

## An Introduction to Mathematical Logic

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# MATHEMATICAL LOGIC

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*We add two words of caution. First, if two different syntactical variables occur in the same context, they do not necessarily represent different expressions ...*

Logic is the study of reasoning; and mathematical logic is the study of the type of reasoning done by mathematicians. To discover the proper approach to mathematical logic, we must therefore examine the methods of the mathematician.

The conspicuous feature of mathematics, as opposed to other sciences, is the use of proofs instead of observations. A physicist may prove physical laws from other physical laws; but he usually regards agreement with observation as the ultimate test of a physical law. A mathematician may, on occasions, use observation; for example, he may measure the angles of many triangles and conclude that the sum of the angles is always  $180^\circ$ . However, he will accept this as a law of mathematics only when it has been proved.

MATHEMATICAL LOGIC HAS ALWAYS BEEN CLOSELY CONNECTED WITH THE PHILOSOPHY OF MATHEMATICS

--- Joseph R. Shoenfield