

# Why Mathematics Is a Language

Mathematics is called the language of science. Italian astronomer and physicist [Galileo Galilei](#) is attributed with the quote, "*Mathematics is the language in which God has written the universe.*" Most likely this quote is a summary of his statement in *Opere Il Saggiatore*:

[The universe] cannot be read until we have learnt the language and become familiar with the characters in which it is written. It is written in mathematical language, and the letters are triangles, circles and other geometrical figures, without which means it is humanly impossible to comprehend a single word.

Yet, is mathematics truly a language, like English or Chinese? To answer the question, it helps to know what language is and how the vocabulary and grammar of mathematics are used to construct sentences.

## Key Takeaways: Why Math is a Language

- In order to be considered a language, a system of communication must have vocabulary, grammar, syntax, and people who use and understand it.
- Mathematics meets this definition of a language. Linguists who don't consider math a language cite its use as a written rather than spoken form of communication.
- Math is a universal language. The symbols and organization to form equations are the same in every country of the world.

## What Is a Language?

There are multiple definitions of "[language](#)." A language may be a system of words or codes used within a discipline. Language may refer to a system of communication using symbols or sounds. [Linguist](#) Noam Chomsky defined language as a set of sentences constructed using a finite set of elements. Some linguists believe language should be able to represent events and abstract concepts.

Whichever definition is used, a language contains the following components:

- There must be a **vocabulary** of words or symbols.
- **Meaning** must be attached to the words or symbols.
- A language employs **grammar**, which is a set of rules that outline how vocabulary is used.
- A **syntax** organizes symbols into linear structures or propositions.
- A **narrative** or discourse consists of strings of syntactic propositions.
- There must be (or have been) a group of people who use and understand the symbols.

Mathematics meets all of these requirements. The symbols, their meanings, syntax, and grammar are the same throughout the world. Mathematicians, scientists, and others use math to communicate concepts. Mathematics describes itself (a field called meta-mathematics), real-world phenomena, and abstract concepts.

## Vocabulary, Grammar, and Syntax in Mathematics

# Language In Mathematics

**Lindiwe Tshuma**



## **Language In Mathematics:**

**The Language of Mathematics** Keith Devlin, 2000-03-13 Taking the reader on a wondrous journey through the invisible universe that surrounds us a universe made visible by mathematics Devlin shows us what keeps a jumbo jet in the air explains how we can see and hear a football game on TV and allows us to predict the weather the behavior of the stock market and the outcome of elections Microwave ovens telephone cables children's toys pacemakers automobiles and computers all operate on mathematical principles Far from a dry and esoteric subject mathematics is a rich and living part of our culture

**Language in Mathematical Education** Kevin Durkin, Beatrice Shire, 1991 Concerned with various aspects of language in mathematics education this book aims to reveal some of the ambiguities and complexities in the way language is used in the mathematics curriculum It aims to present current perspectives and review key issues in mathematics education

**The Language of Mathematics** Mohan Ganesalingam, 2013-03-14 The Language of Mathematics was awarded the E W Beth Dissertation Prize for outstanding dissertations in the fields of logic language and information It innovatively combines techniques from linguistics philosophy of mathematics and computation to give the first wide ranging analysis of mathematical language It focuses particularly on a method for determining the complete meaning of mathematical texts and on resolving technical deficiencies in all standard accounts of the foundations of mathematics The thesis does far more than is required for a PhD it is more like a lifetime's work packed into three years and is a truly exceptional achievement Timothy Gowers

**The Language of Mathematics** Robert L. Baber, 2011-09-09 A new and unique way of understanding the translation of concepts and natural language into mathematical expressions Transforming a body of text into corresponding mathematical expressions and models is traditionally viewed and taught as a mathematical problem it is also a task that most find difficult The Language of Mathematics Utilizing Math in Practice reveals a new way to view this process not as a mathematical problem but as a translation or language problem By presenting the language of mathematics explicitly and systematically this book helps readers to learn mathematics and improve their ability to apply mathematics more efficiently and effectively to practical problems in their own work Using parts of speech to identify variables and functions in a mathematical model is a new approach as is the insight that examining aspects of grammar is highly useful when formulating a corresponding mathematical model This book identifies the basic elements of the language of mathematics such as values variables and functions while presenting the grammatical rules for combining them into expressions and other structures The author describes and defines different notational forms for expressions and also identifies the relationships between parts of speech and other grammatical elements in English and components of expressions in the language of mathematics Extensive examples are used throughout that cover a wide range of real world problems and feature diagrams and tables to facilitate understanding The Language of Mathematics is a thought provoking book of interest for readers who would like to learn more about the linguistic nature and aspects of mathematical notation

