LIBRARY OF CONGRESS COLLECTIONS POLICY STATEMENTS

Mathematics
(Class QA)

Contents

I.   Scope

The overall context for this policy is the Library's position as the *de facto* national library of the United States. This Collections Policy Statement covers the subclass QA (Mathematics), with exception of major subset, QA75-QA76 (Computer Science), which is addressed in a separate Collections Policy Statement. Since the Library of Congress does not support a specific mathematical study or program, the collection includes a broad overview of titles that reflect the interests of both theoretical and applied mathematicians. Examples of mathematical studies covered under subclass QA are the following: analytical mechanics, elementary mathematics, geometry, mathematical logic, mathematical statistics, probabilities, numerical analysis, and number theory. Also represented are subjects on mathematical education, studying & teaching mathematics, history of mathematics, mathematical biographies, and bibliographies of mathematics (Z6651-Z6655). Works across multiple formats are collected, including print materials, electronic resources, audio-visual, and microform. Applied mathematical subjects that relate to Astronomy (QB), Business (HF/ HG), Engineering (T), Life Sciences (QH), and Physics (QC) are not addressed in this statement.

II.   Diverse and Inclusive Collecting Statement

As the nation's de facto national library, the Library of Congress strives to build an expansive, yet selective, collection that records the creativity of the United States and is reflective of the nation's diversity and complexity. The Library's mandate is to have collections that are inclusive and representative of a diversity of creators and ideas. A priority includes acquiring material of underrepresented perspectives and voices in the Library's collections to ensure diverse authorship, points of view, cultural identities, and other historical or cultural factors. The Library also seeks to build a research collection that comprises a globally representative sample of international materials that are diverse in voice and perspective, relative to their places of origin, further supporting the Library's mission to sustain and preserve a universal collection of knowledge and creativity for Congress and future generations.

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Diverse collecting is mentioned within many of the Library's Collections Policy Statements. In addition, the Library has adopted several specific collection policies in an effort to ensure it is building an inclusive and representative collection. For more information, see the Library's Collections Policy Statements on *Ethnic Materials*, *LGBTQIA+ Studies*, *Women's and Gender Studies*, *Independently Published and Self-Published Textual Materials*, *and Countries and Regions with Acquisitions Challenges*.

III. Research Strengths

A. General

The Library's mathematics collections include and are influenced by Thomas Jefferson's personal library, which he sold to Congress after the British burned the Capitol and congressional library in 1814. Jefferson was an avid student of mathematics and had an enormous impact on the promotion of the study of mathematics at West Point and the University of Virginia. He continued to study the subject far into his later years, writing in an 1812 letter that "mathematics was the passion of my life." Mathematical items from his collection cover a wide range of topics including fluxions, probability theory, and logarithms. Two notable items from Jefferson's collection are Luke Trevigar's *Sectionum conicarum elementa*... and Isaac Newton's *Arithmetica universalis*. Following in the steps of Thomas Jefferson, the Library recognizes the importance of mathematical education. This is reflected in a broad collection of titles on the various methods of studying and teaching of mathematics, including publications from the Association of Teachers of Mathematics, Mathematical Association of America, National Council of Teachers of Mathematics, and Education Resources Information Center (ERIC) reports.

Current and retrospective literature are central to the work of mathematicians, and the Library's mathematics collection reflects this view. In terms of size alone, the mathematics monograph and serial collections surpass that of any other library in the country. These numbers are augmented by mathematics holdings in the area studies, audio-visual, electronic, manuscript, microform, and special collections.

The importance of serial literature in the field of mathematics cannot be overemphasized. Through the years, the Library has received a steady influx of mathematical titles, ranging from important to obscure, and resulting in a large number of non-U.S. journal runs. One noteworthy example in the Library's collection is the *Journal für die reine und angewandte mathematik* by A. L. Crelle, thought to be the first published mathematical journal not published as a proceedings/transaction by an academy or learned society. The Library's holdings of this journal stretches back to its inception in 1826.

The Library's mathematics collection is particularly strong in non-English language materials, including indigenous languages. From its origins, mathematics advanced in many parts of the world: Indian numerals, Mayan sophisticated development of zero independent of the development in ancient Mesopotamia, Incan quipu, and Arab and Persian mathematicians who greatly influenced Early Modern European mathematicians. In mathematics particularly, a significant number of research publications are published in Russia, Japan, the Middle East, and Europe. Mathematics has long been a Russian specialty, and Russian mathematicians are considered to be among the best in the world. The Library is, therefore, fortunate to have an extensive collection of Russian mathematic serials and monographs.

Many of the cover-to-cover translations, which the Library secured through the legal requirements of the copyright deposit, may not be generally available elsewhere due to their prohibitive cost.

