

SECOND EDITION

TRADITIONAL LOGIC

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Introduction to Formal Logic



Teacher Key

(Workbook, Quizzes, & Tests)

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CLASSICAL TRIVIUM CORE SERIES



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Introduction



Exercises for Day 1. Read the entire chapter. You may read it fairly quickly on this first reading. Don't expect to understand everything you read. Try only to get a general idea of what the chapter is about. Next, read the beginning sections of the introduction: "The History of Logic" and "The Two Main Branches of Logic." Read these sections carefully and try to fully understand them.

1. Based on what you have read in this chapter, what is the definition of 'logic'?

Logic is the science of right thinking.

2. Who was called the "father of logic"? Aristotle

3. Who laid the groundwork for modern symbolic logic? Chrysippus

4. Give the name of one philosopher who made advances in symbolic logic.

Gottfreid Wilhelm Leibniz

5. Who pioneered the theories about induction that we study today? John Stuart Mill

6. Give the names of three people whose names are associated with modern kinds of mathematical logic.

1. Gottlob Frege

2. Alfred North Whitehead

3. Bertrand Russell

7. Give the names of the two main branches of logic.

1. formal or "minor" logic

2. material or "major" logic

8. Explain the first of the main branches of logic (in Question 7), and describe it in your own words.

Formal logic is interested in the form or structure of reasoning.

9. Explain the second of the main branches of logic (in Question 7), and describe it in your own words.

Material logic is concerned with the content of argumentation. It deals with the truth of the terms and the propositions in an argument.

10. Indicate whether the following statements are true or false:

F a. The purpose of formal logic is to discover truth.
(The purpose of formal logic is to lead us from one truth to another.)

F b. It is necessary to have logic in order to discover truth.
(Formal logic is useful only if we already have truths with which to use logic.)

T c. Logic leads us from one truth to another.

T d. A statement can be true or false.

F e. A statement can be valid or invalid.
(Statements can only be true or false.)

F f. An argument can be true or false.
(Arguments can only be valid or invalid.)

T g. An argument can be valid or invalid.

 T h. Truth is only of secondary consideration in formal logic.

Exercises for Day 2. Read "Truth, Validity, and Soundness" and "The Components of an Argument." Read them carefully.

11. On the basis of today's reading, define 'truth.'

Truth is correspondence to reality.

12. On the basis of today's reading, explain what it means to say an argument is valid.

We say an argument is valid when its conclusion follows logically from its premises.

13. On the basis of today's reading, define 'soundness.'

The term soundness is used to indicate that all the premises in an argument are true and that the argument is valid.

14. Indicate whether the following statements are true or false:

 T a. An argument can contain true premises and be invalid.

 F b. An argument can be sound and contain false premises.
(A sound argument must both be valid and have true premises.)

 T c. A sound argument must be valid.

 F d. A valid argument must be sound.
(A valid argument need not be sound, since an argument can be valid but have false premises, disallowing it from being sound.)

 T e. An argument with true premises can be unsound.

 F f. An argument can contain only one premise.
(An argument must contain two premises in traditional logic.)

15. In the following argument, identify the premises and the conclusion by writing the words 'premise' or 'conclusion' in the space next to the statement.

 premise All men are mortal

 premise Socrates is a man

 conclusion Therefore, Socrates is mortal

16. Name the three types of logical processes (or acts of the mind) involved in logic.

1. Simple Apprehension

2. Judgment

3. Deductive Inference

Exercises for Day 3. Read "Term" and "Proposition."

17. Each of these logical processes (in Question 16 above) originates in a _____ mental act _____ and manifests itself in the form of a _____ verbal expression _____ .
18. What is the mental act involved in the first of the three kinds of logical processes?
Simple apprehension.
19. What is the verbal expression connected to this mental act (in Question 18)? Term
20. What occurs in our minds when we have a simple apprehension?
We form in our minds a concept of something.
21. If you think of this book and have the concept in your mind, you are having a simple apprehension. What is the term you use to verbally express this particular simple apprehension?
Book (Term would also be acceptable.)
22. Name the terms included in the argument in Question 15 above.
Men; mortal; and Socrates
23. What does each one of these terms (in Question 22) represent?
A concept
24. What is the mental act involved in the second of the three kinds of logical processes?
Judgment
25. What is the verbal expression connected to this mental act (in Question 24)?
Proposition
26. What occurs in our minds when we perform a judgment?
We perform a judgment any time we think in our minds that something is something else (which we call affirmation), and also when we think that something is not something else (which we call denial).
27. If you think that this book is boring by affirming in your mind that this is so, your mind is performing a judgment. What is the term you use to verbally express this judgment?
Proposition
28. Indicate the propositions included in the argument in Question 15 above.
"All men are mortal"; "Socrates is a man"; and "Socrates is mortal." (You do not have to include the word 'therefore' in the last proposition.)
29. What does each one of these propositions (in Question 28) represent?
A judgment

Exercises for Day 4. Read "Syllogism" and "Summary." Read them carefully.

30. What is the mental act involved in the third of the three kinds of logical processes?

Deductive inference

31. What is the verbal expression connected to this mental act (in Question 30)?

Syllogism

32. Describe in no less than one and no more than three sentences what occurs in our minds when we engage in deductive inference.

