Logic: What is it?

– A Collection of Definitions of 'Logic' and 'Mathematical Logic'

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Definitions of 'Reasoning' in Dictionaries

- "The process by which one judgment is deduced from another or others which are given." [The Oxford English Dictionary, 2nd Edition]
- "The drawing of inferences or conclusions through the use of reason." [Longman Dictionary of the English Language]
- "The drawing of inferences or conclusions through the use of reason." [Webster's Third New International Dictionary of the English Language]
- "The process of forming conclusions, judgments, or inferences from facts or premises." [The Random House Dictionary of the English Language, 2nd Edition]
- "Use of reason, especially to form conclusions, inferences, or judgments." [The American Heritage Dictionary of the English Language, 3rd Edition]

Definitions of 'Inference' in Dictionaries

- "The drawing of a conclusion from known or assumed facts or statements; the forming of a conclusion from data or premises, either by inductive or deductive methods; reasoning from something known or assumed to something else which follows from it." [The Oxford English Dictionary, 2nd Edition]
- "The act or an instance of passing from one proposition accepted as true to another whose truth is believed to follow from that of the former." [Longman Dictionary of the English Language]
- "The act of passing from one or more propositions, statements, or judgments considered as true to another the truth of which is believed to follow from that of the former." [Webster's Third New International Dictionary of the English Language]
- "The process of deriving the strict logical consequences of assumed premises." [The Random House Dictionary of the English Language, 2nd Edition]
- "The act or process of deriving logical conclusions from premises known or assumed to be true." [The American Heritage Dictionary of the English Language, 3rd Edition]

Definitions of 'Argument' in Dictionaries

- "A statement or fact advanced for the purpose of influencing the mind; a reason urged in support of a proposition; spec. in Logic, the middle term in a syllogism." [The Oxford English Dictionary, 2nd Edition]
- "A connected series of statements or reasons intended to establish a position (and, hence, to refute the opposite); a process of reasoning; argumentation." [The Oxford English Dictionary, 2nd Edition]
- "Statement of the reasons for and against a proposition; discussion of a question; debate." [The Oxford English Dictionary, 2nd Edition]
- "A reason given to support or disprove something; the use of reason to decide something." [Longman Dictionary of the English Language]
- "A reason or matter for dispute or contention." "A course of reasoning aimed at demonstrating truth or falsehood." "A fact or statement put forth as proof or evidence." [The American Heritage Dictionary of the English Language, 3rd Edition]

Logic: What Is It? – Definitions of 'Logic' in Dictionaries

- "The branch of philosophy that treats of the forms of thinking in general, and more especially of inference and of scientific method." [The Oxford English Dictionary, 2nd Edition]
- "The fundamental science of thought and its categories (including metaphysics or ontology)." [The Oxford English Dictionary, 2nd Edition]
- "The science or art of reasoning as applied to some particular department of knowledge or investigation." [The Oxford English Dictionary, 2nd Edition]
- "A branch of philosophy that deals with the formal principles and structure of sound thought and reasoning." [Longman Dictionary of the English Language]

Logic: What Is It? – Definitions of 'Logic' in Dictionaries

- "A science that deals with the canons and criteria of validity in thought and demonstration and that traditionally comprises the principles of definition and classification and correct use of the terms and the principles of correct predication and the principles of reasoning and demonstration." [Webster's Third New International Dictionary of the English Language]
- "The science on the normative formal principles of reasoning." [Webster's Third New International Dictionary of the English Language]
- "The science of correct reasoning." [Webster's Third New International Dictionary of the English Language]
- "The science which investigates the principles governing correct or reliable inference." [The Random House Dictionary of the English Language]
- "The study of the principles of reasoning, especially of the structure of propositions as distinguished from their content and of method and validity in deductive reasoning." [The American Heritage Dictionary of the English Language, 3rd Edition]

