

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 31

PART XI

MATHEMATICAL SIGNS AND SYMBOLS FOR USE IN PHYSICAL SCIENCES AND TECHNOLOGY

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BRIEF HISTORY

The ISO Recommendation R 31, Part XI, *Mathematical Signs and Symbols for Use in the Physical Sciences and Technology*, was drawn up by Technical Committee ISO/TC 12, *Quantities, Units, Symbols, Conversion Factors and Conversion Tables*, the Secretariat of which is held by the Danish Standards Association, Dansk Standardiseringsråd (DS).

The ISO/TC 12 Secretariat drew up two drafts in succession, the second of which was studied by the Technical Committee during its fourth meeting, held in Copenhagen in November 1957. The Secretariat then prepared a third draft proposal, which was submitted by correspondence to the Members of the Technical Committee and was approved as a Draft ISO Recommendation.

It should be noted that the following international organizations have had these draft proposals sent to them and have taken part in the discussions at the meetings of Technical Committee ISO/TC 12:

International Commission on Illumination
International Committee on Weights and Measures
International Electrotechnical Commission
International Union of Pure and Applied Chemistry
International Union of Pure and Applied Physics
and its Sub-Committee SUN
Organisation Internationale de Métrologie Légale.

On 29 May 1959, the Draft ISO Recommendation (No. 287) was distributed to all the ISO Member Bodies and was approved by the following Member Bodies:

Australia	Greece	Poland
Austria	Hungary	Portugal
Belgium	India	Romania
Burma	Ireland	Spain
Canada	Japan	Sweden
Chile	Netherlands	Switzerland
Denmark	New Zealand	U.S.A.
France	Norway	U.S.S.R.
Germany	Pakistan	

Three Member Bodies opposed the approval of the Draft:
Czechoslovakia, Italy, United Kingdom.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in February 1961, to accept it as an ISO RECOMMENDATION.

Mathematical Signs and Symbols for Use in the Physical Sciences and Technology

Introduction

This document, containing a selection of *mathematical signs and symbols* recommended for use in the physical sciences and technology, is part of a more comprehensive publication dealing with quantities and units in various fields of science and technology.

This publication is issued as ISO Recommendation R 31/Part I, Part II, etc.

Where several signs or symbols with the same meaning are given, they are on an equal footing.

No recommendation is made or implied about the fount of upright type in which certain mathematical symbols are printed. In this document the same fount is used as in the columns "Meaning" and "Remarks".

Some principles for printing symbols and numbers are given in ISO Recommendation R 31/Part XII *)

1. Arithmetic, algebra and analysis of real scalar quantities

Item No.	Sign or Symbol	Meaning	Remarks
1.1	$=$	equal to	It is recommended not to use this sign with the meaning "defined as equal to". Examples: On the basis of the equation $E = mc^2$, $1 \text{ g} \triangleq 9 \times 10^{20} \text{ erg}$ When 1 cm on a map corresponds to a length of 10 km one may write $1 \text{ cm} \triangleq 10 \text{ km}$ $\sim$ is also used $\propto$ is also used
1.2	$\neq$	not equal to	
1.3	$\equiv$	identically equal to	
1.4	$\triangleq$	corresponds to	
1.5	$\approx$	approximately equal to	
1.6	$\rightarrow$	approaches	
1.7	$\simeq$	asymptotically equal to	
1.8	$\sim$	proportional to	
1.9	∞	infinity	
1.10	$<$	smaller than	
1.11	$>$	larger than	
1.12	$\leq$	smaller than or equal to	
1.13	$\geq$	larger than or equal to	
1.14	$\ll$	much smaller than	
1.15	$\gg$	much larger than	
1.16	$+$	plus	

*) Draft ISO Recommendation No. 345