A deductive inference occurs when we make the logical connections in our minds between the terms in the argument in a way that shows us that the conclusion either follows or does not follow from the premises. (or something similar)

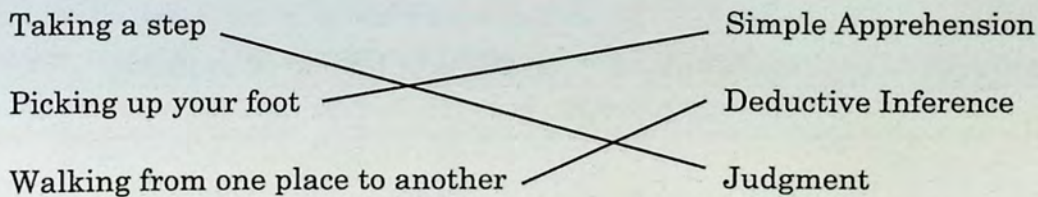
33. If you think that because all books are boring and that this is a book, and that therefore this book is boring, your mind engaged in deductive inference. What is the term you use to verbally express this deductive inference?

Syllogism

34. Fill out the chart below, listing the mental acts and their corresponding verbal expressions in the order in which we have covered them:

Mental Act	Verbal Expression
Simple Apprehension	Term
Judgment	Proposition
Deductive Inference	Syllogism

35. Draw a line to indicate which action best describes what each mental act is like:



Chapter 1: What Is Simple Apprehension?



Exercises for Day 1. Read the entire chapter. You may read it fairly quickly on this first reading. Try only to get a general idea of what the chapter is about. Read the beginning sections of Chapter 1: “What Is Simple Apprehension?” and “What Is Sense Perception?” Read these sections carefully and try to understand them as best you can.

1. What are the three things associated with simple apprehension?
First, we perceive something with our senses; second, we form an image of it in our mind;
and, thirdly, we conceive its meaning.
2. Which one of the three parts of the answer to Question 1 is the simple apprehension itself?
The third: we conceive its meaning.
3. Which two of the three answers in Question 1 are connected with simple apprehension, but are not simple apprehension itself?
The first and second: perceiving something with our senses and forming an image of it in our minds.
4. Which one of the three things associated with simple apprehension (in Question 1) is present when we are looking at something with our eyes, but ceases once we are no longer looking at it?
The first: the perception of something with our senses.
5. Why is the sense perception of a chair different from the chair itself?
Because the sense perception occurs in our minds, while the chair exists outside of our minds.
6. What is the definition of ‘sense perception’?
Sense perception is the act of seeing or hearing or smelling or tasting or touching.

Exercises for Day 2. Read “What Is a Mental Image?” Read it carefully.

7. What happens in your mind when you have a sense perception?
We form a mental image.
8. When you remember something you have seen, say, a chair, are you having a sense perception or a mental image?
A mental image

9. Give one reason why a mental image of a chair must be different from the sense perception of the chair. While the sense perception lasts only as long as we are looking at the chair, the mental image can be present even when we are not perceiving the chair through our senses.

10. What is the definition of 'mental image'?

A mental image is the image of an object formed in the mind as a result of a sense perception of that object.

Read "What Is a Concept?"

11. What are you having when you understand the meaning of the concept 'chair'?

Simple apprehension

12. Is the simple apprehension you experience when you understand the meaning of an object, such as a chair, the same as or different from the sense perception you experience when looking at a chair or the mental image in your mind that results from the sense perception?

Different

13. Give one reason why a mental image must be different from simple apprehension itself.

While a mental image is representative of something tangible and material (for example, it has shape and color), simple apprehension is the grasp of something intangible and immaterial.

14. What is the definition of 'simple apprehension'?

Simple apprehension is an act by which the mind grasps the concept or general meaning of an object without affirming or denying anything about it.

15. What is another term used for simple apprehension?

Concept

Exercises for Day 3. Read "Concept vs. Image." Read it carefully.

16. What do we grasp when we have a simple apprehension of a thing?

We grasp the essence (or meaning) of the thing.

17. If you have a mental image in your mind when you think of the concept 'man,' and someone else has a different mental image, does that mean you are each thinking of a different concept? Explain, using the concept 'man.'

When we think of the concept man, we may have some kind of image in our mind, such as an actual man, tall, with blond hair, blue eyes, and light skin. But when someone else thinks of the concept man, he may have a completely different image in his mind. He may think of an actual man who is short, with dark hair, brown eyes, and dark skin. Although the mental images we have when we think of the concept man are completely different, that doesn't mean that we do not both understand the same concept man. We may have exactly the same understanding of what man is, yet have completely different mental images that we associate with it. (or something similar)

18. Offer an explanation for your answer in Question 17 above, only this time use an example other than that of 'man.'

(This answer should be similar to the one in 17, only using another concept.)

Read "Abstraction."

19. What is the definition of the term 'abstraction'?

The process by which a simple apprehension is derived from a sense perception or mental image is called abstraction.

Exercises for Day 4. Read "Simple Apprehension vs. Judgment."

20. Explain at what point you go from simple apprehension to judgment.

If you affirm or deny anything about a concept, you are going beyond simple apprehension and engaging in judgment.

