Categorical Statements

- all, no, some
- x is A. x is y
- Give categories like dogs capitals: D
- particular things are given lower-case letters

Categorical syllogism

The premise containing the predicate of the conclusion is called the major premise The premise containing the subject of the conclusion is called the minor premise ALWAYS PUT THE MAJOR PREMISE ON TOP.

Distribution

The terms after ALL and Not are distributed. Everything after No is distributed.

Syllogism ALWAYS looks like this

- Major Premise (Premise with Predicate of Conclusion)
- Minor Premise (Premise with Subject of Conclusion)
- Conclusion

Performing the Star Test

- Put a star next to distrbuted terms in the premises
- Put a star next to undistibuted terms in the conclusion

Validity and the star test

Star premise letters that are distributed and conclusion letters that aren't distributed. Then the syllogism is VALID if and only if every capital letter is starred exactly once and there is exactly one star on the right-hand side.

Complex Translations: ALL A's are B's

- Every (each, any) A is B.
- Whoever is A is B.
- A's are B's.
- Those who are A are B.
- If a person is A, then he or she is B.
- If you're A, then you're B.
- Only B's are A's. None but B's are A's.
- No one is A unless he or she is B.
- No one is A without being B.
- A thing isn't A unless it's B.
- It's false that some A is not B.

Complex Translations: No A's are B's

- A's aren't B's.
- Every (each, any)
- A is non-B.
- Whoever is A isn't B.
- If a person is A, then he or she isn't B.
- If you're A, then you aren't B.
- No one that's A is B.
- There isn't a single A that's B.
- Not any A is B.
- It's false that there's an A that's B.
- It's false that some A is B.

Some are / Some are not

- It's false that no A is B

Some are not

- It's false that all A is B.

Venn Diagrams

1. Draw three overlapping circles.
2. First draw “all” and “no” premises by shading.
3. 3.3 Then draw “some” premises by putting an “$\times$” in some unshaded area.
   - When you draw “some,” you sometimes can put the “$\times$” in either of two unshaded areas. Then the argument is invalid; to show this, put the “$\times$” in an area that doesn’t draw the conclusion.
   - 3.4 If you must draw the conclusion, then the argument is valid; other- wise, it’s invalid.

Propositional Logic

P

$\sim$P

P • Q (True only when both 1)

P $\vee$ Q (False when 0 $\vee$ 0)

P $\supset$ Q (False when 1 $\supset$ 0)

p $\equiv$ Q (True when both 0 or Both 1)

Commutation

$(P \bullet Q) = (Q \bullet P)$

- Works the Same with $\vee$
- Only works with AND and OR

Association

$((A \bullet B) \bullet C)$
$(A \bullet (B \bullet C)$

Contraposition

$$(A \supset B) = ({\sim}B \supset {\sim}A)$$

De Morgans

$\sim(A \bullet B) = \sim A \vee \sim B$
$\sim(A \vee B) = \sim A \bullet \sim B$

And

P	•	Q
0	0	0
0	0	1
1	0	0
1	1	1

OR

P	$\vee$	Q
0	0	0
0	1	1
1	1	0
1	1	1

Material Implication

P	$\supset$	Q
0	1	0
0	1	1
1	0	0
1	1	1

Material Equivalence

P	$\equiv$	Q
0	1	0
0	0	1
1	0	0
1	1	1