MATH 1C03: Introduction to Mathematical Reasoning

Research in Mathematics

PRESENTED BY

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I. Researching in Mathematics

1. Steps in Researching a Topic

   a) Get background information from handbooks, encyclopedias, dictionaries
      Note any synonyms that can be used in searching further
      Note any specific aspect of your topic in order to narrow your topic
      Note any references to search in the Library Catalogue

   b) Find books on your topic to gain greater depth and understanding
      Note any synonyms that can be used in searching further
      Note any specific aspect of your topic in order to narrow your topic further
      Note any references to search in the Library Catalogue

   c) Once your topic is narrowly defined, select databases to find specific articles that have
      been published in journals

   d) Write down or store all the references you have consulted to include them in your
      bibliography of your research paper (e.g., Refworks)

2. Finding Resources

   Encyclopedias, handbooks, dictionaries
   - McGraw-Hill Encyclopedia of Science and Technology 20 v. (Thode Ref. Q 121 M3)
   - Encyclopaedia of Mathematics (Thode Ref. QA 5 .M3713)
   - Dictionary of Scientific Biography 18 vols. (Thode Ref. Q 141 D 5)

   Search Library Catalogue; use “in Subject” index
   - mathematics encyclopedias
   - mathematicians biography
   - scientists biography dictionaries

   Books
   - Search Library Catalogue; use “in Subject” index
   - fermats last theorem

   Databases: these are resources to locate articles published in journals, conference
   proceedings, etc., on a particular topic
   - There are general science databases:
     - Science Citation Index Expanded (Web of Science)

   and subject specific databases
   - Mathematics
     - Jahrbuch über die Fortschritte der Mathemtik (1868-1942)
MathSciNet
Statistical Theory and Method Abstracts –
Zentralblatt (STMA-Z)
Zentralblatt für Mathematik und Ihre Grenzgebiete
THODE 2nd floor, ZQA 1 Z4 – 1931-1995)

Mathematical Physics/Physics  Inspec (Engineering Village 2)

Search Library Catalogue:
by the title of the database “in Title” index:
e.g. mathscinet
by subject “in Subject” index:
e.g. mathematics indexes
browse "Find Articles" for other databases

II. Types of scientific literature
1. scholarly versus popular
   a) types of scholarly:
      primary/origina
         journal articles
         conference papers
         pre-prints on arXiv
         dissertations/theses

      secondary
         review articles
         books (monographs)
         encyclopedias/handbooks/dictionaries

      tertiary
         databases (indexes/abstracts)
         bibliographies
         guide to literature

   b. popular
      magazines
      newspapers
      blogs
      Facebook/Second Life
      Wikipedia

2. Characteristics of scholarly journal articles
   a) prior to publication, articles are subjected to the peer-reviewed process; in
other words, they are refereed by researchers in the field at hand (peers) with regard to quality and importance of contribution on published articles indicated with "received on..."; "accepted for publication on..."

Sources for determining peer-reviewed journal articles:
Section on "Information to authors" in the journal Ulrichsweb – accessible through Library Catalogue

b) research aimed at specific groups; if research is new, articles are referred to as primary or original; if evaluation/analysis/state of the art of research is presented, articles are referred to as review articles, which are scholarly, but not original/primary

c) follow particular format (abstract, introduction, methods, discussion, conclusion)

d) references

e) acknowledgement (for financial support, technical assistance, personal assistance)

f) affiliation/credentials

3. Evaluating Print and Web Resources

Similar criteria apply to print and web resources:

a) Authority: authors' names, indication of credentials, such as occupation, degree, institution (commercial versus educational)

b) Content: can the subject matter be quickly determined? research, opinion, fact, bias, advertisement are statements/claims verifiable through listed references popular, academic/scholarly, technical, clinical comprehensive, selective, overview

c) Currency: date of publication date of update (new edition for print)

III. References/Citations

1. Reasons for References/Citations
Whenever you use information that is not your own whether in print or from the web, you have to give the source where you found it. This is referred to as Citations or References or Bibliography (last being arranged alphabetically by author). Sources are cited in order:
   a) to acknowledge the work of others
   b) to allow readers to obtain full reference
   c) to show development of an idea

2. Citation Styles

The basic elements of a citation include:
   For a book: Author(s)
   Title of book
   Edition (if given)
   Place of publication : Publisher, year of publication

   Fleischner, H. *Eulerian Graphs and Related Topics.*

   For an article: Author(s)
   Title of article
   Title of journal, year, volume no., pages

   2008 21 (1): 171-234

3. Resources on citation styles

   *Chicago-Style Citation Quick Guide*

   *Council of Biology Editors (CBE) Style of Documentation in Science and Mathematics*

   *How to Cite Your Sources in Chicago Style: Documentation Type Author-Date System / Bailey/Howe Library Reference*
   [http://library.uvm.edu/guides/cite/handouts/ChicagoScientific.pdf](http://library.uvm.edu/guides/cite/handouts/ChicagoScientific.pdf)

   *MRef / American Mathematical Society*
   [http://www.ams.org/mref](http://www.ams.org/mref)
   This site will reformat a reference according to the style used in MathSciNet
IV. Guides to Writing in Mathematics

_Handbook of Writing for the Mathematical Sciences_
Thode Bookstacks: QA 42. H54 1993
Guide to specific requirements in the writing of mathematics, stylistic and grammatical usage

_Mathematical publishing: a Guidebook_
Thode Reference QA 42 .K727 2005
Guide to publishing in books, journals and to copyright issues