21. Indicate whether the following statements are true or false:

- F a. Mental image is the simple apprehension itself.
(Only the act of the mind grasping the essence or nature of a thing is the act itself.)
- T b. A sense perception of something we see disappears when we are no longer looking at it.
- F c. A sense perception of a chair is different from the chair itself because the chair exists in the mind while the sense perception exists outside the mind.
(The chair exists outside the mind and the sense perception inside the mind.)
- T d. Sense perception is the act of seeing or hearing or smelling or tasting or touching.
- T e. When we see something, an image forms in our mind, which we call a 'mental image.'
- T f. A sense perception lasts only as long as we are perceiving the object through our senses.
- T g. A mental image is the image of an object formed in our mind as a result of a sense perception of that object.
- F h. The idea of a chair in your mind must be accompanied by the sense perception of a chair or by the mental image of a chair.
(The idea of a chair in your mind need not be accompanied by the sense perception or the mental image.)
- F i. Simple apprehension is an act by which the mind grasps the concept or general meaning of an object and affirms or denies something about it. (While the simple apprehension is an act by which the mind grasps the concept or general meaning of an object, it does not affirm or deny anything about it. If it did, it would be a judgment, not a simple apprehension.)
- T j. The terms 'concept' and 'simple apprehension' mean the same thing.
- F k. A simple apprehension (or concept) has shape and color.
(Only sense perceptions and mental images can have shape and color.)
- T l. When we have a simple apprehension of a thing, we grasp the thing's essence.
- F m. If you have a different mental image of a concept than another person has, then you both cannot be thinking of the same concept. (Mental images of the same essence can differ.)
- T n. The process by which a simple apprehension is derived from a sense perception and mental image is called 'abstraction.'
- T o. If we were to affirm or deny something about a concept, we would be going beyond simple apprehension to judgment.

Review Exercises.

22. What is the definition of 'logic'?

Logic is the science of right thinking.

23. On the basis of last week's reading, define 'truth.'

Truth is correspondence to reality.

24. Name the three types of logical processes (or acts of the mind) involved in logic.

Simple apprehension, judgment, deductive inference

25. Fill out the chart below, listing the mental acts and their corresponding verbal expressions in the order in which we have covered them:

Mental Act	Verbal Expression
Simple Apprehension	Term
Judgment	Proposition
Deductive Inference	Syllogism



Chapter 2: Comprehension and Extension

Exercises for Day 1. Read the entire chapter. Try only to get a general idea of what the chapter is about. Then read the introduction. Read this section carefully and try to understand it as best you can.

1. What are we discussing in this chapter?

The properties of simple apprehension.

2. What are the two properties of simple apprehension?

The two properties of simple apprehension are comprehension and extension.

Read "Comprehension." Read it carefully.

3. Is the concept 'man' simple or complex?

Complex

4. Is the concept 'chair' simple or complex?

(Relatively) simple

5. What was the philosopher Plato's tongue-in-cheek definition of 'man'?

A featherless biped

6. Was Plato's definition correct, technically speaking? Yes

7. What is the problem with Plato's definition?

It doesn't tell us many things about human beings that make up his nature or essence.

8. What is the definition of 'comprehension'?

Comprehension can be defined as the completely articulated sum of the intelligible aspects or elements (or notes) represented by a concept.

9. Define the following terms: 'sentient,' 'material,' and 'substance.'

Sentient: having senses, such as sight, hearing, etc.; *material*: having a body, rather than being purely spiritual; *substance*: being something rather than nothing

Exercises for Day 2. Read "Notes." Read it carefully.

10. What are the simple concepts we use to define a complex concept called? Notes

11. How many notes does the concept 'animal' have? Four

12. Using the idea of comprehension, what is the answer to the question "What is an animal?"

A sentient, living, material substance

13. How many notes does the concept 'man' have? Five

14. Using the idea of comprehension, what is the answer to the question "What is a man?"
A rational, sentient, living, material substance
-

Read "The Porphyrian Tree." Read it carefully.

15. What is the diagram invented by the third-century logician Porphyry called?
The Porphyrian Tree
-

16. What does Porphyry's invention help us do?
It gives us a convenient way to break down a complex concept into the simple concepts out of which it is made.
-

17. Using the Porphyrian Tree, explain how you find the number of notes in the concept 'chair.'
Is it material substance or nonmaterial (or spiritual) substance? A chair is, of course, a material substance; in other words, it has *body* (the next level of the Porphyrian Tree). Now we know, then, that a chair is *material substance*. But what kind of material substance? Is it living material substance or nonliving material substance? A chair (let's say it is a metal chair instead of a wooden one) is a *nonliving material substance*, since metal cannot be said to be living. That is about as much as we can say about it. A chair, therefore, is a *nonliving material substance*.
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18. Using the Porphyrian Tree, explain how you find the number of notes in the concept 'animal.'
Is an animal a material substance or nonmaterial (or spiritual) substance? An animal is, of course, a *material substance*; in other words, it has *body*. An animal, therefore, is a *material substance*. But what kind of material substance? Is it living material substance or nonliving material substance? An animal is a *living material substance*. Is it sentient or non-sentient? It is sentient. So far, then, we know it is a *sentient, living, material substance*. Is it anything more? Is it rational? No, it is not. Therefore, we have said all we can say about it. An animal, then, is a *non-rational, sentient, living, material substance*.
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19. Using the Porphyrian Tree, explain how you find the number of notes in the concept 'man.'
Is a man a material substance or nonmaterial (or spiritual) substance? A man is, of course, a *material substance*; in other words, he has *body*. A man, therefore, is a *material substance*.
But what kind of material substance? Is he living material substance or nonliving material substance? A man is a *living material substance*. Is he sentient or non-sentient? He is sentient. So far, then, we know he is a *sentient, living, material substance*. Is it anything more? Is he rational? Yes, he is. Therefore, we know that a man is a *rational, sentient, living, material substance*.

Exercises for Day 3. Read "Extension." Read it carefully.

