

# ESSENTIAL ARITHMETICA

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## A BRIEF OVERVIEW

The aim of the current presentation is to outline and illustrate the very essentials of Pythagorean Arithmetic as well as to mathematically reproduce and possibly extend some major parts of the treatise **INTRODUCTION TO ARITHMETIC** written by **Nicomachus of Gerasa**.

Nicomachus' treatise **INTRODUCTION TO ARITHMETIC** had remained the standard text of higher arithmetic for over ten centuries mainly due to its clearness, conciseness, compendiousness, orderly arrangement and adaptability for scholastic use. In fact, it has been included in Volume 11 of the **GREAT BOOKS OF THE WESTERN WORLD** [0] together with The Thirteen Books of Euclid's Elements and The Works of Archimedes.

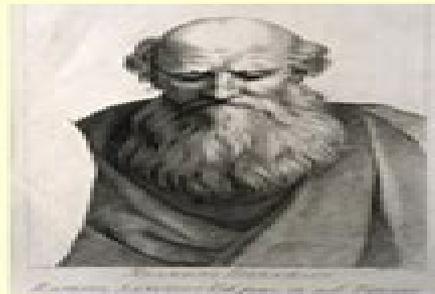
Title of the treatise in classical Greek: **ΝΙΚΟΜΑΧΟΥ ΓΕΡΑΣΗΝΟΥ ΠΥΘΑΓΟΡΕΪΚΟΥ ΑΡΙΘΜΗΤΙΚΗ ΕΙΣΑΓΩΓΗ** [1]

Title of the treatise in Latin: **NICOMACHI GERASENI PYTHAGOREI INTRODUCTIONS ARITHMETICA** [2] A Latin translation by Lucius Apuleius (c. 124–170) is lost, but a version by Anicius Boethius (c. 470–524) survived and was extensively used in schools up to the Renaissance.

Title of the treatise in English: **INTRODUCTION TO ARITHMETIC BY NICOMACHUS OF GERASA**, Translator: Martin Luther D'Ooge [3]

For (a) the programming and the tabulation of integer solutions to equations, (b) all relevant graphics and (c) the very same article's editing, extensive use was made of the technical computing software **MATHEMATICA** [4].

## NICOMACHUS OF GERASA



NICOMACHUS GERASENUS  
ΝΙΚΟΜΑΧΟΣ ΓΕΡΑΣΗΝΟΣ Engraving by an. P. Fischer

**NOTE:** Raffaello Sanzio da Urbino (1483-1520), now generally known in English as **Raphael**, was an Italian painter and architect of the High Renaissance, greatly influenced by Michelangelo and Leonardo da Vinci. His work is admired for its clarity of form, ease of composition, and visual achievement of the Neoplatonic ideal of human grandeur.

### On the Life of Nicomachus

History has been most unkind to Nicomachus of Gerasa, author of the *Introduction to Arithmetic*: During his lifetime he enjoyed, apparently, the highest reputation as a mathematician, and after his death he continued to be studied, directly or indirectly, by generation after generation, yet scarcely a word has come down to us to tell what sort of man he was, or where he lived, and under what circumstances, or even what were the years of his birth and death.

Nicomachus is referred to as a Gerasene. The most prominent city having the name Gerasa was located in Palestine, in the Decapolis, some thirty miles southeast of the Lake of Tiberias. Nicomachus's lived somewhere between the middle of the first century and the middle of the second century after Christ.

# Essential Arithmetic

**Marcel A. Müller**



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## **Table of Contents Essential Arithmetic**

1. Understanding the eBook Essential Arithmetic
  - The Rise of Digital Reading Essential Arithmetic
  - Advantages of eBooks Over Traditional Books
2. Identifying Essential Arithmetic
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Essential Arithmetic
  - User-Friendly Interface
4. Exploring eBook Recommendations from Essential Arithmetic
  - Personalized Recommendations
  - Essential Arithmetic User Reviews and Ratings
  - Essential Arithmetic and Bestseller Lists
5. Accessing Essential Arithmetic Free and Paid eBooks
  - Essential Arithmetic Public Domain eBooks
  - Essential Arithmetic eBook Subscription Services
  - Essential Arithmetic Budget-Friendly Options
6. Navigating Essential Arithmetic eBook Formats
  - ePub, PDF, MOBI, and More
  - Essential Arithmetic Compatibility with Devices
  - Essential Arithmetic Enhanced eBook Features
7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Essential Arithmetic
  - Highlighting and Note-Taking Essential Arithmetic
  - Interactive Elements Essential Arithmetic
8. Staying Engaged with Essential Arithmetic

- Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Essential Arithmetic
9. Balancing eBooks and Physical Books Essential Arithmetic
    - Benefits of a Digital Library
    - Creating a Diverse Reading Collection Essential Arithmetic
  10. Overcoming Reading Challenges
    - Dealing with Digital Eye Strain
    - Minimizing Distractions
    - Managing Screen Time
  11. Cultivating a Reading Routine Essential Arithmetic
    - Setting Reading Goals Essential Arithmetic
    - Carving Out Dedicated Reading Time
  12. Sourcing Reliable Information of Essential Arithmetic
    - Fact-Checking eBook Content of Essential Arithmetic
    - Distinguishing Credible Sources
  13. Promoting Lifelong Learning
    - Utilizing eBooks for Skill Development
    - Exploring Educational eBooks
  14. Embracing eBook Trends
    - Integration of Multimedia Elements
    - Interactive and Gamified eBooks

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