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic is the science of sciences, and the art of arts."
  – John Duns Scotus, 13th century.
- "Logic is the art of using reason well in our inquiries after truth, and the communication of it to others."
  – I. Watts, "Logic," 1724, 1847, Soli Deo Gloria Publications, 1996.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Reasoning is for the most part carried on by the aid of signs. It has been contended by some writers that it can only be conducted by this agency; others maintain that the use of signs is not indispensable and this is the more probable opinion. But it is universally agreed that use of signs is a most important aid and that without them no extended process or reasoning could be conducted."
  "Now logic while it is the science of reasoning in general is in a more especial sense the science of reasoning by signs. It investigates the forms and expressions to which correct reasoning may be reduced and the laws upon which it is founded."
  – G. Boole, "The Nature of Logic," 1848, in I. Grattan-Guinness and G. Bornet (Eds.), "George Boole – Selected Manuscripts on Logic and its Philosophy," Birkhauser Verlag, 1997.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "What we have to take for granted in Logic is, then, a duality, external and internal. On the one hand, outside us, there is the world of phenomena pursuing its course; and, on the other hand, within us, there is the observing and thinking mind. Logic is concerned with the judgments of the latter about the former. The entire omission of either of these two elements, - if indeed such were possible, - would involve the destruction of the science, as any undue stress upon either leads to confusion and to inconsistency."
  "Logic then as here conceived is neither a purely objective nor a purely subjective science. It involves both elements, consisting essentially in the relation of one to the other, and serious error results from the neglect of either aspect, and even from insufficient recognition of it."
  – J. Venn, "The Principles of Empirical or Inductive Logic," Macmillan, 1889, Kessinger Publishing, 2004 (Reprint).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic has always made high claims as the scientia scientiarum, the science of sciences."
  – W. Minto, "Logic: Inductive and Deductive," C. Scribner's Sons, 1893, Kessinger Publishing, 2004 (Reprint).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Philosophy seems to consist of two parts, Logic and Metaphysics. …… Logic is the science of thought, not merely of thought as a psychical phenomenon but of thought in general laws and kinds. Metaphysics is the science of being, not merely as given in physical experience, but of being in general, its laws and types. Of the two branches of philosophy Logic is somewhat more affiliated to psychics, metaphysics to physics."
  "Logic in the narrower sense is that science which concerns itself primarily with distinguishing probable reasonings into good and bad reasonings, and with distinguishing probable reasonings into strong and weak reasonings. Secondarily, logic concerns itself with all that it must study in order to draw those distinctions about reasoning, and with nothing else."
  – C. S. Peirce, "Reasoning and the Logic of Things – The Cambridge Conferences Lectures of 1898," K. L. Ketner (Ed.), Harvard University Press, 1992.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Symbolic Logic is the development of the most general principles of rationale procedure, in ideographic symbols, and in a form which exhibits the connection of these principles one with another."
  – C. I. Lewis, "A Survey of Symbolic Logic," University of California Press, 1918, Thoemmes Press, 2001.
- "The essential purpose of logic is attained if we can analyse the various forms of inference and arrive at a systematic way of discriminating the valid from the invalid forms."
  – M. R. Cohen and E. N. Nagel, "An Introduction to Logic and Scientific Method," Routledge and Kegan Paul, 1934.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "There is a special discipline, called logic, which is considered to be the basis for all other sciences, and where one aims to establish the precise meaning of such terms (as "not", "and", "or", "is", "every", "some", and many others belong here) and to determine the most general laws which govern them. Logic evolved into an independent science long ago, earlier even than arithmetic and geometry."
  "Logic is treated primarily as a discipline which strengthens the foundations of mathematics."
  – A. Tarski, "Introduction to Logic and to the Methodology of the Deductive Sciences," 1936(in Polish), Oxford University Press, 1941, 1946, 1965, 1994 (4th Edition, Revised).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "The scope of the term 'logic' has varied widely from writer to writer through the centuries. But these varying scopes seem all to enclose a common part: the logic which is commonly described, vaguely, as the science of necessary inference."
  – W. V. O. Quine, "Elementary Logic," Harvard University Press, 1941, 1965, 1980 (Revised Edition).
- "Logic, like any science, has as its business the pursuit of truth. What are true are certain statements; and the pursuit of truth is the endeavor to sort out the true statements from the others, which are false."
  – W. V. O. Quine, "Methods of Logic," Harvard University Press, 1950, 1959, 1972, 1978, 1982 (4th Edition).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic is the study of the methods and principles used to distinguish good (correct) from bad (incorrect) reasoning."
  "The aim of the study of logic is to discover and make available those criteria that can be used to test arguments for correctness."
  "The distinction between correct and incorrect reasoning is the central problem with which logic deals. The logician's methods and techniques have been developed primarily for the purpose of making this distinction clear."
  – I. M. Copi and C. Cohen, "Introduction to Logic," Macmillan, 1953, 1961, I. M. Copi, 1968, 1972, 1978, 1982, 1986, Macmillan, 1990, Prentice-Hall, 1994 (9th Edition).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic has frequently been defined as the science of the laws of thought. But this definition, although it gives a clue to the nature of logic, is not accurate. In the first place, thinking is studied by psychologists. Logic cannot be "the" science of the laws of thought, because psychology is also a science that deals with laws of thought (among other things). And logic is not a branch of psychology; it is a separate and distinct field of study. In the second place, if "thought" refers to any process that occurs in people's minds, not all thought is an object of study for the logician. All reasoning is thinking, but not all thinking is reasoning. …… To define 'Logic' as the science of the laws of thought is to make it include too much."
  – I. M. Copi and C. Cohen, "Introduction to Logic," Macmillan, 1953, 1961, I. M. Copi, 1968, 1972, 1978, 1982, 1986, Macmillan, 1990, Prentice-Hall, 1994 (9th Edition).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic is sometimes defined as the science of reasoning. This definition is much better, but it also will not do. Reasoning is a special kind of thinking in which problems are solved, in which inference takes place, that is, in which conclusions are drawn from premises. It is still a kind of thinking, however, and therefore still part of the psychologist's subject matter. …… The logician, however, is concerned primarily with the correctness of the completed process of reasoning. The logician asks: Does the conclusion reached follow from the premises used or assumed? If the premises do provide adequate grounds for affirming the conclusion, if asserting the premises to be true does warrant asserting the conclusion also to be true, then the reasoning is correct. Otherwise, it is incorrect."
