

LOGIC COMPETENCY EXAM STUDY GUIDE

BASIC CONCEPTS

- What roles do premises and conclusion play in an argument? What makes an argument deductive? What makes an argument inductive?
- What is a conditional? What are the parts of a conditional? How is a conditional falsified? How are conditionals similar to and different from arguments? Can they figure as parts of arguments?
- What are necessary and sufficient conditions? Can you answer questions that ask whether something is necessary or sufficient for something else? In a conditional, what is necessary for what and what is sufficient for what? What is a counterexample? Can you recognize what constitutes a counterexample to a claim and shows it to be false?
- What is it for an argument to be valid? What is it for an argument to be sound?
- How does “logical form” relate to validity given our assumption that validity is to be understood as formal validity? What is it for an argument to be a counterexample to another argument? How does the method of counterexample work to show invalidity? Can it show validity?
- Do you understand the following concepts: tautologous, self-contradictory, contingent, equivalent, contradictory, consistent, inconsistent, valid, invalid—and how to test for these properties using truth tables? How do these properties relate to validity, e.g. what, if anything does it show about the validity of an argument if its premises are inconsistent? If its conclusion is a tautology? Etc.
- What is a function? Which relations are functions and which aren't? What is it to say that the connectives of propositional logic are “truth functional”? What do we mean by saying some ordinary English connectives are *not* truth functional? What are some examples of ordinary English connectives that are *not* truth functional?
- What is meant by saying that the rules of propositional logic are *truth-preserving* and why is this of significance? What is meant by saying that the system of propositional logic is *sound*? What is meant by saying that the system of propositional logic is *complete*.
- Conditional and indirect proof. How can you show that a set of sentences is inconsistent using natural deduction (i.e. proof, as in Chapter 7)? How does indirect proof show validity? What assumptions are strategically correct when doing conditional and indirect proof?
- What is meant by saying that the rules of our system of propositional logic are ‘truth preserving’? What is meant by saying that the system is *sound*? What is meant by saying that it's *complete*?
- Predicate Logic. What do the individual constants and predicates of predicate logic designate? How do we understand singular sentences ascribing properties to individuals in terms of set membership? How do we understand singular sentences ascribing relations to

individuals in terms of set membership? What do universally quantified and existentially quantified general sentences say about the emptiness or non-emptiness of sets?

IDENTIFYING CONCLUSIONS

Identifying the conclusions of arguments (ordinary language arguments—not in symbols)

PROPOSITIONAL LOGIC TRANSLATION

Translating English sentences into the language of propositional logic.

CATEGORICAL PROPOSITIONS AND VENN DIAGRAMMS

Representing categorical propositions on Venn Diagramms.

CATEGORICAL SYLLOGISMS

Proving the validity of a categorical syllogism—either using a Venn Diagram and explaining how it shows validity or by symbolizing it and doing a proof in Predicate Logic (Hurley Ch. 8) (you don't need to do both!)

TRUTH TABLES AND TRUTH TREES

Using either truth tables or truth trees to:

- *Determine whether a sentence is tautologous, self-contradictory or contingent*
- *Determine whether a pair of sentences is equivalent, contradictory or neither*
- *Determine whether a set of sentences is consistent or inconsistent*
- *Determine whether an argument is valid or invalid*

PROPOSITIONAL LOGIC: PROOFS

Deriving the conclusions of symbolized arguments and proving tautologies. You should be able to use the 18 rules, conditional and indirect proof.

PROPOSITIONAL LOGIC: TRUTH TREES

Given a completed truth tree, what does it show?

PREDICATE LOGIC TRANSLATION

Which of the symbolized sentences is/are correct translation of the English sentences