20. What is the second of the two properties of simple apprehension we studied in this chapter?
The second of the two properties of simple apprehension we studied in this chapter is the property of extension.
21. What is the answer to the question "What is the extension of the concept 'man'?"
All the men who have ever lived, who are now living, and who will live in the future.
22. What is the answer to the question "What is the extension of the concept 'animal'?"
All the animals who have ever lived, who are now living, and who will live in the future.
23. Distinguish between comprehension and extension.
Comprehension tells us what the essence of a thing is; extension tells us the things to which that essence applies.

Read "The Relationship between Comprehension and Extension." Read it carefully.

24. Which concept has greater comprehension, 'man' or 'animal'?
Man, because the concept man has more notes than the concept animal.
25. Which concept has greater extension, 'man' or 'animal'?
Animal, because there are, have been, and will be more of them.
26. Which concept has greater extension, 'man' or 'body'?
Body

27. Which concept has greater comprehension, 'man' or 'body'?

Man

28. The greater the comprehension a concept has, the less extension it has; and the more extension it has, the less the comprehension.

Exercises for Day 4.

29. Indicate whether the following statements are true or false:

- F a. The two properties of simple apprehension are concept and extension.
(They are *comprehension* and *extension*, not *concept* and *extension*.)
- T b. The concept 'man' is complex.
- F c. Porphyry once said that a man is a "featherless biped." (Plato said this, not Porphyry.)
- T d. If something is sentient, that means that it is something rather than nothing.
- F e. The concept 'man' has four notes.
(The concept *man* has five notes.)
- T f. The concept 'animal' has greater extension than the concept 'man.'
- F g. The concept 'man' has greater extension than the concept 'body.'
(Man has greater comprehension but less extension than body: there are fewer men who have ever lived, are living, and ever will live than there are things that have substance that ever were, are, or will be.)
- T h. The concept 'man' has greater comprehension than the concept 'body.'
- T i. The concept 'man' has greater comprehension than the concept 'animal.'

30. Give the comprehension of the concept 'automobile.'

An automobile is a non-living material substance.

31. Give the extension of the concept 'automobile.'

All the automobiles that have ever been made, that are now being made, and that ever will be made.

32. Choose something from your surroundings at home and tell both its comprehension and its extension.

(The answer to this question should be similar to the answers to Questions 30 and 31.)

Review Exercises.

33. Indicate whether the following statements are true or false:

- T a. Sense perception is the act of seeing or hearing or smelling or tasting or touching.
- F b. Simple apprehension is an act by which the mind grasps the concept or general meaning of an object and affirms or denies something about it.
(While the simple apprehension is an act by which the mind grasps the concept or general meaning of an object, it does not affirm or deny anything about it. If it did, it would be a judgment, not a simple apprehension.)

- T c. The terms 'concept' and 'simple apprehension' mean the same thing.
- T d. When we have a simple apprehension of a thing, we grasp the thing's essence.
- T e. If we affirm or deny something about a concept, we are going beyond simple apprehension to judgment.

34. Fill out the chart below, listing the mental acts and their corresponding verbal expressions in the order in which we have covered them:

Mental Act	Verbal Expression
Simple Apprehension	Term
Judgment	Proposition
Deductive Inference	Syllogism

Chapter 3: Signification and Supposition



Exercises for Day 1. Peruse the entire chapter. Then read the introductory section at the very beginning of Chapter 3. Read this section carefully and try to understand it as best you can.

1. In this chapter, we discussed the two properties of terms.

2. What is the definition of 'term'?

A term is a word or group of words which verbally expresses a concept.

3. What are the two properties of terms?

Signification and supposition

Read "Signification." Read the first paragraph carefully.

4. What are the three ways that terms can be divided according to their signification?

Terms can be divided according to their signification in three ways. There are *univocal terms*, *equivocal terms*, and *analogous terms*.

Exercises for Day 2. Read "Signification." Read the entire section carefully.

5. What are univocal terms?

Univocal terms are terms that have exactly the same meaning no matter when or how they are used.

6. What are some examples of univocal terms mentioned in the section you read for today?

photosynthesis, anthropology, the second law of thermodynamics, tablesaw, phillips head screwdriver, and drill bit

7. Many univocal terms are what kind of terms?

Scientific or manufacturing terms

8. What does the term 'univocal' mean if you translate it literally from the Latin?

"one voice"

9. Think up three univocal terms that are not in the book and then write below.

(Make sure answers to this question are terms that have exactly the same meaning no matter when or how they are used.)

10. What are equivocal terms?

Equivocal terms are terms that, although spelled and pronounced exactly alike, have entirely different and unrelated meanings.

11. What are some examples of equivocal terms mentioned in the section you read for today?
pitcher, plane, and jar
12. In what are many equivocal terms used?
puns
13. What does the term 'equivocal' mean if you translate it literally from the Latin?
"equal voice"
14. Think up three equivocal terms that are not in the book and then write below.
(Make sure answers to this question are terms that, although spelled and pronounced exactly alike, have entirely different and unrelated meanings.)
15. What are analogous terms?
Analogous terms are terms that are applied to different things, but have related meanings.
16. What are some examples of analogous terms mentioned in the section you read for today?
window, wheel, and wooden
17. In what are analogous terms commonly used?
In poetry and literature
18. Think up three analogous terms that are not in the book and then write below.
(Make sure answers to this question are terms that are applied to different things, but have related meanings.)
19. Why is it important to know about univocal, equivocal, and analogous terms?
Terms must be defined accurately in order to use proper logic.

Exercises for Day 3. Read "Supposition." Read the entire section carefully.

