

The Square of Opposition*

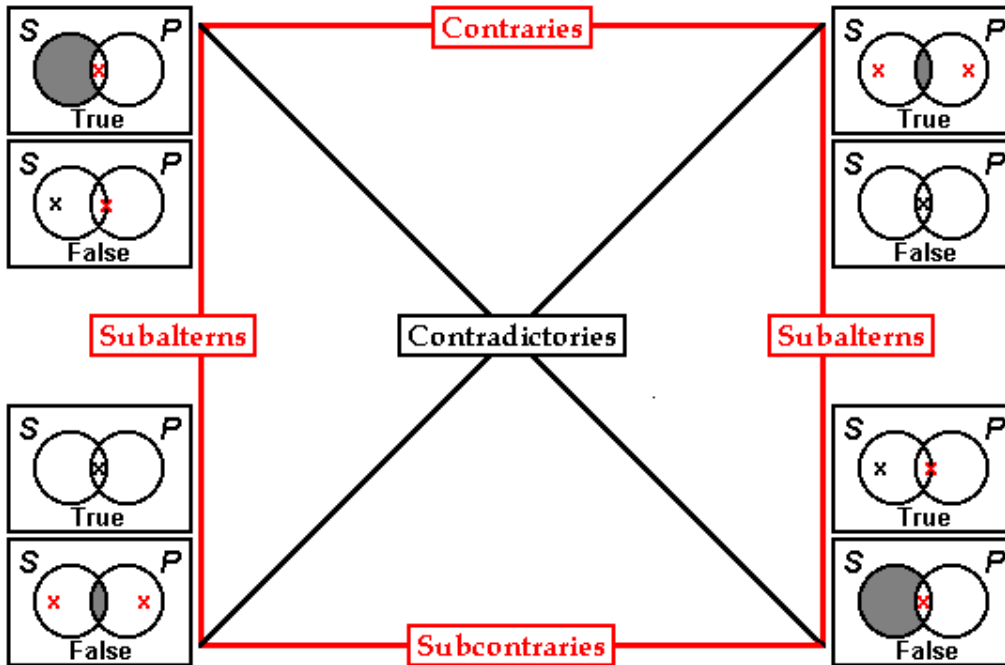
(Diagram of Immediate Inferences)

A: All S are P

$\forall x(Sx \rightarrow Px)$ or $\neg \exists x(Sx \wedge \neg Px)$, and $(\exists x)Sx$
(It follows that $\exists xPx$.)

E: No S is P

$\forall x(Sx \rightarrow \neg Px)$ or $\neg \exists x(Sx \wedge Px)$
and $\exists xSx$ and $\exists xPx$



I: Some S are P

$\exists x(Sx \wedge Px)$ or $\neg \forall x(Sx \rightarrow \neg Px)$,
(It follows that $\exists xPx$ and $\exists xQx$.)

O: Some S are not P

$\exists x(Sx \wedge \neg Px)$ or $\neg \forall x(Sx \rightarrow Px)$, & $\exists xSx$
(It follows that $\exists xPx$.)

The Valid Moods

(Those in red depend on Aristotle's *Existential Assumptions*)

(* indicates *indirect moods*, subalterns to moods of the same figure)

First Figure:

Third Figure:

AAA	Barbara	AAI	Darapti
M,P EAE	Celarent	M,P EAO	Felapton
S,M AII	Darii	M,S IAI	Disamis
S,P EIO	Ferio	S,P AII	Datisi
EAO	*Celaront	OAQ	Bocardo
AAI	*Barbari	EIO	Ferison

Second Figure:

Fourth Figure:

EAE	Cesare	EIO	Fresison
P,M AEE	Camestres	P,M EAO	Fesapo
S,M EIO	Festino	M,S IAI	Dimaris
S,P AOO	Baroco	S,P AAI	Bramantip
AEO	*Camestrop	AEE	Camenes
EAO	*Cesaro	AEO	*Camelop



A Mnemonic Poem (The Valid Direct Moods):

Barbara, Celarent, Darii, Ferioque prioris;
Cesare, Camestres, Festino, Baroco secundae;
Tertia, Darapti, Disamis, Datisi, Felapton,
Bocardo, Ferison, habet; Quarta insuper addit
Bramantip, Camenes, Dimaris, Fesapo, Fresison.

Peter of Spain, Tractatus, 13th Century

*Properties and assumptions that do not hold in modern logic, but which do hold in traditional Aristotelian logic, which accepts Aristotle's "Existential Assumption" that in true propositions every term stands for a non-empty set, are in diagrammed in **Red** (or Gray if the page is printed in black and white).

Note: In the Venn Diagrams "non-empty" areas are indicated by an **x** or **x**. If the **x** or **x** occurs on a line, at least one of its flanking area is non-empty. Blank areas are "unknowns", maybe empty, maybe not.

Reduction of valid 2nd, 3rd, or 4th figure moods to valid 1st figure moods, and then these to Barbara or Celarent: A,E,I,O indicates a statement's type. Initial B,C,D,F indicates the 1st figure mood reduced to. M = *metathesis*, switching the order of the premises; S = *conversio simplex*, converting (i.e. reversing) the subject and predicate terms of E and I statements; P = *conversio per accidens* ("limited conversion") has two forms: deducing the I subaltern from an A proposition & then converting its terms, or converting the terms of an E & then deducing its O subaltern (this rule is valid only given Aristotle's existential assumptions); non-initial C = *per contradictionem*, switching the preceding premise with the conclusion, & then replacing each with its contradictory. Other letters are meaningless.

