
First-Order Logic: Translation Exercise

Instructions

Translate each of the following English sentences into first-order logic using the interpretation key provided below. Use standard logical notation: $\neg$ (negation), $\wedge$ (conjunction), $\vee$ (disjunction), $\rightarrow$ (conditional), $\leftrightarrow$ (biconditional), $\forall$ (universal quantifier), $\exists$ (existential quantifier), and $=$ (identity).

Pay careful attention to the scope of quantifiers and the logical form of English expressions such as *only*, *except*, *no one else*, and definite descriptions.

Interpretation Key

Domain

The domain of discourse consists of all persons.

Individual Constants (Proper Names)

a	Anna	c	Carlos
b	Beatrice	d	David

Predicate Symbols

Monadic Predicates:	Px	x is a philosopher
	Lx	x is a logician
	Sx	x is a student
	Rx	x is rational
Binary Predicates:	Axy	x admires y
	Txy	x teaches y
	Kxy	x knows y
Triadic Predicates:	$Ixyz$	x introduces y to z
	$Gxyz$	x gives y to z

Sentences to Translate

1. Anna is a philosopher who admires every logician.

2. Someone admires Carlos, but Carlos admires only himself.

3. Every philosopher who is not a logician admires some logician.

4. No student knows every philosopher.

5. David teaches someone who is rational, and everyone David teaches is a student.

6. Beatrice introduced Anna to everyone she knows except herself.

7. There is exactly one logician whom every philosopher admires.

8. If anyone is a philosopher, then Carlos introduced that person to some logician.

9. Anna gives something to Beatrice that Beatrice gives to no one else.

10. Every student who admires a philosopher admires someone who is not identical to themselves.

Remarks

- Sentence 2 tests your understanding of the exclusive reading of *only*.
- Sentence 6 requires careful handling of the exception clause.
- Sentence 7 involves a uniqueness claim (“exactly one”).
- Sentences 9–10 involve reflexive pronouns and identity.