20. What are the three ways we can divide up terms according to their supposition?
According to their verbal, mental, or real existence.
21. What is material supposition?
Material supposition occurs when a term refers to something as it exists verbally.
22. Give an example of material supposition mentioned in the section you read for today.
"Man is a three-letter word."
23. Think up and then write a sentence expressing material supposition not in the book.
(Make sure the term used in material supposition in this answer uses the term in reference to something as it exists verbally, as in "Man is a three-letter word," "Man is a phonetic word," etc.)
24. What is logical supposition?
Logical supposition occurs when a term refers to something as it exists logically.
25. Give an example of logical supposition mentioned in the section you read for today.
"Man has five notes."

26. Think up and then write a sentence expressing logical supposition not in the book.
 (Make sure the term used in logical supposition in this answer uses the term in reference to something as it exists logically, as in "Man has five notes," "The concept *man* has less extension than *body*," etc.)

27. What is real supposition?
 Real supposition occurs when a term refers to something as it exists in the real world.

28. Give an example of real supposition mentioned in the section you read for today.
 "Man was created by God."

29. Think up and then write a sentence expressing real supposition not in the book.
 (Make sure the term used in real supposition in this answer uses the term in reference to something as it exists in the real world, as in "Man was created by God," "Some men are brave," etc.)

Exercises for Day 4. Read "Summary of Chapters 1-3." Read it carefully.

30. Fill out the chart below showing the three aspects of logic:

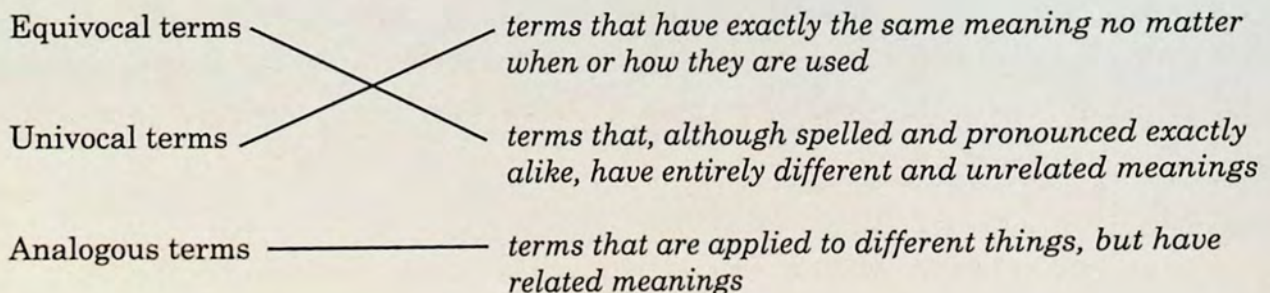
Mental Act	Verbal Expression
Simple Apprehension	Term
Judgment	Proposition
Deductive Inference	Syllogism

31. With what did Chapter 1 deal?
 The definition of simple apprehension.

32. With what did Chapter 2 deal?
 The properties of simple apprehension (comprehension and extension).

33. With what did Chapter 3 deal?
 The properties of terms (signification and supposition).

34. Draw lines between the term and the corresponding definition:



35. Draw lines between the term and the corresponding definition:

Real supposition	_____	occurs when a term refers to something as it exists verbally
Logical supposition	_____	occurs when a term refers to something as it exists logically
Material supposition	_____	occurs when a term refers to something as it exists in the real world

36. Indicate whether the following statements are true or false:

- F a. Comprehension and extension are two properties of terms.
(They are the properties of *simple apprehension*.)
- T b. The three ways terms can be divided according to their signification are univocal, equivocal, and analogous.
- F c. The term 'photosynthesis' is an example of an equivocal term.
(It is an example of a *univocal term*.)
- T d. Univocal terms always mean the same thing.
- F e. Equivocal terms have related meanings.
(They have entirely different and unrelated meanings, even though they are spelled or pronounced exactly the same way)
- F f. Analogous terms have entirely different and unrelated meanings.
(Analogous terms are applied to different terms but have related meanings.)
- T g. The term 'jar' is an example of an equivocal term.
- F h. The term 'window' is an example of an equivocal term.
(*Window* is an analogous term.)
- T i. Equivocal terms are used in puns.
- F j. Many analogous terms are scientific terms.
(Scientific terms are primarily univocal terms.)
- F k. The three ways to divide up terms according to their signification is into verbal, mental, and real existence.
(This is how terms are divided up according to their *supposition*, not their *signification*.)
- F l. Material supposition occurs when a term refers to something that exists in the real world.
(Material supposition occurs when a term refers to something as it exists verbally.)
- F m. When a term refers to real existence, it is said to be an instance of material supposition.
(See explanation of previous answer.)
- T n. When a term refers to mental existence, it is said to be an instance of logical supposition.
- T o. In the sentence "Man was created by God," the term 'man' is an example of real supposition.
- T p. The three aspects of logic are simple apprehension, judgment, and deductive inference.

Chapter 4: What Is Judgment?



Exercises for Day 1. Peruse the entire chapter. Read the introductory section at the very beginning of Chapter 4. Read this section carefully and try to understand it as best you can.

1. In the previous chapter, we discussed simple apprehension. What are we discussing in this chapter?

Judgment

2. What do we call the verbal expression of a simple apprehension? [Review question]

Term

3. What do we call the verbal expression of a judgment? Proposition

4. Judgment is the second part of the study of logic. (first, second, or third)

Read "The Definition of Judgment." Read it carefully.