  – I. M. Copi and C. Cohen, "Introduction to Logic," Macmillan, 1953, 1961, I. M. Copi, 1968, 1972, 1978, 1982, 1986, Macmillan, 1990, Prentice-Hall, 1994 (9th Edition).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic is the study of the methods and principles used to distinguish correct reasoning from incorrect reasoning. There are objective criteria with which correct reasoning may be defined. If these criteria are not known, then they cannot be used. The aim of the study of logic is to discover and make available those criteria that can be used to test arguments, and to sort good arguments from bad ones."
  – I. M. Copi and C. Cohen, "Introduction to Logic," Macmillan, 1953, 1961, I. M. Copi, 1968, 1972, 1978, 1982, 1986, Macmillan, 1990, Prentice-Hall, 1994, 1998, 2002 (11th Edition).
- "Logic is concerned with the principles of valid inference."
  – W. Kneale and M. Kneale, "The Development of Logic," Clarendon Press, 1962, 1984 (Paperback Edition with Corrections).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Although logic is general regarded as a branch of philosophy, its applications extend far beyond the limits of any single discipline. The critical standards of logic have application in any subject which employs inferences and argument – in any field in which conclusions are supposed to be supported by evidence. This includes every domain of serious intellectual endeavor as well as the practical affairs of everyday life."
  "Logic provides tools for the analysis of arguments. Logical analysis is concerned with the relationship between a conclusion and the evidence given to support it."
  "Logic deals with arguments and inferences. One of its main purposes is to provide methods for distinguishing those which are logically correct from those which are not."
  "Logic is concerned with an objective relation between evidence and conclusion."
  – W. C. Salmon, "Logic," Prentice-Hall, 1963, 1973, 1984 (3rd Edition).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "We open this inquiry (the nature of mathematical logic) by examining three sense which the word 'logic' has in ordinary discourse."
  "The first sense is that intended when we say that 'logic is the analysis and criticism of thought.' We observe that we reason, in the sense that we draw conclusions from our data; that sometimes these conclusions are correct, sometimes not; and that sometimes these errors are explained by the fact that some of our data were mistaken, but not always; and gradually we become aware that reasonings conducted according to certain norms can be depended on if the data are correct. The study of these norms, or principles of valid reasoning, has always been regarded as a branch of philosophy. In order to distinguish logic in this sense from other senses introduced later, we shall call it philosophical logic."
  – H. B. Curry, "Foundations of Mathematical Logic," McGraw-Hill, 1963, Dover Publications, 1977.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "In the study of philosophical logic it has been found fruitful to use mathematical methods, i.e., to construct mathematical systems having some connection therewith. ... The systems so created are naturally a proper subject for study in themselves, and it is customary to apply the term 'logic' to such a study. Logic in this sense is a branch of mathematics. To distinguish it from other senses, it will be called mathematical logic."
  "In both of its preceding senses 'logic' was used as a proper name. The word is also frequently used as a common noun, and this usage is a third sense of the word distinct from the first two. In this sense a logic is a system, or theory, such as one considers in mathematical or philosophical logic."
  – H. B. Curry, "Foundations of Mathematical Logic," McGraw-Hill, 1963, Dover Publications, 1977.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "One of the popular definitions of logic is that it is the analysis of methods of reasoning. In studying these methods, logic is interested in the form rather than the content of the argument. …… The truth or falsity of the particular premises and conclusions is of no concern to logicians. They want to know only whether the premises imply the conclusion. The systematic formalization and cataloguing of valid methods of reasoning are a main task of logicians."
  – E. Mendelson, "Introduction to Mathematical Logic," Chapman & Hall, 1964, 1979, 1987, 1997 (4th Edition).
- "Formal logic studies the forms of human reasoning without paying attention to their specific subject matter. It seeks the answer to the question, how do we reason?"
  – A. A. Stolyar, "Elementarnoye vvedeniye v matematicheskuyu logiku (in Russian)," Prosveshcheniye Press, 1965, "Introduction to Elementary Mathematical Logic," The MIT Press, 1970, Dover Publications, 1983.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic has the important function of saying what follows from what. …… Logic is used in organizing scientific knowledge, and as a tool of reasoning and argumentation in daily life"
  – S. C. Kleene, "Mathematical Logic," John Wiley & Sons, 1967, Dover Publications, 2002.
- "Logic is the study of reasoning."
  – J. R. Shoenfield, "Mathematical Logic," Addison-Wesley, 1967, 1973 (2nd printing), Association for Symbolic Logic, 2001 (reprinting).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Formal logic is the science of deduction. It aims to provide systematic means for telling whether or not given conclusions follow from given premises, i.e., whether arguments are valid or invalid."
  "If logic is the science of deduction, it is the science of refutation as well. From this point of view formal logic aims to provide systematic means for recognizing inconsistency."
  "Then truth-functional logic is the science of tautology as truly as it is the science of deduction and of refutation."
  – R. Jeffrey, "Formal Logic: Its Scope and Limits," McGraw-Hill, 1967, 1981, 1991, Hackett Publishing, 2006 (4th Edition).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "In large part, deductive logic concerns what can legitimately be inferred from what – i.e., whether a given statement would have to be true, or might still be false, if others offered as grounds for asserting it were true."
  "Logic treats other things as well: whether a given statement could be false at all, or is necessary true; whether, of two given statements, either one could be true and the other false; whether a number of statements could all be true together; and so on. These things too depend on how statements are put together, or are compounded from other statements."
  "Often, to be sure, the credibility of a conclusion is enhanced by premises which do not guarantee its truth. Inductive logic is the study of such arguments, and of the degree of support that their premises bestow on their conclusions. But in deductive logic, the question is not how well the premises of an argument support the conclusion, but whether or not they would absolutely preclude the falsehood, and hence ensure the truth, of the conclusion."