The book also serves as a valuable supplement for engineers technicians managers and consultants who would like to improve their ability to apply mathematics effectively systematically and efficiently to practical problems *The Language of Mathematics* Bill Barton,2007-12-24 The book emerges from several contemporary concerns in mathematics language and mathematics education However the book takes a different stance with respect to language by combining discussion of linguistics and mathematics using examples from each to illustrate the other The picture that emerges is of a subject that is much more contingent much more relative much more subject to human experience than is usually accepted Another way of expressing this is that the thesis of the book takes the idea of mathematics as a human creation and using the evidence from language comes to more radical conclusions than most writers allow *Language Practices in School Mathematics* Anne P. Chapman,2003 With a view to contributing to understanding the nature and role of language in mathematics education this book examines spoken language practices The book demonstrates that learning mathematics is very much a matter of learning to speak properly There is a pervasive and continual requirement often hidden in everyday classroom practices to shift towards increasingly mathematical language The outcomes of the research reported here affirm the value of viewing language and mathematics learning from a social semiotic perspective and help further our understandings about the construction of a social semiotic theory of classroom education both in school mathematics and across the curriculum

Language and Communication in Mathematics Education Judit N. Moschkovich,David Wagner,Arindam Bose,Jackeline Rodrigues Mendes,Marcus Schütte,2018-03-27 This book considers some of the outstanding questions regarding language and communication in the teaching and learning of mathematics an established theme in mathematics education research which is growing in prominence Recent research has demonstrated the wide range of theoretical and methodological resources that can contribute to this area of study including those drawing on cross disciplinary perspectives influenced by among others sociology psychology linguistics and semiotics Examining language in its broadest sense to include all modes of communication including visual and gestural as well as spoken and written modes it features work presented and discussed in the Language and Communication topic study group TSG 31 at the 13th International Congress on Mathematical Education ICME 13 A joint session with participants of the Mathematics Education in a Multilingual and Multicultural Environment topic study group TSG 32 enhanced discussions which are incorporated in elaborations included in this book Discussing cross cutting topics it appeals to readers from a wide range of disciplines such as mathematics education and research methods in education multilingualism applied linguistics and beyond **The Language of Mathematics** M. Evans Munroe,1960 Classroom Research on Mathematics and Language Núria Planas,Candia Morgan,Marcus Schütte,2021-03-22 This book offers an international perspective on the current and future state of the research focusing in particular on the role and use of language in mathematics school teaching and learning It focuses on the development of a unified view of the languages of the learners of the teachers and of mathematics by considering the role of language in the

learning teaching and doing of mathematics in the classroom and the current richness and plurality of language and culture The contributions in this volume combine to show how views of language and of language research in mathematics education have changed significantly in recent decades and how they will continue to change and become even more complex and challenging in the era of diversity All of these contributions by leading scholars are grouped into two sections for emphasis on issues of Theorising the complexity of language in mathematics teaching and learning Opening spaces of learning with mathematics classroom research on language This book will be of great interest to mathematics teachers teacher educators curriculum developers and mathematics education researchers who deal with the study and implementation of pedagogies of mathematics teaching and learning specifically in regions of the world which are culturally and sociolinguistically diverse

**Language and Mathematics** Marcel Danesi, 2016-06-06 This book explores the many disciplinary and theoretical links between language linguistics and mathematics It examines trends in linguistics such as structuralism conceptual metaphor theory and other relevant theories to show that language and mathematics have a similar structure but differential functions even though one without the other would not exist Mathematics Education and Language Diversity Richard

Barwell, Philip Clarkson, Anjum Halai, Mercy Kazima, Judit Moschkovich, Núria Planas, Mamokgethi Setati-Phakeng, Paola Valero, Martha Villavicencio Ubillús, 2015-11-25 THIS BOOK IS AVAILABLE AS OPEN ACCESS BOOK ON SPRINGERLINK This book examines multiple facets of language diversity and mathematics education It features renowned authors from around the world and explores the learning and teaching of mathematics in contexts that include multilingual classrooms indigenous education teacher education blind and deaf learners new media and tertiary education Each chapter draws on research from two or more countries to illustrate important research findings theoretical developments and practical strategies This open access book examines multiple facets of language diversity **Language, mathematics, and**

**linguistics** Charles F. Hockett, 2019-01-29 No detailed description available for Language mathematics and linguistics

The Language Issue in the Teaching of Mathematics in South Africa Lindiwe Tshuma, 2021-01-26 The book is the result of a five year project that culminated within the first three years in doctoral research interrogating language competency for meaningful mathematics instruction at upper primary level conducted at University of Stellenbosch in 2017 and this book in the succeeding two years The initial research project received countrywide coverage in several South African media outlets including Times Live and Radio 2000 Structure of Language and Its Mathematical Aspects, 1961 **Encyclopedia of**

