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The Four Categorical Propositions are:

All S is P = Universal Affirmative = A

Some S is P = Particular Affirmative = I

All S is not P = Universal Negative = E

Some S is not P = Particular Negative = O

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The Standard Form of the categorical proposition is:

Quantifier (All / Some) - Subject Term - Copulative Verb (Is [are] / Is [are] not) - Predicate Term

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The Standard Structural Form of the categorical proposition is:

**All** **S** **is** **P**  
**Some** **S** **is not** **P**

Terms:

The 8 Terms, 4 Subjects & 4 Predicates, are said to be Distributed when they are used as a universal or Not Distributed when they are used as particulars.

There are three rules that govern the quantity of the 8 terms of the Categorical Propositions:

1. Subjects are determined by their quantifier: All = Distributed Some = Not Distributed.
  2. Affirmative Predicates are not distributed = is P = Not Distributed
  3. Negative Predicates are distributed = is NOT P = Is Distributed.
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## Immediate Inferences:

### 1. Truth-Functional Relation Type = Square of Opposition

**a.) Define Logical Relations:**

Contradiction: Categorical Propostions differ by quantity and quality:  $A \text{ -- } O + E \text{ -- } I$

Contrary: Universal Categorical Propostions differ by quality:  $A \text{ -- } E$

Sub-Contrary: Particular Categorical Propostions differ by quality:  $I \text{ -- } O$ .

Alternating: Relation of Universal Categorical Propostions to the Particular Categorical Propostions of the same Quality.

Sub-Alternating: Relation of Particular Categorical Propostions to the Universal Categorical Propostions of the same Quality.

**b.) State Rules for each relation.**

Contradiction: Opposite Truth Values and they are Truth Functionally Reciprocal.  $T \text{ --- } >F / F \text{ ---- } >T$ ; any truth value for any proposition.

Contrary: Argue from Truth To Falsity.  $T \text{ ---- } >F$

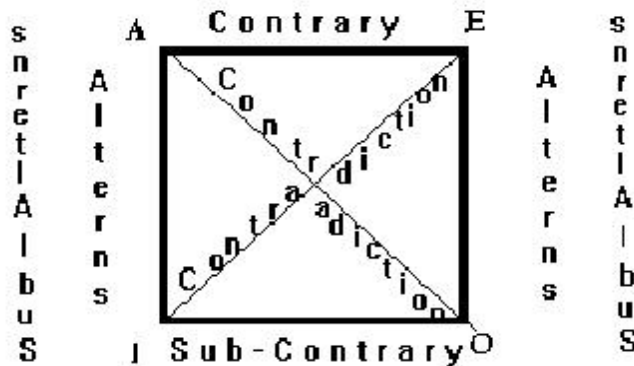
Sub-Contrary: Argues from Falsity to Truth.  $F \text{ ---- } >T$

Alterns: Argue From Truth to Truth  $T \text{ ---- } >T$

Sub-Alterns: Argue from Falsity To Falsity.  $F \text{ ---- } >F$

**Summarizing Rule:**

If Truth of Universal or Falsity of Particular is known then the whole square can be deduced. If not only Contradiction is known.



## 2. Structure Transformation Type.

Conversion: Switch Subject and Predicate.

Obversion: Change Quality and replace Predicate with its Complement.

Contraposition: Convert Proposition then replace Subject and Predicate with Complements.

| Symbol | Proposition      | Conversion                                    | Obversion                 | Contraposition  |
|--------|------------------|---|---------------------------|---|
| A      | All S is P.      | All P is S. Invalid<br>(Some P is S.)by limit | All S is not non-P.Valid  | All non-P is non-S. Valid   |
| E      | All S is not P.  | All P is not S. --Valid                       | All S is non-P.Valid      | All non-P is not non-S-- Invalid .<br><br>Limitation Some non-P is not non-S. |
| I      | Some S is P.     | Some P is S.-- Valid                          | Some S is not non-P.Valid | Some non-P is non-S --Invalid   |
| O      | Some S is not P. | Some P is not S -- Invalid                    | Some S is non-P. Valid    | Some non-P is not non-S. Valid  |

Conversion = Valid in E and I (A by limitation) Obversion = Valid in A E I O  
 Contraposition Valid in A and O (E by limitation)

## Modern Logic

### Existential Import:

Universal is always interpreted as Hypothetical or as Existentially neutral:

All men are mortal. = If there is such a thing as a man, that thing is mortal.

The Particular is assumed to have EXISTENTIAL IMPORT.

Some men are mortal = There exists a thing and that thing is a man and that thing is mortal.

**Only Contradiction remains given the Existential Import interpretation of the categorical propositions.**

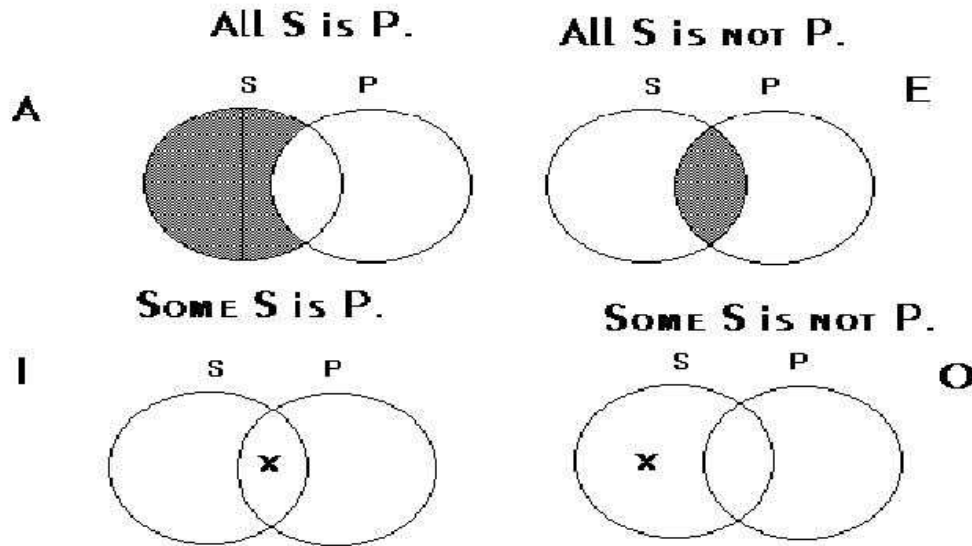
## Venn Diagramming:

A Venn Diagram is an analytical tool used to display the logical relations in the categorical proposition. The conventions of Venn Diagrams are:

1. Drawing 2 intersecting circles to represent any proposition' subject and predicate terms.
- 2 Shading out an area represents the fact that NO INDIVIDUALS CAN BE INCLUDED in the category.
- 3.Using an X to indicate Individuals.

The four categorical propositions are Venn Diagrammed as follows:

|                |          |
|----------------|----------|
| $S\bar{P} = 0$ | $SP = 0$ |
|----------------|----------|



|             |                   |
|-------------|-------------------|
| $SP \neq 0$ | $S\bar{P} \neq 0$ |
|-------------|-------------------|

### Boolean Equations

The Boolean Equations are just another convention to represent the categorical propositions and can be read off of the Venn Diagrams. Boole's conventions are:

1. Represent any proposition as SP.

2. Represent not P as  $\bar{P}$

3.  $= 0$ , means the category MUST BE empty;  $\neq 0$ , means the category cannot be empty.