  – H. Leblanc and W. A. Wisdom, "Deductive Logic," Prentice-Hall, 1972, 1976, 1993 (3rd Edition).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "A central concern of logic is to discriminate valid from invalid arguments; and formal logical systems, such as the familiar sentence and predicate calculi, are intended to supply precise canons, purely formal standards, of validity."
  – S. Haack, "Philosophy of Logic," Cambridge University Press, 1978.
- "Logic deals with what follows from what. It is the systematic study of the fundamental principles that underlie correct, 'necessary' pieces of reasoning as these occur in proofs, arguments, inferences, and deductions."
  – J. A. Robinson, "Logic: Form and Function: The Mechanization of Deductive Reasoning," Edinburgh University Press, 1979.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Traditionally, logic is said to be the art (or study) of reasoning."
  – D. van Dalen, "Logic and Structure, Springer-Verlag, 1980, 1983, 1994, 2004, 2008 (4th Edition).
- "Logic is concerned with truth and inferences; that is, with determining the conditions under which a proposition is true and the conditions under which one proposition may be inferred or deduced from other propositions."
  – J. D. McCawley, "Everything that Linguists have Always Wanted to Know about Logic* *but were ashamed to ask," The University of Chicago Press, 1981, 1993 (2nd Edition).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic may be defined as the organized body of knowledge, or science, that evaluates arguments."
  "The purpose of logic, as the science that evaluates arguments, is thus to develop methods and techniques that allow us to distinguish good arguments from bad."
  "The aim of logic is to develop a system of methods and principles that we may use as criteria for evaluating the arguments of others and as guides in constructing arguments of our own."
  – P. J. Hurley, "A Concise Introduction to Logic," Wadsworth, 1982, 1985, 1988, 1991, 1993, 1997, 1999, 2003, 2005, 2008, 2012 (11th Edition).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic is primarily about inferring, about reasoning; in particular, it is the study of what constitutes correct reasoning."
  "Logic is concerned with the verbal expression of reasoning, since this is the only thing that is publicly ascertainable. The term that we will use for this verbal expression of reasoning is argument."
  "The only thing logic is concerned with is whether arguments are good or bad, correct or incorrect. Logic is a normative enterprise; its job is to evaluate arguments."
  "Logic is concerned solely with whether the conclusion follows from the premises, and this is a matter of the form rather than of the truth, falsity, or content of an argument."
  – V. Klenk, "Understanding Symbolic Logic," Prentice-Hall, 1983, 1989, 1994, 2002 (4th Edition).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic, it is often said, is the study of valid arguments. It is a systematic attempt to distinguish valid arguments from invalid arguments."
  – W. H. Newton-Smith, "Logic: An Introductory Course," Routledge & Kegan Paul, 1985, Taylor & Francis e-Library, 2005 (Revised and corrected Edition).
- "Logic can be defined as the study of the concepts and principles of good reasoning. Its purpose is to develop a science of reasoning involving the fundamental concepts of argument, inference, truth, falsity, and validity, among others. That objective has great practical value as well, since it is by means of logic that we clarify our ideas, formulate solutions, consider options, make choices, and guide our actions. It is hard to imagine a competency more important than being able to reason well. Hence we think of the qualities of the successful person, "being logical" is certainly at the center."
  – R. M. Johnson, "A Logic Book: Fundamentals of Reasoning," Wadsworth, 1987, 1992, 1998, 2002, 2007 (5th Edition).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic is the study of correct reasoning. Logic pertains to all subjects, since people can reason about anything they can think about. …… Using logic, we can evaluate bits of reasoning as proper or improper, good or bad. Logic is not the study of how people do reason, but how they should reason. …… Logic describes not the psychological process of reasoning but the rules for correct reasoning. Logic does not describe real reasoning, with its errors, omissions, and oversights; it prescribes methods for justifying reasoning; that is, for showing that a given bit of reasoning is proper. Logic thus describes an ideal that actual reasoning strives for but sometimes fails to reach."
  – D. Bonevac, "Deduction: Introductory Symbolic Logic," Mayfield Publishing, 1987, Blackwell, 2003 (2nd Edition).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "The logician's concern is with validity, with the relation of consequence between premises and conclusion. In order to justify an assertion, we may adduce other statements, from which we claim the assertion follows. But what is the criterion by which to decide if the conclusion really does follows? The question has two aspects: concretely, to decide in particular cases whether the conclusion follows from the premises - in technical language, whether a consequence relation holds; and abstractly, to understand in general what the relation between premises and conclusion in a valid argument is."
  "The purpose of logical theory is to provide an explanation of the validity and invalidity of argument. The goal is to describe the relation which must hold between premises and conclusion for it to be correct to say that the premises entail the conclusion, that the conclusion follows from the premises, or that the inference from premises to conclusion is valid."
  – S. Read, "Relevant Logic: A Philosophical Examination of Inference," Basil Blackwell, 1988.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic is the study of arguments. An argument is a sequence of statements of which one is intended as a conclusion and the others, the premises, are intended to prove or at least provide some evidence for the conclusion."
  "The purpose of logic is precisely to develop methods and techniques to tell good arguments from bad ones."
  – J. N. Nolt, D. Rohatyn, and A. Varzi, "Schaum's Outline of Theory and Problems of Logic," McGraw-Hill, 1988, 1998 (2nd Edition).
- "Logic may be said to be the study of correct and incorrect reasoning. This includes the study of what makes arguments consistent or inconsistent, valid or invalid, sound or unsound. It has two branches, known as formal (symbolic) logic and philosophical logic."
  – S. Wolfram, "Philosophical Logic: An Introduction," Routledge, 1989.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic is the study of formal (that is symbolic) systems of reasoning and of methods of attaching meaning to them."
  – S. Reeves and M. Clarke, "Logic for Computer Science," Addison-Wesley, 1990.
- "Logic has been conceived as the science of valid inference."
  – J. P. Cleave, "A Study of Logics," Oxford University Press, 1991.
- "Logic, one might say, is the science of reasoning. Reasoning is something which has various applications, and important among these traditionally is argumentation. The trains of reasoning studied in logic are still called arguments, or argument schemata, and it is the business of logic to find out what it is that makes a valid argument (or a valid inference) valid."
  – L. T. F. Gamut, "Logic, Language, and Meaning," The University of Chicago Press, 1991.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "The Science of Logic is the formal study of reasoning. Logic is a science because it aims to offer a systematic account of reasoning – chiefly what is known as deductive reasoning. It is formal because, unlike an empirical science such as psychology, logic does not study the beings who do the reasoning or their thought processes but the structure of reasoning itself. Formal logic is sometimes described as a preparation for other studies."
