

# The Application Study of Mathematics Equation in Senior Middle School

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**How to cite this paper:** Zhuolin Mao. (2022) The Application Study of Mathematics Equation in Senior Middle School. *Journal of Applied Mathematics and Computation*, 6(4), 450-453. DOI: 10.26855/jamc.2022.12.006

**Received:** October 28, 2022

**Accepted:** November 24, 2022

**Published:** December 21, 2022

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## Abstract

Equation thinking is an important thinking method in high school mathematics study. It is necessary to apply equation thinking to solve problems such as functions, trigonometry, solid geometry, and sequence of numbers. It is a problem worthy of study. When applying the idea of functions and equations in the process of solving problems, students' should avoid falling into the "identity" situation. Only when students' can deeply understand functions and equations in the process of solving problems can students' improve the efficiency and accuracy of solving mathematical problems. Firstly, this paper organizes and analyzes the research on mathematical equations in high school, and sorts out the knowledge points that reflect mathematical ideas in high school mathematics textbooks to understand the presentation of mathematical ideas in equation learning. Secondly, to understand the current situation of high school students applying mathematical ideas to solve equation problems. Combining with classroom practice, it aims at understanding the current situation of high school students applying mathematical ideas to solve equation problems through putting forward strategies and methods for penetration and application of mathematical ideas in equation study.

## Keywords

Equation thought, High school mathematics, Mathematics practice

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## Introduction

Mathematical thought is the result of the real space and the quantity relation reflected in the human consciousness, which is generated by the thinking activity. Mathematics thought is the basic knowledge that comes from the generalization of mathematical facts. During the training, the students' math ability and learning efficiency will be greatly improved. Meanwhile, knowledge will be transferred and the nature of the problem will be revealed. Mathematics thinking is a key component in the solution of mathematics research. Thought is his soul. Grasp the mathematical concept also grasp the essence of mathematics. Equation thinking is of great importance in senior math problem solving [1]. Therefore, this thesis will do some research into the penetration and application of equation thinking in senior middle school, which will offer some reference.

### 1. Mathematical thought

Mathematics thought is abstract, not as intuitive as mathematics knowledge, but the application of mathematics theory can help us to understand the nature of mathematics more deeply, and mathematics ability will be greatly enhanced. Mathematics thought is a reflection of people's understanding of mathematics, and it controls the practice of mathematics directly. Mathematical thinking is embodied in the comprehension of any mathematical facts, the mastery of mathematical concepts, the application of mathematics methods, and the establishment of mathematical theory [2].

## 2. Application of Equation Thought in Solving Mathematical Problems in Senior Middle School

In senior high school, the theory of equation has been widely applied to solving problems, for example, the sequence of numbers, trigonometric functions, solid geometry, and so on. But for us, it is hard to find the equivalent relation in the solution, and the solution of the equation is complicated. In the meantime, the computation load is very big, and it is more difficult to analyse the relation between the known and the unknown, and it is more difficult to calculate the precision [3]. Mastering and using equation thinking flexibly can reveal the nature of the problem, and enhance the comprehension of mathematics knowledge.

## 3. Infiltration and Application of Mathematical Ideas in Education Study

Function and equation are important knowledge in senior high school, and the related content and the solution method have permeated into many aspects of learning, so they have become focus of the college entrance exam. The establishment of the function relation is the expression of the change tendency of the quantity relation among the variables in the problem condition [4]. For example, in the basic one-variable linear function, there are two variables, which are independent and dependent, and 2 is a coefficient, which means that it varies with the change of the function. In fact, the change of "variable representation" is a further development of functional thinking. In learning process, without obsessed with the traditional way of thinking, we will have a deeper understanding of the process of function by practicing our thinking and gradually form functional thinking.

## 4. Infiltration and Application of Mathematical Thought in Equation Research

The key point in solving equation problems is to comprehend and apply the new knowledge. In the Course of proving formula and theorem, it penetrates the theory of equation to deduce and prove, and displays the process of exploring and deducing.

### 4.1 Improving knowledge and applying it

The concept of equations is implicit in the mathematical concepts, theorems and formulas. It is necessary for students to carefully study and dig deeply into their knowledge in order to better understand how the knowledge is generated. In this paper, students' discuss how to combine the equations with the new knowledge: (1) The root of equation and the zero of function are mandatory in the process of introducing the concept of function zero [5]. As a high student, learn to master establishing the relationship between the function and the equation through images, the property of the function, the root of the equation, and the other existing knowledge and experience. (2) The linear equation establishes the relation between the horizontal and the vertical. Geometrically, it is a binary linear equation, i. e. a binary linear equation. An equation is a definite straight line on the rectangular coordinate plane. From the point of view of the equation, the geometric problem is solved by the algebraic method. The rectangle coordinate system is the bridge between the equation and the straight line.