5. What is the definition of 'judgment'?

Judgment can be defined as the act by which the intellect unites by affirming, or separates by denying.

6. What does a judgment unite (or separate)? Two concepts

7. In the sentence "Man is an animal," what two things are we uniting by affirming?

The two concepts *man* and *animal*.

8. In the sentence "Man is not God," what two things are we separating by denying?

The two concepts *man* and *God*.

9. In any proposition, what are the two concepts which we unite by affirming or separate by denying?

The subject and the predicate

10. Explain what a subject is as we use it in judgment.

The subject is that about which we are saying something; it is the concept about which we are affirming or denying something.

11. Explain what a predicate is as we use it in judgment.

The predicate is what it is we are saying about the subject; it is what we are affirming or denying about it.

12. What is the subject and the predicate in the judgment expressed by the proposition "Man is an animal"?

Man is the subject and *animal* is the predicate.

13. What is the subject and predicate in the judgment expressed by the proposition "Man is not God"?

The subject is *man* and the predicate is *God*.

14. What are we affirming about the subject in the proposition "Man is an animal"?

That he is an animal (biologically).

15. What are we denying about the subject in the proposition "Man is not God"?
That he is not God.
-

Exercises for Day 2. Read "The Definition of Proposition" again. Read the entire section carefully.

16. What is the proper definition of 'proposition'?
A sentence or statement which expresses truth or falsity.
-

17. What kind of sentences are not propositions?
Questions, commands, exclamations, and greetings
-

18. Tell whether the following sentences are propositions or not:

	<u>Proposition</u>	<u>Not a Proposition</u>
a. Peter is a man.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Just do it.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. Where in the world is Carmen San Diego?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d. Peter is not a man.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e. There were three thousand purple ducks found on Mars.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f. Barney (the purple dinosaur) is a man.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
g. Oh, wow!	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h. Hello!	<input type="checkbox"/>	<input checked="" type="checkbox"/>
i. All dogs go to heaven.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
j. No purple dinosaurs go to heaven.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
k. Who is President of the United States?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
l. Barney is President of the United States.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
m. The postman never rings twice.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
n. How are you today?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
o. That's a fine duck you have there.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
p. How many ducks do you have?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
q. Don't feed the animals.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
r. Peter is not a duck.	<input checked="" type="checkbox"/>	<input type="checkbox"/>

19. Give three examples of sentences that are propositions.

(Make sure that none of the sentences given in answer to this question are questions, commands, exclamations, or greetings.)

20. Give six examples of sentences that are *not* propositions.
 (Make sure that the sentences given in answer to this question are not sentences that express truth or falsity.)

Exercises for Day 3. Read "Elements of Propositions." Read the entire section carefully.

21. What are the three elements of any proposition?

The subject, the predicate, and the copula

22. Tell what each of the following letters stand for:

S: Subject

P: Predicate

c: Copula

23. Explain what the subject-term is.

The subject-term is the verbal expression of the subject of a judgment.

24. Explain what the predicate-term is.

The predicate-term is the verbal expression of the predicate of a judgment.

25. Explain what the copula is.

A copula is a form of the *to be* verb (e.g., *is*, *are*, etc.) that connects the subject and the predicate.

26. How many words must the subject-term have?

A subject-term can be made up of many words.

27. How many words must the predicate-term have?

A predicate-term can be made up of many words.

28. Write the subject-term, predicate-term, and copula for each of the following propositions:

Proposition	Subject-Term	Predicate-Term	Copula
Peter is a man.	Peter	a man	is
Two and two are four.	Two	four	are
I am the vine.	I	the vine	am
You are the branches.	You	the branches	are
I am the Son of God.	I	the Son of God	am
My kingdom is not of this world. (Ignore the word 'not' for purposes of this exercise.)	My kingdom	not of this world	is

Exercises for Day 4. Read "The Logical Form of a Sentence." Read it carefully.

29. How do you determine whether a proposition is in logical form?

It is in logical form if the subject, predicate, and copula are easily distinguishable.

30. What is the best way to change a sentence that is not in logical form into one that is in logical form?

By reworking the predicate-copula portion of the sentence to make it more explicit.

31. Indicate whether the following sentences are in logical form or not:

	<u>Logical Form</u>	<u>Not Logical Form</u>
a. Peter is a man.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. My nose is big.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Peter is big.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d. I am the way and the truth and the life.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e. He that seeth me seeth Him that sent me.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f. Man thinks.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g. Roses are red.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
h. Three's a crowd.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
i. I like it.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
j. Home is where the heart is.	<input checked="" type="checkbox"/>	<input type="checkbox"/>

32. Put into logical form the sentences in Question 31 that you identified as not in logical form.

"He that seeth me is a person (is someone, etc.) who seeth Him that sent me."

"Man is a being (creature, etc.) who thinks."

"Three (people) is a crowd."

"I am a person who likes it."

Read "Summary." Read it carefully.

33. Indicate whether the following statements are true or false:

- T a. A proposition is the verbal expression of a judgment.
- F b. A judgment unites two concepts.
(A judgment could also separate two concepts by denying.)
- F c. Judgment is the third part of the study of logic.
(Deductive inference is the third part of the study of logic.)
- F d. The subject and the copula are united by the predicate.
(The subject and the predicate are united by the copula.)

- F e. The subject of the sentence "Man is an animal" is 'animal.'
(The subject of the sentence is *man*.)
- F f. The subject of the sentence "Man is not God" is 'God.'
(The subject is *man*.)
- T g. Questions are not propositions.
- F h. "Just do it" is a proposition.
(It is a command, not a proposition.)
- T i. "All dogs go to heaven" is a proposition.
- T j. The three elements of any proposition are the subject, the predicate, and the copula.
- F k. A subject-term must have at least two words.
(It can have one or more words.)