  – F. D. Portoraro and R. E. Tully, "Logic with SYMLOG: Learning Symbolic Logic by Computer," Prentice-Hall, 1994.
- "Logic is the study of the distinction between valid and invalid arguments."
  – G. Forbes, "Modern Logic: A Text in Elementary Symbolic Logic," Oxford University Press, 1994.
- "Logic is the study of how to reason, how to deduce from hypotheses, how to demonstrate. Logic is concerned with providing symbolic models of acceptable reasoning."
  – R. L. Epstein, "Predicate Logic," Oxford University Press, 1994.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logical consequence is the central concept in logic. The aim of logic is to clarify what follows from what, to determine which are the valid consequences of a given set of premises or assumptions. The consequence relation relates a set or collection of given propositions to those propositions or conclusions which correctly, or validly, follow from them. We can say that the premises entail the conclusion; or that the conclusion (validly) follows from the premises; or that one may correctly infer the conclusion from the premises; or that the conclusion is a (valid) logical consequence of the premises; or that the argument or inference from premises to conclusion is valid."
  – S. Read, "Thinking about Logic: An Introduction to the Philosophy of Logic," Oxford University Press, 1994.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic is the study of the relations of logical consequence, that is, of relations of implication or entailment. Its concrete manifestation is an ability to perform logical inferences, that is, to draw deductive conclusions."
  – J. Hintikka, "The Principles of Mathematics Revisited," Cambridge University Press, 1996.
- "In general, logic is about reasoning. It is about the validity of arguments, consistency among statements (or propositions, as they're called in logic) and matters of truth and falsehood. In a formal sense logic is concerned only with the form of an arguments and the principles of valid inferencing. It is not science – it is not concerned with the content of reasoning. It deals with the notion of truth in an abstract sense."
  – J. Kelly, "The Essence of Logic," Prentice-Hall, 1997.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic was one of the first scientific disciplines to be identified and studied systematically."
  – C. Howson, "Logic with Trees: An Introduction to Symbolic Logic," Routledge, 1997.
- "The word logic derives from the Greek λογοσ: reasoning, and is defined in the OED as the:
  (a) branch of philosophy that deals with reasoning and thinking, especially inference and scientific method;
  (b) systematic use of symbolic techniques and mathematical methods to determine the forms of valid deductive argument.
  These definitions nicely illustrate the two-way traffic between logic and mathematics. Thus, according to (a), logic underpins mathematics. On the other hand, (b) declares that mathematical ideas, notation and methods can be used to describe and develop the study of logic."
  – D. L. Johnson, "Elements of Logic via Numbers and Sets," Springer, 1998.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic studies the notion(s) of consequence. It deals with propositions (sentences), sets of propositions and the relation of consequence among them. The task of formal logic is to represent all this by means of well-defined logical calculi admitting exact investigation. Various calculi differ in their definitions of sentences and notion(s) of consequence."
  – P. Hajek, "Metamathematics of Fuzzy Logic," Kluwer Academic, 1998.
- "Logic is the study of reasoning. Aristotle (384-322 B.C.) founded logic as a system of principles upon which all other knowledge rests. Logic pertains to all subjects; people can reason about anything. Sometimes the reasoning is good. Sometimes it is not. People use logic to tell the difference."
  "Logic is not the study of how people do reason but how they should reason. ……Logic describes an ideal that actual reasoning sometimes fails to reach ."
  – D. Bonevac, "Simple Logic," Harcout Brace College Publishers, 1999.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Although it may differ in form from one scientific discipline to another, logic lies at the heart of every such discipline: physicists use logic with extensive use of symbols and proofs and biologists with a less formal form of reasoning. Logic makes such disciplines scientific, by providing a way to deduce the vast amount of knowledge in each discipline from a relatively small number of explicitly stated facts or hypotheses. In order to make this kind of deduction, logic can be treated as a language, and this allows, first, the expression of knowledge concisely and precisely and, secondly, a way to reason about the consequences of knowledge rigorously."
  – N. Nissanke, "Introductory Logic and Sets for Computer Scientists," Addison Wesley, 1999.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "To study logic is to study argument. Argument is the stuff of logic. …… Argument itself is the subject-matter of logic. The central problem which worries the logician is just this: how, in general, can we tell good arguments from bad arguments? Modern logicians have a solution to this problem which is incredibly successful and enormously impressive."
  – P. Tomassi, "Logic," Routledge, 1999.
- "Roughly speaking, logic is the study of methods for evaluating arguments. More precisely, logic is the study of methods for evaluating whether the premises of an argument adequately support (or provides good evidence for) its conclusion."
  – C. S. Layman, "The Power of Logic," Mayfield, 1999, 2002, McGraw-Hill, 2005 (3rd Edition).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic is the study of what counts as a good reason for what, and why."
  – G. Priest, "Logic: A Very Short Introduction," Oxford University Press, 2000.
- "Logic is about consequences. Take a body of propositions. The job of a logic is to tell you what follows from that body of propositions."
  – G. Restall, "An Introduction to Substructural Logics," Routledge, 2000.
- "Logic is the theory of consequence relations, of valid inferences."
  – L. Goble, "The Blackwell Guide to Philosophical Logic," Blackwell, 2001.
- "Logic is quite simply the study of truth-preserving arguments."
  – D. Cryan, S. Shatil, and B. Mayblin, "Introducing Logic," Icon Books, 2001.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "Logic is the collective name for the principles of correct reasoning. The study of logic investigates these principles and identifies the general rules that distinguish good from bad reasoning. …… Logic, in contrast (to that Psychology is a descriptive empirical study), is a prescriptive abstract study like mathematics that seeks to establish rules for correct reasoning and to help thinkers avoid mistaken reasoning. The purpose of logic is to discover and justify principles that offer the best account of reasoning as it should ideally occur."
  – D. Jacquette, "Symbolic Logic," Wadsworth, 2001.
- "Logic is about reasoning – about going from premises to a conclusion. …… Logic is the analysis and appraisal of arguments. When you do logic, you try to clarify reasoning and separate good from bad reasoning."
  – H. J. Gensler, "Introduction to Logic," Routledge, 2002, 2010 (2nd Edition).