**Mathematics Education** Louise Grinstein, Sally I. Lipsey, 2001-03-15 This single volume reference is designed for readers and researchers investigating national and international aspects of mathematics education at the elementary secondary and post secondary levels It contains more than 400 entries arranged alphabetically by headings of greatest pertinence to mathematics education The scope is comprehensive encompassing all major areas of mathematics education including assessment content and instructional procedures curriculum enrichment international comparisons and psychology of

learning and instruction      **The Language of Mathematics** Patrick M. Jenlink, 2020-02-04 The Language of Mathematics How the Teacher's Knowledge of Mathematics Affects Instruction introduces the reader to a collection of thoughtful works by authors that represent current thinking about mathematics teacher preparation The book provides the reader with current and relevant knowledge concerning preparation of mathematics teachers The complexity of teaching mathematics is undeniable and all too often ignored in the preparation of teachers with substantive mathematical content knowledge and mathematical teaching knowledge That said this book has a focus on the substantive knowledge and the relevant pedagogy required for preparing teachers to enter classrooms to teach mathematics in K 12 school settings Each chapter focuses on the preparation of teachers who will enter classrooms to instruct the next generation of students in mathematics Chapter One opens the book with a focus on the language and knowledge of mathematics teaching The authors of Chapters Two Nine present field based research that examines the complexities of content and pedagogical knowledge as well as knowledge for teaching Each chapter offers the reader an examination of mathematics teacher preparation and practice based on formal research that provides the reader with insight into how the research study was conducted as well as providing the findings and conclusions drawn with respect to mathematics teacher preparation and practice Finally Chapter 10 presents an epilogue that focuses on the future of mathematics teacher preparation      **Teaching and Learning Mathematics in**

**Multilingual Classrooms** Anjum Halai, Philip Clarkson, 2015-12-17 Contemporary concerns in mathematics education recognize that in the increasingly technological and globalized world with concomitant change in population demographics e g immigration urbanization and a change in the status of languages e g English as a dominant language of science and technology multilingualism in classrooms is a norm rather than an exception Shifts in perspective also view language not simply as an instrument for cognition with all learners equipped with this instrument in service of learning although clearly in the classroom that remains of importance Rather it is now also being acknowledged that language use is inherently political so that the language that gets official recognition in the classroom is invariably the language of the powerful elite or the dominant societal language or in the case of post colonial contexts the language of the colonisers From this socio political role of language in learning quite different issues arise for teaching learning and curriculum for linguistically marginalized learners than that of cognition e g immigrants second language learners other Policies on language in education are being considered and re considered with specific reference to mathematics teaching and learning Given the policy environment globally the proposed publication is timely This edited collection draws on recent emerging insights and understandings about the approaches to improving policy and practice in mathematics education and mathematics teacher education in multilingual settings It presents and discusses critically examples of work from a range of contexts and uses these examples to draw out key issues for research in education in language diverse settings including teaching learning curriculum and fit these with appropriate policy and equity approaches With contributions from all over the world especially novice researchers

in low income countries this book is a valuable resource for courses in Mathematics Education and related social sciences both at the graduate and undergraduate levels as well as for students of international development     Collaborating to Meet Language Challenges in Indigenous Mathematics Classrooms Tamsin Meaney, Tony Trinick, Uenuku Fairhall, 2011-10-03

Language can be simultaneously both a support and a hindrance to students learning of mathematics When students have sufficient fluency in the mathematics register so that they can discuss their ideas they become chiefs who are able to think mathematically However learning the mathematics register of an Indigenous language is not a simple exercise and involves many challenges not only for students but also for their teachers and the wider community Collaborating to Meet Language Challenges in Indigenous Mathematics Classrooms identifies some of the challenges political mathematical community based and pedagogical to the mathematics register faced by an Indigenous school in this case a M ori immersion school It also details the solutions created by the collaboration of teachers researchers and community members     *The Language of Mathematics* Lauris Weber, 2003 Innovative teaching material on the language of mathematics This teacher s resource includes photocopyable vocabulary tests at the end of each unit test solutions and blackline masters for mathematics games e g dominoes card and board games bingo and more     The Mathematical Theory of Context Free Languages Seymour Ginsburg, 1966

## Unveiling the Power of Verbal Artistry: An Mental Sojourn through **Language In Mathematics**

In a world inundated with displays and the cacophony of immediate interaction, the profound power and psychological resonance of verbal beauty often fade in to obscurity, eclipsed by the regular onslaught of sound and distractions. However, located within the musical pages of **Language In Mathematics**, a charming perform of literary elegance that impulses with raw emotions, lies an remarkable trip waiting to be embarked upon. Published by way of a virtuoso wordsmith, this exciting opus instructions viewers on a mental odyssey, softly exposing the latent possible and profound influence stuck within the complex internet of language. Within the heart-wrenching expanse of this evocative examination, we shall embark upon an introspective exploration of the book is central styles, dissect their captivating writing style, and immerse ourselves in the indelible impression it leaves upon the depths of readers souls.

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