

## What Is Logic?

**Introduction.** The best way to answer the question, “What is logic?” is with a definition. But that is easier said than done. Throughout history, many people have thought and written about the subject of logic and many people have offered definitions. Some of them are useful and some are not.

Josiah Royce, an American philosopher, defined logic as “the science of order, “ but this definition is so general that it really could include things outside of logic.

Raymond McCall: “Logic in general is the science of right thinking.”

Jacques Maritain: “Logic is the art which enables us to proceed with order, ease, and correctness in the act of reason itself.”

Irving Copi: “The distinction between correct and incorrect reasoning is the central problem with which logic deals.”

**The Two Main Branches of Logic.** There are two main branches of logic. One is called **formal** or **minor** logic, the other **material** or **major** logic. The two branches are quite distinct and deal with different problems.

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

Formal logic is interested in the **form** or **structure** of reasoning. The truth of an argument is of only secondary consideration in this branch of logic. Formal logic is concerned with the method of deriving one truth from another.

The distinction between these two branches of logic was nicely described by G. K. Chesterton:

*Logic and truth... have very little to do with each other. Logic is concerned merely with the fidelity and accuracy with which a certain process is performed, a process which can be performed with any materials, with any assumption. You can be as logical about griffins and basilisks as about sheep and pigs=== Logic, then, is not necessarily an instrument for finding out truth; on the contrary, truth is a necessary instrument for using logic – for using it, that is, for the discovery of further truth--- Briefly, you can only find truth with logic if you have already found truth without it.*

This last remark of Chesterton’s is important. It is not the purpose of formal logic to discover truth. That is the business of everyday observation and, in certain more formal circumstances, empirical science. Logic serves only to lead us from one truth to another.

That is why, for example, you should not call a statement of fact **logical** or **illogical**. You should instead call it **true** or **false**. Likewise, you should not call an argument (which contains several

statements of fact) **true** or **false**. You should only call it valid or invalid. Validity is the term we use when we mean to say that an argument is logical. The term **soundness** however, can be applied to an argument to say something about both its truth and its validity.

### **Truth, Validity, and Soundness.**

**Truth** means the correspondence of a statement to reality. An argument is **valid** when its conclusion follows logically from its premises. The term **soundness** is used to indicate that all the premises in an argument are true *and* that the argument is valid.

An argument can contain true premises and still be invalid. Likewise it can be perfectly valid (or **logical**, if you prefer) and contain false premises. But if an argument is sound, its premises must be true and it must be valid.

If this sounds confusing, don't worry: these concepts will become clearer as we progress through the material in this book.

### **The Components of an Argument:**

An argument contains several components. In order to illustrate what these components are and how they work in the reasoning process, let us begin with a simple argument:

All men are mortal  
Socrates is a man  
Therefore, Socrates is mortal

The first two statements are **premises** and the last one is the **conclusion**.

On the face of it, this argument contains a number of words making up three statements which fit together into what looks and sounds like an argument. But there is more here than meets the eye.

In formal logic, we recognize three kinds of logical processes. We recognize that each of these originates in a **mental act**, but that each also manifests itself (and is known to us in the form of) a **verbal expression**.

**Term.** The mental act involved in the first of these three logical processes is called **simple apprehension**. We call the verbal expression of simple apprehension the **term**. A simple apprehension occurs when we first form in our mind a concept of something. When we put this concept into words, we have put this simple apprehension in the form of a term.

At the point of simple apprehension, we do not affirm or deny anything about it. We just possess or grasp it.

If in your mind, for example, you think of this book (the one you're reading right now), you are performing this first logical process. You are having a simple apprehension. And if you speak or write anything about it, you will have to use a term, the term **book**.

In the argument above (the one about Socrates), there are three terms representing three simple apprehensions. The first is **men**; the second is **Socrates**; and the third is **mortal**. Each one of these represents in our mind a concept that we have transformed into a word. The concept we call the **simple apprehension** and the word we call the **term**.

Mental Act

Verbal Act

Simple Apprehension

Term

### **Proposition.**

The mental act involved in the second of these three logical processes is called **judgment**. The verbal expression of a judgment is called a **proposition**. We perform a judgment any time we think in our mind that something *is* something (which we call affirmation), and also when we think that something *is not* something else. To **judge** is to affirm or deny.

If you think that this book is boring, then you are performing a judgment. If you verbally express this judgment, you will have to do it in the form of a proposition, the proposition, "This book is boring." The judgment is the mental act you have when you think that this book is boring and the proposition is the statement you make to express that thought.

In the argument above, there are three propositions expressed. The first is "All men are mortal": The second is "Socrates is a man"; and the third is "Socrates is mortal." Each one of these represents in our mind a thought that something is something else: that **all men** are **mortal**; and that **Socrates** is **mortal**.

We should point out that some people use the word **statement** instead of **proposition**.

Mental Act

Verbal Act

Judgment

Proposition

### **Syllogism.**

The mental act involved in the third of these three logical processes is called **deductive inference**. We call the verbal expression of deductive inference the **syllogism**. A deductive inference occurs when we make the logical connections in our mind between the terms in the argument in a way that show us that the conclusion either follows or does not follow from the premises. When we verbally express this in an argument, we have put this deductive inference in the form of a syllogism. (By the way, the term **verbal** is not limited to when we speak. It refers to any method of expression, including speaking or writing.)

It is at this point that we are said to make progress in knowledge. It is through the process of deductive inference, as expressed in a syllogism, that we can say, as we explained above, that we have gone from one truth or set of truths to another truth.

Let's say the reason you think this book is boring is because you think all books are boring. If this were true, you would be performing a deductive inference. You would be thinking to yourself, all books are boring, and this is a book. Therefore, this book is boring. And if you verbally expressed this deductive inference, you would do it in the form of a syllogism. The judgment expressed by "All books are boring" and "This is a book" are different from the judgment "This book is boring." Through deductive inference, however, you can go from these first two to the last one. In this way, you have gone from one set of truths to another truth (if indeed they are true, which we hope they are not).

We would say that the argument above (the one about Socrates), in its entirety, is a syllogism. It expresses a deductive inference that logically connects certain simple apprehensions that are parts of three judgments. And this process has been expressed in the form of a syllogism.

<u>Mental Act</u>	<u>Verbal Expression</u>
Deductive Inference	Syllogism

If we now put this all together, keeping our distinction between mental acts and verbal expressions, it would look like this:

<u>Mental Act</u>	<u>Verbal Expression</u>
Simple Apprehension	Term
Judgment	Proposition
Deductive Inference	Syllogism

In order to give ourselves a mental picture of these three logical processes, let us think of a man walking. In order to get from, say, one room to another, he has to pick up his foot and take several steps in order to get to the room that is his destination. The initial act – picking up his foot – is like the initial logical act of simple apprehension. Taking a full step is like making a judgment. And stringing all the steps together into one movement is like deductive inference – we move from one place to another.

### Summary.

We started out by defining logic as "the science of right thinking." We said there are two main branches of logic. One is called **formal** or **minor** logic, the other **material** or **major** logic. Material logic is concerned with the **content** of argumentation. Formal logic is interested in the **form** or structure of reasoning. We defined **truth** as correspondence with reality. We said an argument is **valid** when its conclusion follows logically from its premises. And we said that

**soundness** indicates that all the premises in an argument are true **and** that the argument is valid.

We said also that all arguments must contain at least two premises and a conclusion. And finally, that there are three mental acts that make up the logical process; Simple apprehension, judgment, and deductive inference. These mental acts correspond to three verbal expressions: term, proposition, and syllogism.