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "The whole point of the logic we shall develop is to provide a tool for doing mathematics and philosophy (in other words, thought)."
  "Logic tries to provide a mechanical and methodical way of performing some otherwise complicated thought operations whilst preserving the results these complicated operations yield."
  – M. J. Gabbay, "Logic With Added Reasoning," Broadview Press, 2002.
- "The business of logic is the systematic evaluation of arguments for internal cogency. And the kind of internal cogency that will especially concern us is deductive validity."
  – P. Smith, "An Introduction to Formal Logic," Cambridge University Press, 2003.
- "Logic is the theory of good reasoning. Studying logic not only helps you to reason well, but it also helps you understand how reasoning works. Logic can be done in two ways – it can be formal and it can be philosophical."
  – G. Restall, "Logic: An Introduction," Routledge, 2006.

Logic: What Is It? – Definitions of 'Logic' by Logicians

- "It is far from clear what is meant by logic or what should be meant by it. It is nevertheless reasonable to identify logic as the study of inferences and inferential relations. The obvious practical use of logic is in any case to help us to reason well, to draw good inferences. And the typical form the theory of any part of logic seems to be a set of rules of inference."
  – J. Hintikka and G. Sandu, "What is Logic?" in D. Jacquette (Ed.), "Philosophy of Logic," Elsevier, 2007.
- "Logic is the study of correct reasoning. The study of correct reasoning is the most important study there can be. Therefore, logic is the most important study there can be."
  – A. vander Nat, "Simple Formal Logic: With Common-Sense Symbolic Techniques," Routledge, 2010.

Mathematical Logic: What Is It?
– Definitions of 'Mathematical Logic' by Mathematical Logicians

- "Mathematical logic, also call symbolic logic or logistic, is an extension of the formal method of mathematics to the field of logic. It employs for logic a symbolic language like that which has long been in use to express mathematical relations."
  "The purpose of the symbolic language in mathematical logic is to achieve in logic what it has achieved in mathematics, namely, an exact scientific treatment of its subject-matter. "
  – D. Hilbert and W. Ackermann, "Principles of Mathematical Logic," (Translation into English of the second Edition of the "Grundzuge der Theoretischen Logik") Julius Springer, 1928, 1938, Chelsea Publishing Company, 1950.

Mathematical Logic: What Is It?
– Definitions of 'Mathematical Logic' by Mathematical Logicians

- "Mathematical Logic, which is nothing else but a precise and complete formulation of formal logic, has two quite different aspects. On the one hand, it is a section of Mathematics, treating of classes, relations, combinations of symbols, etc. instead of numbers, functions, geometric figures, etc. On the other hand, it is a science prior to all others, which contains the ideas and principles underlying all sciences. It was in the second sense that Mathematical Logic was first conceived by Leibniz in his Characteristica universalis, of which it would have formed a central part."
  – K. Gödel, "Russell's Mathematical Logic," in Schilpp (Ed.) "The Philosophy of Bertrand Russell," Open Court Publishing Company, 1994.
- "Traditionally, (formal) logic is concerned with the analysis of sentences or of propositions and of proof with attention to the forms in abstraction from the matter."
  – A. Church, "Introduction to Mathematical Logic," Annals of Mathematics Studies, 1944, Princeton University Press, 1956.

Mathematical Logic: What Is It?
– Definitions of 'Mathematical Logic' by Mathematical Logicians

- "Mathematical or symbolic logic has two aspects. On one hand it is logic – it is an analytical theory of the art of reasoning whose goal is to systematize and codify principles of valid reasoning. The other aspect of symbolic logic is interlaced with problems relating to the foundations of mathematics. In brief, it amounts to formulating a mathematical theory as a logical system augmented by further axioms."
  – R. R. Stoll, "Set Theory and Logic," W. H. Freeman and Company, 1961, 1963, Dover Publications, 1979.

Mathematical Logic: What Is It?
– Definitions of 'Mathematical Logic' by Mathematical Logicians

- "In the study of philosophical logic it has been found fruitful to use mathematical methods, i.e., to construct mathematical systems having some connection therewith. ... The systems so created are naturally a proper subject for study in themselves, and it is customary to apply the term 'logic' to such a study. Logic in this sense is a branch of mathematics. To distinguish it from other senses, it will be called mathematical logic."
  – H. B. Curry, "Foundations of Mathematical Logic," McGraw-Hill, 1963, Dover Publications, 1977.

Mathematical Logic: What Is It?
– Definitions of 'Mathematical Logic' by Mathematical Logicians

- "The systematic formalization and cataloguing of valid methods of reasoning are a main task of logicians. If the work uses mathematical techniques or if it is primarily devoted to the study of mathematical reasoning, then it may be called mathematical logic. We can narrow the domain of mathematical logic if we define its principal aim to be a precise and adequate understanding of the notion of mathematical proof."
  – E. Mendelson, "Introduction to Mathematical Logic," Van Nostrand, 1964, 1979, 1987, Chapman & Hall, 1997 (4th Edition).
- "Mathematical logic (also called symbolic logic) is logic treated by mathematical methods. Logic has the important function of saying what follows from what. Every development of mathematics makes use of logic."
  – S. C. Kleene, "Mathematical Logic," John Wiley & Sons, 1967, Dover Publications, 2002.