Chapter 5: The Four Statements of Logic

Exercises for Day I. Peruse the entire chapter. Then read the introductory section at the very beginning of Chapter 5. Read this section carefully and try to understand it as best you can.

1. What are we discussing in this chapter?

The classification of propositions

Read "The Four Statements of Logic." Read it carefully.

2. What are the four basic categorical propositions? (Use S to represent the subject-term and P to represent the predicate-term in each proposition.)

"All S is P"; "Some S is P"; "No S is P"; and "Some S is not P"

3. What are the letters that we use to represent each of these propositions?

A, I, E, and O

4. Why is "All S is P" called an A statement?

"A" stands for the first vowel in the Latin word *affirmo*.

5. Why is "Some S is P" called an I statement?

"I" stands for the second vowel in the Latin word *affirmo*.

6. Why is "No S is P" called an E statement?

"E" stands for the first vowel in the Latin word *nego*.

7. Why is "Some S is not P" called an O statement?

"O" stands for the second vowel in the Latin word *nego*.

8. Tell whether the following are A, I, E, or O statements:

- | | |
|--|--|
| <u> A </u> a. All men are mortal. | <u> E </u> i. No girls are pretty. |
| <u> O </u> b. Some men are not mortal. | <u> O </u> j. Some cars are not fast. |
| <u> E </u> c. No boys are rude. | <u> A </u> k. All boys are rude. |
| <u> A </u> d. All cars are fast. | <u> O </u> l. Some girls are not pretty. |
| <u> I </u> e. Some men are mortal. | <u> A </u> m. All girls are pretty. |
| <u> I </u> f. Some boys are rude. | <u> I </u> n. Some cars are fast. |
| <u> E </u> g. No men are mortal. | <u> E </u> o. No cars are fast. |
| <u> O </u> h. Some boys are not rude. | <u> I </u> p. Some girls are pretty. |

Read "The Quantifier." Read it carefully.

9. In addition to the subject-term, the predicate-term, and the copula, what is the fourth component of a categorical proposition?

The quantifier

10. What are the four quantifiers used in categorical statements?

"All," "Some," "No," and "Some ... not"

11. Indicate the quantifier in the following statements:

- | | |
|---------------------|-----------------------------|
| <u>All</u> | a. All men are mortal. |
| <u>Some</u> | b. Some men are mortal. |
| <u>No</u> | c. No men are mortal. |
| <u>Some ... not</u> | d. Some men are not mortal. |

12. Indicate the quantifier in each of the statements in Question 8.

- | | | | |
|---------------------|-----------------------------|---------------------|-------------------------------|
| <u>All</u> | a. All men are mortal. | <u>No</u> | i. No girls are pretty. |
| <u>Some ... not</u> | b. Some men are not mortal. | <u>Some ... not</u> | j. Some cars are not fast. |
| <u>No</u> | c. No boys are rude. | <u>All</u> | k. All boys are rude. |
| <u>All</u> | d. All cars are fast. | <u>Some ... not</u> | l. Some girls are not pretty. |
| <u>Some</u> | e. Some men are mortal. | <u>All</u> | m. All girls are pretty. |
| <u>Some</u> | f. Some boys are rude. | <u>Some</u> | n. Some cars are fast. |
| <u>No</u> | g. No men are mortal. | <u>No</u> | o. No cars are fast. |
| <u>Some ... not</u> | h. Some boys are not rude. | <u>Some</u> | p. Some girls are pretty. |

13. What are the two characteristics of categorical statements?

Quality and quantity

Exercises for Day 2. Read "Quality." Read it carefully.

14. With what does the quality of a proposition have to do?

The quality of a proposition has to do with whether it is affirmative or negative.

15. What are we asking when we ask, "What is the quality of this statement?"

Whether it is affirmative or negative.

16. What do we mean when we say that a proposition is affirmative?

We mean that something is affirmed about the subject of the sentence.

17. What do we mean when we say that a proposition is negative?

We mean that something is denied about the subject of the sentence.

18. Indicate whether each of the following categorical statements is affirmative or negative:

- | | |
|--------------------|--------------------|
| <u>Affirmative</u> | a. All S is P |
| <u>Affirmative</u> | b. Some S is P |
| <u>Negative</u> | c. No S is P |
| <u>Negative</u> | d. Some S is not P |

19. Indicate whether each of the following categorical statements is affirmative or negative:

- | | |
|--------------------|-----------------------------|
| <u>Affirmative</u> | a. All men are mortal. |
| <u>Negative</u> | b. Some men are not mortal. |
| <u>Negative</u> | c. No boys are rude. |
| <u>Affirmative</u> | d. All cars are fast. |

<u> Affirmative </u>	e.	Some men are mortal.
<u> Affirmative </u>	f.	Some boys are rude.
<u> Negative </u>	g.	No men are mortal.
<u> Negative </u>	h.	Some boys are not rude.
<u> Negative </u>	i.	No girls are pretty.
<u> Affirmative </u>	j.	Some cars are fast.
<u> Affirmative </u>	k.	All boys are rude.
<u> Negative </u>	l.	Some girls are not pretty.
<u> Affirmative </u>	m.	All girls are pretty.
<u> Affirmative </u>	n.	Some cars are fast.
<u> Negative </u>	o.	No cars are fast.
<u> Affirmative </u>	p.	Some girls are pretty.

