

Ratiocination: The Relevance of Algebra to the Nursing Student and Practitioner

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Received: July 10, 2020; **Published:** August 31, 2020

DOI: 10.31080/ecnh.2020.02.00083

Abstract

Ratiocination is the process of logical reasoning or rational thought. Algebra is crucial in developing and enhancing logical thinking. It is applied in various disciplines to solve specific problems by seeking logical solutions and conclusions. Algebra is used extensively in the business and financial sectors. It is also widely used in the fields of engineering, construction, and planning, as well as daily life. In medicine and nursing, algebra, algebraic concepts and principles, and logical thinking are fundamental. Thus, a solid foundation in algebra for the nursing student is essential. From its origins in antiquity, algebra has grown to be a vital subject of study for the nursing student, and is indispensable to nursing practice.

Keywords: *Algebra; Logical Thinking; Nursing; Pharmacology; Ratiocination; Statistics*

Introduction

Overview of algebra

Algebra is a division of mathematics that uses symbols to solve equations and mathematical problems. It is a field that deals with logical thinking by finding undefined variables and solving for their solutions [1]. Algebra has grown to acquire a wide range of applications in various disciplines, including engineering, science, business, sports, and medicine. Algebra is fundamental in forging and honing the skill of ratiocination. Studying algebra is crucial in enhancing logical thinking where a problem is first broken down, and the solution is found. Algebra is fundamental in forging and honing the skill of ratiocination.

History and development of algebra

Algebra, as a field of mathematics, originated in ancient Egypt. Scholars also attribute the origin of algebra to the Babylonians who were more advanced and opened doors for widespread use of algebra in daily activities. Muhammad Ibn Musa al-Khwarizmi was a Muslim mathematician associated with the origin and development of algebra [2]. Scholars state that the term "algebra" was derived from Muhammad's book titled, *Kitab al-Jabr*. His contributions to algebra were documented in the book, *The Compendious Book on Calculation by Completion and Balancing*. In the book, Muhammad discussed several algebraic concepts, such as solving polynomial, quadratic, linear, and simultaneous equations [3]. He also provided practical solutions to various problems, such as the distribution of land, allotment of salaries, and inheritance rules. Owing to the contributions of algebra, Muhammed is popularly known as the "father of algebra".

Another key figure associated with the development of algebra is Omar Khayyam. He was an Arabic mathematician who developed the field of algebra by writing books solving practical problems and equations. His significant contributions included solving cubic equations up to the third degree, an aspect that is still studied today. Algebra continued to develop even more in the 16th and 17th centuries giving rise to modern algebra.

Discussion

Daily applications of algebra

Algebra developed to gain widespread use in daily life in ancient history, which has also been adopted in the modern era. It uses equations to describe relationships between variables [4]. Algebra is applied in various disciplines to solve a particular problem while seeking to acquire a solution. It is a field that applies to all areas of our daily lives ranging from work, shopping, and school.

The dependence on and utilization of basic algebra principles cannot be overlooked in daily activities, such as purchasing items online or at a local store, buying gas for the car at the petrol station, managing the household account, and even home cooking. The seemingly simple process of preparing a family meal or baking a cake can require logic learned through the study of algebra and algebraic methods

and operations.

Professional applications of algebra

Algebra has gained extensive use in the business and financial sectors. A business owner will apply algebraic equations when calculating the losses or profits incurred by the business. It is also used to calculate the rate of value loss of a particular product that is in stock. In the financial or banking sector, algebra is used in calculating interest rates on loans, exchange rates in stock markets, and predicting risks [5]. All of these calculations are represented algebraically from which a solution is determined.

Algebra is also widely used in the field of engineering, construction, and planning. For instance, in construction, algebraic equations are used to ensure the safe and successful completion of projects, such as buildings. Electrical, civil, and mechanical engineering use algebra to measure and obtain dimensions of different structures and objects. Algebra also offers formulas used by engineers and architects to solve unknown variables [5]. Engineering deals with various concepts, such as circuit designs and fluid mechanics. Algebra is used to solve variable equations, such as complex polynomial expressions, vectors, matrices, and other mathematical representations.

Medical applications of algebra

In nursing (and in the medical profession as a whole), algebra, algebraic concepts and principles, and logical thinking are vital. A solid foundation in algebra for the nursing student (and practitioner) is essential. Algebra and algebraic principles will be applied in various courses, such as chemistry, microbiology, informatics, statistics, management, pharmacology and toxicology, genetics, molecular therapeutics, nutrition, and various electives and other courses depending on the degree program (i.e., CNA, LPN, RN, APRN, ADN, BSN, MSN, DNP, and others based on the country, college, and accreditation).

Conclusion

From its early beginnings in ancient Egypt, algebra has grown to be a vital subject of study. It is woven into the fabric of modern lives as well as nursing curriculum and practice. Algebra is a valuable subject of study for the development of logical thinking and reasoning.

Conflict of Interest Statement

The authors declare that this paper was written in the absence of any commercial or financial relationship that could be construed as a potential conflict of interest.

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Volume 2 Issue 9 September

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