In the application of new knowledge, the combination of the problem analysis and the equation idea can help the students to understand and apply knowledge better. The process of applying equation concept has two critical steps, namely modeling and reduction. An equivalent relation can be constructed by modeling, and simplified by reduction. This paper discusses how to use new knowledge in combination with equation thinking by using integration, difference and different products. The purpose of this paper is to examine the application of triangles and difference equations, and to make use of the idea of exchanging elements to solve the binary linear equation system. While it is difficult to understand this equation at the beginning of the learning process, the practice can help us to think positively about learning equations, improve the understanding of equations, and apply them to certain mathematical subjects. The long-term penetration of equation concept trains their consciousness of setting elements, and makes full use of the known conditions in the problem to build equivalent relations. We should practice the ability to solve problems by using equation thinking, deepening the reasoning logic of equation thinking in solving problems, and gradually becoming accustomed to using equation thinking and mathematics.

### 4.2 Consolidation of Exercise Class Application

Through the practice, we can grasp the math knowledge firmly, and apply the equation concept in the practice to find the starting point and the fundamental direction. First, we have the feeling of setting the elements; then we build the model and list the equations to build the equivalent relationship. Next, the equation is reduced, and the equivalence relation is simplified. After that, look for the element to get the unknown value. Finally, we return the obtained value to the problem, and solve the problem. In the following, we will introduce the two key steps of the equation, namely modeling and reduction.

#### 4.2.1 Solve triangle

In the problem of solving the triangle, there is a lot of knowledge about how to construct the equivalent relationship by using the equation, such as sine, cosine, triangle, triangle area, perfect sum of square and internal angle of triangle. Among them, sine, cosine, etc., are the most used. Through a great deal of practice, we can get a better understanding of triangle exercises, and make full use of them in solving problems, and analyze and compute them. The sum of the inner angles of the triangle can be realized by the sum of the angles. The perfect sum of the squares is the one which integrates the circumference, the area, the sine and the cosine.

#### 4.2.2 Series

In the order of numbers, the key points for us to construct equivalent relations are: (1) the general term formula, the sum formula and the property of the arithmetic sequence and the proportional order. (2) Using the function's image and attribute, the maximum value of the sequence is found. (3) Through the relation between and, the relation between and is derived recursively, and the relation between the two equations is obtained by subtraction and simplification. Among them, the formulas, properties and ( $n \geq 2$ ) applications of and are the most. The best way for us to do this kind of exercise is to practice. Lots of practice and sorting out the wrong questions will help us to quickly grasp this kind of knowledge and improve their academic achievement.

#### 4.2.3 Function

Function is also an important part of the University Entrance Examination. The study of functional knowledge not only needs the basic mathematics in junior middle school, but also lays a solid foundation for advanced mathematics study. Therefore, it is very important to study the function in senior high school. In the meantime, the role of the NMET is not to be underestimated. In function, the key to construct equivalent relationship is: (1) the zero-point problem of function, and the combination of function and equation is used to analyze the problem. (2) The geometry of derivatives, formulas, and tangents. Derivatives are widely used in functions. You can solve the tangent equation with the derivative, and you can also analyze the monotonicity of the function. (3) Functional characteristics and the usual mathematical models. (4) A new function is constructed by dividing the parameters. In this paper, a new function is constructed by dividing the parameters, which can be transformed into the maximum value of a new function, which plays an important role.

#### 4.2.4 Conic section

In the solution of conic section, it is common to use the definition of conic section, standard equation and eccentricity to construct the equidistance relation, and also to use the knowledge of triangle, straight line, plane vector, and function. Among them, the equivalent relation is constructed by sine, cosine, and area. Most of the time, it is used to construct the equivalent relationship by means of Root Discriminant, Vedic Theorem and Midpoint Coordinate Formula. In the plane vector, the equidistance relation is constructed by two vector, the quantity product and the included angle. Among the functions, a constructor uses the image and attributes of a function to solve a problem.

#### 4.2.5 Solid geometry

In solid geometry, the key points to construct equivalent relationship are as follows: (1) Surface area, volume, distance, etc. (2) The related knowledge about triangle solution includes sine and cosine theorem, Pythagorean theorem and equal area transformation. (3) Construct a spatial rectangle coordinate system, construct an equivalent relation based on the relation of the two vectors in the plane and the normal vector, and use the spatial vector to calculate the spatial angle.

As far as high school math is concerned, math problems sometimes test students' comprehensive application of knowledge. Therefore, under the instruction, as a high school student, we should carry out the relevant math thoughts, problem solving thoughts, and the evaluation points for the different problems. In conclusion, this method can enhance the ability to think and logic, and enhance the ability to solve math problems. And there is a need to transfer the related math knowledge into the solution process, and combine the knowledge we have learned with the new knowledge to reduce the difficulty of the problem. It is necessary to have a plan, procedure and aim to study, which will help us to improve their math literacy and improve their academic achievement.

### Acknowledgement

The paper was completed under the guidance of Professor Li Helong, South China University of Technology School of Economics and Finance. I would like to express my sincere thanks!

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