Mathematical Logic: What Is It?
– Definitions of 'Mathematical Logic' by Mathematical Logicians

- "Logic is the study of reasoning; and mathematical logic is the study of the type of reasoning done by mathematicians."
  – J. R. Shoenfield, "Mathematical Logic," Addison-Wesley, 1967, 1973 (2nd printing), Association for Symbolic Logic, 2001 (reprinting).
- "Formal logic is the science of deduction. It aims to provide systematic means for telling whether or not given conclusions follow from given premises, i.e., whether arguments are valid or invalid. "
  "Then truth-functional logic is the science of tautology as truly as it is the science of deduction and of refutation."
  – R. Jeffrey, "Formal Logic: Its Scope and Limits," McGraw-Hill, 1967, 1981, 1991, Hackett Publishing, 2006 (4th Edition).
- "Symbolic logic is a mathematical model of deductive thought."
  – H. B. Enderton, "A Mathematical Introduction to Logic," Academic Press, 1972, 2001 (2nd Edition).

Mathematical Logic: What Is It?
– Definitions of 'Mathematical Logic' by Mathematical Logicians

- "It is a familiar misconception to believe that to do mathematical logic is to be engaged primarily in formal thinking. The important point is rather to make precise the concept of formal and thereby be able to reason mathematically about formal systems. And this adds a new dimension to mathematics."
  – H. Wang, "Popular Lectures on Mathematical Logic," Van Nostrand Reinhold, 1981, Dover Publications, 1993.

Mathematical Logic: What Is It?
– Definitions of 'Mathematical Logic' by Mathematical Logicians

- "Logic is concerned mainly with two concepts: truth and provability."
  – J. H. Gallier, "Logic for Computer Science: Foundations of Automatic Theorem Proving," Harper & Row, 1986, 2003, Dover Publications, 2015 (2nd Edition).
- "The function of mathematical logic is to provide formal languages for describing the structures with which mathematicians work, and the methods of proof available to them."
  – P. T. Johnstne, "Notes on Logic and Set Theory," Cambridge University Press, 1987.

Mathematical Logic: What Is It?
– Definitions of 'Mathematical Logic' by Mathematical Logicians

- "In the family of formal logics, one is central: classical logic. It is the most widely used logic, the logic underlying mathematics as it is generally practiced, and the logic on top of which many others have been built."
  "In fact, classical logic was created to embody the reasoning principles of mathematics, where ambiguity and imprecision are a bad thing."
  "Classical logic can be used to reason correctly about such a model. Whether the model accurately reflects the real world is a separate issue."
  "In classical logic we investigate the principles of reasoning for perfect worlds, where truth is unqualified and there are no shades of grey."
  – M. Fitting, "First-Order Logic and Automated Theorem Proving," Springer, 1990, 1996 (2nd Edition).

Mathematical Logic: What Is It? – Definitions of 'Mathematical Logic' by Mathematical Logicians

- "The study of logic was begun by the ancient Greeks whose educational system stressed competence in philosophy and rhetoric. Logic was used to formalize deduction: the derivation of true statements, called conclusions, from statements that are assumed to be true, called premises."
  "We still use many Greek words in logic such as axiom and theorem, but until the nineteenth century, logic remained a philosophical, rather than a mathematical and scientific, tool, perhaps because it lacked a sufficiently developed symbolic notation."
  "Mathematicians revived the study of logic in order to study the foundations of mathematics."
  "While mathematical logic remains an important branch of pure mathematics, it is being extensively applied in computer science. In turn, the application of logic to computer science has spurred the development of new systems of logic."
  – M. Ben-Ari, "Mathematical Logic for Computer Science," Prentice-Hall, 1993, Springer, 2001 (2nd Edition).

Mathematical Logic: What Is It? – Definitions of 'Mathematical Logic' by Mathematical Logicians

- "Even though the study of 'logic' has been in existence since the earliest days of scientific thinking, the general view of mathematical logic has changed significantly over the last 50 years or so. Logic used to be a topic studied by pure mathematicians, and its objective was the ability to construct proofs about the foundations of mathematical theory. Logic was used to find the minimum number of assumptions which were necessary to produce all the mathematical theory in a given area. Most people would still consider logic as a part of 'pure Mathematics' rather than 'Applied Mathematics'. However, the advent of the computer has led to some very important real-world applications. As with many such development, this has in turn led to extensive new areas of theory, and the new development associated with logic are essential to any modern logician."
  – E. Burke and E. Foxley, "Logic and its Applications," Prentice-Hall, 1996.
- "The most fundamental notion in classical logic is that of truth."
  – D. Bostock, "Intermediate Logic," Oxford University Press, 1997.

Mathematical Logic: What Is It? – Definitions of 'Mathematical Logic' by Mathematical Logicians

- "In 1920 logic was mostly a philosophers's garden. There were also a few mathematicians there, cultivating the logical roots of the mathematical tree. Today, Recursion Theory, Set Theory, Model Theory and Proof Theory, logic's major subdisciplines, have become full-fledged branches of mathematics."
  "The emerging areas with an important logic component include imperative, declarative and functional programming; verification of programs; interactive, concurrent, distributed, fault tolerant and real time computing; knowledge-based systems; deductive databases; and VLSI design. Various types of logic are now also playing key roles in the modeling of reasoning in special fields from law to medicine."

  "These applications have widened the horizons of logical research to encompass problems and ideas that were not even considered when logic was motivated only by questions from mathematics and philosophy. Applied logic is now as much a reality as is applied mathematics."
  "Mathematical logic, coupled with some of its applications, should be as easily available to college and university students as is applied mathematics."
  – A. Nerode and R. A. Shore, "Logic for Applications," Springer, 1997 (2nd Edition).