20. Think up five affirmative propositions that are not in the book.

(Make sure the answers to this question include the quantifiers *All* or *Some*.)

21. Think up five negative propositions that are not in the book.

(Make sure the answers to this question include the quantifiers *No* or *Some ... not*.)

Exercises for Day 3. Read "Quantity." Read the entire section carefully.

22. With what does the quantity of a proposition have to do?

The quantity of a proposition has to do with whether it is universal or particular.

23. What are we asking when we ask, "What is the quantity of this statement?"

We are asking whether it is universal or particular.

24. What do we mean when we say that a proposition is universal?

We mean that the proposition says something about all the members of the class referred to by the subject of the proposition.

25. What do we mean when we say that a proposition is particular?

We mean that the proposition says something about only some of the members of the class referred to by the subject of the proposition.

26. Indicate whether each of the following categorical statements is universal or particular:

- | | |
|-------------------|--------------------|
| <u>Universal</u> | a. All S is P |
| <u>Particular</u> | b. Some S is P |
| <u>Universal</u> | c. No S is P |
| <u>Particular</u> | d. Some S is not P |

27. Indicate whether each of the following categorical statements is universal or particular:

- | | | | |
|-------------------|-----------------------------|-------------------|-------------------------------|
| <u>Universal</u> | a. All men are mortal. | <u>Universal</u> | i. No girls are pretty. |
| <u>Particular</u> | b. Some men are not mortal. | <u>Particular</u> | j. Some cars are fast. |
| <u>Universal</u> | c. No boys are rude. | <u>Universal</u> | k. All boys are rude. |
| <u>Universal</u> | d. All cars are fast. | <u>Particular</u> | l. Some girls are not pretty. |
| <u>Particular</u> | e. Some men are mortal. | <u>Universal</u> | m. All girls are pretty. |
| <u>Particular</u> | f. Some boys are rude. | <u>Particular</u> | n. Some cars are fast. |
| <u>Universal</u> | g. No men are mortal. | <u>Universal</u> | o. No cars are fast. |
| <u>Particular</u> | h. Some boys are not rude. | <u>Particular</u> | p. Some girls are pretty. |

28. Think up five universal sentences that are not in the book.

(The propositions given in answer to this question should include the quantifiers *All* or *No*.)

29. Think up five particular sentences that are not in the book.

(The propositions given in answer to this question should include the quantifiers *Some* or *Some ... not*.)

Exercises for Day 4. Read "Distinguishing Universal Statements." Read the entire section carefully.

30. What is the rule for distinguishing universal statements?

The general rule for statements that do not contain a quantifier is that "all" is intended, unless "some" is clearly indicated.

31. Are statements in which the subject-term is the name of a certain individual universal or particular? Explain.

Statements in which the subject-term is the name of a certain individual are universal, since they refer to all the members of the class referred to by the name, even though that class happens to be made up of only one person.

32. Tell which of the following statements are universal and which are particular:

- | | | | |
|------------------|---------------------------------|------------------|----------------------------------|
| <u>Universal</u> | a. Caesar is a great general. | <u>Universal</u> | e. Christians pray. |
| <u>Universal</u> | b. Mary is the mother of Jesus. | <u>Universal</u> | f. Albert Einstein was a genius. |
| <u>Universal</u> | c. The soldiers are tired. | <u>Universal</u> | g. Romans are cruel. |
| <u>Universal</u> | d. Jesus is the Son of God. | | |

Read "Summary." Read the entire section carefully.

33. Tell the quality and quantity of each proposition:

- | | |
|--------------------------------|-------------------------------------|
| <u>Affirmative, universal</u> | a. All kings are good. |
| <u>Negative, universal</u> | b. No truth is simple. |
| <u>Affirmative, particular</u> | c. Some generals are great. |
| <u>Negative, particular</u> | d. Some Gauls are not brave. |
| <u>Affirmative, universal</u> | e. All Romans are brave. |
| <u>Negative, particular</u> | f. Some wars are not cruel. |
| <u>Affirmative, universal</u> | g. All Christians are brothers. |
| <u>Negative, universal</u> | h. No wars are peaceful. |
| <u>Affirmative, particular</u> | i. Some towns are well fortified. |
| <u>Affirmative, universal</u> | j. All truth is God's truth. |
| <u>Negative, particular</u> | k. Some towns are not fortified. |
| <u>Negative, particular</u> | l. Some victories are not glorious. |
| <u>Negative, universal</u> | m. No tribes are safe. |
| <u>Affirmative, universal</u> | n. All leaders are slaughtered. |
| <u>Affirmative, particular</u> | o. Some wars are fierce. |
| <u>Negative, universal</u> | p. No kings are good. |

34. Fill out the following chart:

		Quality	
		Affirmative	Negative
Quantity	Universal	A	E
	Particular	I	O

Review Exercises for Day 4.

35. What is the best way to change a sentence that is not in logical form into one that is in logical form?

By reworking the predicate-copula portion of the sentence.

36. Indicate whether the following statements are true or false:

- T a. A proposition is the verbal expression of a judgment.
- F b. Judgment is the third part of the study of logic.
(Deductive inference is the third part of the study of logic.)
- F c. The subject and the copula are united by the predicate.
(The subject and the predicate are united by the copula.)
- F d. "Just do it" is a proposition.
(It is a command, not a proposition.)
- T e. "All dogs go to heaven" is a proposition.
- F f. A subject-term must have at least two words.
(It can have one or more words.)



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