The Library possesses extensive holdings of publications from mathematical societies and academies and actively seeks materials from a large array of international institutions. Extensive runs of literature from international scientific societies such as the Royal Society of London, Académie des Sciences in Paris, the Akademie der Wissenschaften in Berlin, the Instituto de Matemática Pura e Aplicada in Brazil, and the Mathematical Society of Japan are acquired by the Library. Publications from the American Mathematical Society, the Moscow Mathematical Society, and the International Mathematical Union are also well represented in the Library's collection, with many items being unique to the Library of Congress, such as publications from smaller societies and organizations, including at the national level for non-U.S. countries. The Library also collects materials related to the International Mathematical Olympiad, an important competition for youth to test their math skills against students around the world.

The Library provides access to abstracting and indexing services in electronic format and full text databases. Electronic resources that are currently of interest to mathematics research include *Academic Search Complete*; *Chinamaxx Digital Libraries; ERIC*; *History of Science, Technology, and Medicine; IngentaConnect*; *JSTOR; J-Stage; Knovel*; *Project Euclid*; *ProQuest; REDALyC; SciELO;* and *Web of Science.*

B. Areas of Distinction
The Library's Rare Book and Special Collections Division holds important first editions of the works of many famous mathematicians and other seminal books in the field of mathematics. Among these are a copy of the first printed edition of Euclid's *Elements*, a work that has seen over a thousand subsequent editions. Archimedes' writings are represented by the *Opera, quae quidem extant, omnia,* of 1544, the first complete edition of his work. The Library holds a 1561 edition of *The Grounde of artes,* sometimes referred to simply as "Arithmetike" by Robert Recorde*,* which is cited as the most influential English mathematics textbook of the sixteenth century. In addition, the Library holds a first edition copy of Johann Rahn's *Teutsche algebra* (1569) which includes the first known printing of the modern division symbol ($\div$). The Library also holds an 1829 pamphlet on the Andean method of sophisticated knot-tying (quipu) as a form of mathematics and record keeping.

The Library possesses landmark works by prominent women mathematicians. Maria Gaetana Agnesi's *Instituzioni analitiche ad uso della gioventu' Italiana* (1748), the first surviving mathematical work written by a woman, is one such treasure. Important works by Mary Everest Boole, Emilie du Châtelet, Mary Somerville, and Emmy Noether also demonstrate the richness of the Library's mathematical collections.

Also of note is the Library's collection of the major works by influential mathematicians such as Sudhakara Dvivedi, Leonhard Euler, Carl Friedrich Gauss, Girolamo Cardano, Joseph-Louis Lagrange, José Luis Massera, William Oughtred, Srinivasa Ramanujan, Federico Villarreal, Karl Weierstrass, and Ahmad Muhammad Janājī.

One can also find unique mathematical material in the Library's area studies collections. A noteworthy example is the Asian Division's collection of Japanese traditional mathematics called *wasan,* which includes more than 400 rare titles produced between the 17th and 19th centuries.

More recent publications of note include resources authored by notable mathematicians Paul Erdős, Karen Uhlenbeck, Michael Atiyah, Ingrid Daubechies, and Cédric Villani. Of particular strength are developments in topology, quantum theory, and combinatorial optimization.

Another area of distinction is the collection of early American mathematics books and periodicals published before 1900. Among these is a copy of Isaac Greenwood's *Arithmetick vulgar and decimal: with the application thereof to a variety of cases in trade and commerce* (1729), which is credited as the first English mathematical textbook written and published in what is now the United States. A collection of Nicolas Pike's first edition (1788) and revisions (1797, 1798, 1804, 1809) of *A new and complete system of arithmetic, composed for the use of citizens of the United States* are also held by the Library. Among the Library's early American mathematical periodicals titles are the brief, but notable, runs of *Cambridge miscellany of mathematics, physics, and astronomy,* which is recognized as the first American mathematical periodical edited by scholars, and popular mathematical periodicals such as *Mathematical correspondent, Mathematical diary*, *Mathematical miscellany,* and *Mathematical monthly*. Other strong areas of note are the works of influential American mathematicians George Bruce Halsted, Eliakim Hastings Moore, R .L. Moore, and the papers of Oswald Veblen, which are held in the Manuscript Division.

IV. Collecting Policy

The Library collects in mathematics on a worldwide basis, primarily at the Research Level and acquires materials across multiple formats and in many languages. The "Copyright Best Edition" statement is used in conjunction with this policy to maintain the Library's collecting strengths in mathematics and to support the work of Congress, scholars, educators, and citizens throughout the country and the world. As more publications are issued digitally, the Library must ensure that all important and appropriate information is added to the collections and that the formats represented are maintained to assure continued access. As e-prints, podcasts, webcasts, and new technologies for creating mathematical material proliferate, they will be collected using the same criteria as for print acquisition. Other relevant collections policy statements at the Library of Congress include the *Dissertations and Theses Collections Policy Statement*, as well as Supplementary Guidelines noted in the following section.

V. Best Editions and Preferred Formats

For guidance regarding best editions for material acquired via the Copyright Office, see: http://copyright.gov/circs/circ07b.pdf.