Mathematical Logic: What Is It? – Definitions of 'Mathematical Logic' by Mathematical Logicians

- "The aim of logic in computer science is to develop languages to model the situations we encounter as computer science professionals, in such a way that we can reason about them formally. Reasoning about situations means constructing arguments about them; we want to do this formally, so that the arguments are valid and can be defended rigorously, or executed on a machine."
  – M. Huth and M. Ryan, "Logic in Computer Science: Modelling and Reasoning about Systems," Cambridge University Press, 2000, 2004 (2nd Edition).

Mathematical Logic: What Is It? – Definitions of 'Mathematical Logic' by Mathematical Logicians

- "In its first meaning, a logic is a collection of closely related artificial languages. There are certain languages called first-order languages, and together they form first-order logic."
  "In its second but older meaning, logic is the study of the rules of sound argument. First-order languages can be used as a framework for studying rules of argument; logic done this way is called first-order logic."
  – W. Hodges, "Classical Logic I: First-Order Logic," in L. Goble (Ed.), "The Blackwell Guide to Philosophical Logic," Blackwell Publishers, 2001.
- "Logic is the science of reasoning. Mathematical logic applies to mathematical reasoning – the art and science of writing down deductions."
  – G. Tourlakis, "Lectures in Logic and Set Theory, Volume 1: Mathematical Logic," Cambridge University Press, 2003.

Mathematical Logic: What Is It? – Definitions of 'Mathematical Logic' by Mathematical Logicians

- "One set of rules for reasoning was laid down by the ancient Greeks over two thousand years ago. They called this system of reasoning 'logic'. This logic forms the basis of reasoning throughout much of Western civilization. It should be noted, however, that the term logic is often applied to any system of reasoning; in such circumstances, the term classical logic may then be used to refer to the logic of the ancient Greeks."
  "Until the nineteenth century, reasoning was purely verbal and used normal, everyday language; we shall refer to such language as natural language. Since then, much progress has been made on developing symbolic logic in which information is represented using letters and special symbols, rather like algebra. Symbolic logic enables a certain degree of automation of reasoning; indeed, its original motivation was a desire to be able to decide a logical problem by 'calculation', just as the answer to a numerical problem can be calculated using arithmetic."
  – N. Dean, "Logic and Language," Palgrave Macmillan, 2003.

Mathematical Logic: What Is It?
– Definitions of 'Mathematical Logic' by Mathematical Logicians

- "A logic is a language equipped with rules for deducing the truth of one sentence from that of another."
  "Logic is defined as the study of the principles of reasoning. The study of logics (as defined above) is the part of this study known as symbolic logic. Symbolic logic is a branch of mathematics. "
  "A century ago, the primary aim of symbolic logic was to provide a foundation for mathematics. Today, foundational studies are just one part of symbolic logic."
  "Symbolic logic views mathematics and computer science from a unique perspective and supplies distinct tools and techniques for the solution of certain problems."
  – S. Henman, "A First Course in Logic: An introduction to model theory, proof theory, computability, and complexity," Oxford University Press, 2004.

Mathematical Logic: What Is It?
– Definitions of 'Mathematical Logic' by Mathematical Logicians

- "Why should students of mathematics want to know something about predicate logic? Here is one answer: predicate logic helps one understand the fine points of mathematical language, including the ambiguities that arise from the use of natural language (English, French, etc.) in mathematics."
  "The study of logic and the foundations of mathematics has led to many powerful and versatile methods, and many deep and beautiful results. Some of these methods and results are relevant within foundations only, but many of them are useful and important in other branches of mathematics and in fields outside of mathematics."
  – R. S. Wolf, "A Tour through Mathematical Logic," The Mathematical Association of America, 2005.

Mathematical Logic: What Is It?
– Definitions of 'Mathematical Logic' by Mathematical Logicians

- "Traditional logic as a part of philosophy is one of the oldest scientific disciplines. It can be traced back to the Stoics and to Aristotle and is the root of what is nowadays called philosophical logic. Mathematical logic, however, is a relatively young discipline, having arisen from the endeavors of Peano, Frege, and Russell to reduce mathematics entirely to logic. It steadily developed during the twentieth century into a broad discipline with several subareas and numerous applications in mathematics, computer science, linguistics, and philosophy."
  – W. Rautenberg, "A Concise Introduction to Mathematical Logic," Springer, 2006, 2010 (3rd Edition).

Mathematical Logic: What Is It?
– Definitions of 'Mathematical Logic' by Mathematical Logicians

- "One feature of modern logic is a clear distinction between object language and metalanguage. The first is formalized or at least formalizable. The latter is, like the language of this book, a kind of a colloquial language that differs from author to author and depends also on the audience the author has in mind. It is mixed up with semiformal elements, most of which have their origin in set theory. The amount of set theory involved depends on one's objectives. Traditional semantics and model theory as essential parts of mathematical logic use stronger set-theoretic tools than does proof theory. In some model-theoretic investigations these are often the strongest possible ones. But on average, little more is assumed than knowledge of the most common set-theoretic terminology, presented in almost every mathematical course or textbook for beginners."
  – W. Rautenberg, "A Concise Introduction to Mathematical Logic," Springer, 2006, 2010 (3rd Edition).

Mathematical Logic: What Is It?
– Definitions of 'Mathematical Logic' by Mathematical Logicians

- "The main objects of study of mathematical logic are mathematical theories such as set theory, number theory, and the theory of algebraic structures such as groups, rings, fields, algebraically closed fields, etc., with the aim to develop tools to examine their consistency, completeness, and other similar questions concerning the foundation of these theories."
  – S. M. Srivastava, "A Course on Mathematical Logic," Springer, 2008.