

Name _____ Period _____ Logic and Computation

Logical Validity Test Study Guide

Skills and Topics

- Explain the relationship between terms, propositions, and arguments.
- Be able to give a definition of *valid argument* and *sound argument*. Understand these definitions and their implications.
- Be able to translate a short argument written in English into symbolic logic.
- Be able to determine whether an argument is valid or invalid using the truth table method.

Study Questions

1. In logic, what is a term? Explain the relationship between terms and propositions.
2. In logic, what is a proposition? Explain the relationship between propositions and arguments.
3. Give a definition of valid argument. Contrast this with the definition of a sound argument.
4. Test your understanding of the definitions. Answer yes or no to the following questions:
 - Can a sound argument have a false conclusion?
 - Can a valid argument have false premises?
 - Can a sound argument have false premises?

- Can a valid argument have a false conclusion?
- Can a valid argument have any false premises if it has a true conclusion?
- Can a valid argument have a false conclusion if all its premises are true?
- Is the following argument valid? "If an animal is a mammal, then it has gills. This animal is a mammal. Therefore, it has gills."
- Is the following argument valid? "If a person is a Trivium student, then they wear a uniform. This person wears a uniform. Therefore, they are a Trivium student."
- Can we rely on logic alone to determine whether an argument is valid?
- Can we rely on logic alone to determine whether an argument is sound?

Directions: For the following arguments, write them in symbolic form separating the premises and conclusion with a horizontal line. Then use the truth table method to determine whether they are valid or invalid.

5. Everyone knows that a gadget is magical or it is not revolutionary. This gadget is revolutionary. Therefore it is magical.

6. The food that I buy is not spicy or it is not expensive. I bought food that isn't spicy. Therefore I bought expensive food.

7. This person has scurvy for the following reasons. First of all, they have a vitamin C deficiency. Secondly (as any medical textbook will tell you), if a person has scurvy then they have a vitamin C deficiency.

8. A person will be successful if they are full of passion. It is not the case that this person is successful or wise. Therefore, this person is unwise and lacks passion.

9. Determine whether the following argument form is valid or invalid using a truth table.

$$\neg(P \wedge Q)$$

$$Q \rightarrow P$$

$$P$$

P	Q	
1	1	
1	0	
0	1	
0	0	