For guidance regarding recommended formats for material acquired via all other means; e.g., purchase, exchange, gift and transfer, see: http://www.loc.gov/preservation/resources/rfs.

For information regarding electronic resources, open digital content, web archiving, and data sets, see the following Supplementary Guidelines: http://www.loc.gov/acq/devpol/electronicresources.pdf, https://www.loc.gov/acq/devpol/opencontent.pdf, http://www.loc.gov/acq/devpol/webarchive.pdf, and https://www.loc.gov/acq/devpol/datasets.pdf.

VI. Acquisition Sources

Whenever possible the Library attempts to acquire materials through non-purchase means, such as copyright, exchange, gift, or the Cataloging in Publication program. The Library of Congress collections are heavily dependent upon materials received through the copyright deposit provisions of U.S. copyright law (17 USC section 407 & 17 USC section 408). For copyright demand, the U.S. regulations allow for the Library to receive analog and some digital materials. When items are offered in both formats the Library's default is normally the Best Edition print version, unless the publisher has arranged a special relief agreement with the Copyright Office. For materials not available to the Library through copyright deposit, or other non-purchase means, the Library acquires materials through purchase. Purchase is used predominately for non-U.S. publications that are not widely available within the United States. The Library utilizes an array of traditional methods of library acquisition (firm orders, subscriptions, and approval plans) with vendors located in different areas of the world. In addition, the Library uses its six Overseas Operations Offices to broaden its acquisitions opportunities outside the United States.

VII. Collecting Levels

Meeting the Library's Diverse and Inclusive Collecting Statement (see Section II) and the collecting levels outlined below requires continual evaluation of the publishing landscape, sources of expression, current events, and socio-cultural trends to thus maintain effective collecting policies and acquisitions methods. Changes in publishing or in the creation of materials covered by this policy statement may necessitate collecting efforts not explicitly referenced here. Such efforts will be handled on a case-by-case basis while the Library evaluates the need for policy statement updates.

For materials corresponding to classifications QA1, QA21-QA29, and QA30.3-QA35, non-U.S. collecting levels are set to level 4. However, to address potential collection gaps of these materials from select regions or countries, the Library may seek and collect materials from these geographic areas at higher than research level.

Non-U.S. collecting levels are set lower than U.S. levels. However, these levels do not indicate the inherent importance or value of international collection materials, but provide a structure for the Library to focus limited resources.

For explanation of the Collecting Levels used by the Library, see
https://www.loc.gov/acq/devpol/cpc.html.

LC Classification	Subject	U.S. Levels	Non-U.S. Levels
QA1	Periodicals, societies, congresses, and serial publications	5	4
QA3	Collected works (Nonserial)	4	4

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LC Classification	Subject	U.S. Levels	Non-U.S. Levels
QA5	Dictionaries and encyclopedias	4	4
QA7	Addresses, essays, and lectures	4	4
QA8	Philosophy	4	4
QA8.7	Study and teaching, research	4	4
QA9-10.35	Mathematical logic, classical logical systems, non-classical formal systems, proof theory, fuzzy logic, model theory, matrix logic, algebraic logic, Boolean algebra, quantum logic	4	4
QA10.4	Information theory in mathematics	4	3
QA10.5	Mathematics as a profession, vocational guidance	2	2
QA11-QA20	Study and teaching, research	4	4
QA21-QA29	History and biography	5	4
QA30	Directories	4	4
QA30.3-QA35	Early works through 1800. Egyptian, Greek, Medieval	5	4
QA36-QA39.2	General works, comprehensive treatise, textbooks	4	3
QA40	Handbook, manuals, etc.	4	4
QA40.5	Juvenile works	3	2
QA41-43	Formulas, notation, abbreviations, and problems	3	3
QA47-QA59	Tables	4	3
QA63-74	Problem solving, instruments and machines	3	3
QA77-93	Miscellaneous geometrical instruments	3	2
QA93-99	Popular works, mathematical recreations, miscellany and curiosa	4	4
QA101-QA119	Elementary mathematics, arithmetic, counting, fractions, roots	3	2
QA135-150	Study and teaching, numeration	4	3
QA150-162	Algebra	4	3

LC Classification	Subject	U.S. Levels	Non-U.S. Levels
QA164-271	Combinatorics, graph theory, group theory, matrices, theory of equations, number theory, set theory, game theory	4	4
QA273-QA280	Probabilities, Stochastic process, statistics	4	4
QA281-295	Interpolation, sequences, series	4	3
QA297-433	Numerical analysis, foundations, calculus, theory of functions, differential equations	4	4
QA440-QA608	Geometry	4	4
QA609-699	Topology, infinitesimal geometry, convex geometry, discrete geometry, differential geometry, foundations of geometry	4	4
QA801-939	Analytic mechanics	4	3
Z6651-Z6655	Bibliography	4	4

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