International Journal of Engineering and Management Research e-ISSN: 2250-0758 | p-ISSN: 2394-6962
Volume- 9, Issue- 3 (June 2019)
www.ijemr.net https://doi.org/10.31033/ijemr.9.3.02

The Application of the Combination of Number and Shape in the Process of Mathematics Learning

Jinyi Yan[1] and Jingyao Zheng[2]
[1]Student, Department of Mathematics, Yanbian University, CHINA
[2]Student, Department of Mathematics, Yanbian University, CHINA

[1]Correspondence Author: 1099377393@qq.com

ABSTRACT

The mathematical idea of combining numbers and shapes is an indispensable part of mathematics learning process. It is widely used and has certain difficulties in the process of application. Therefore, in the process of learning, we should properly classify and summarize. In this regard, in this paper, the mathematical combination ideas are introduced and summarized in the aspects of equations and inequalities, analytic geometry and linear programming.

Keywords— Number and Shape Combination, Mathematical Problem, Linear Programming

I. INTORUCTION

China's famous mathematician Luogeng Huasaid: "The combination of numbers and shapes is good, and the separation of the family is a matter of time." "Number" and "form" reflect the attributes of two aspects of things. In fact, the application of the combination of numbers and shapes can be roughly divided into two situations: the first case is "shape aid", and the second case is "definite number". The combination of digital and mathematical is to combine abstract mathematical language, quantitative relationship with intuitive geometric figures and positional relationships. Through the combination of abstract thinking and image thinking through the combination of abstract shape and number The simplification of complex problems and the abstraction of abstract problems, in order to achieve the purpose of optimizing the problem-solving approach.

II. THE SHAPE OF THE HELPER AND THE NUMBER OF THE SHAPE

Many problems of the number (form), if based on the background of the "number", according to a certain corresponding law, the "number" is transferred to the "form" to be reduced to the basic figure, and the "shape" has the image, the intuitive advantage, Expressing more specific thinking and playing a qualitative role in solving the problem, we can find out the correspondence of "number" - "shape" and use graphics to solve the problem. Therefore, the basic idea of solving the problem of "number" into "form" is to clarify the conditions given in the question and the objectives sought. Starting from the known conditions or conclusions in the question, first observe whether the analysis is similar (The same) the basic formula (theorem) or the expression of the graphic that has been learned, then make or construct a suitable graphic, and finally use the properties, geometric meanings, etc. of the already made or constructed graphic to contact the required solution. (Verification) The goal is to solve the problem.

The number solution is another magical effect of the combination of numbers and shapes. His thought is opposite to the shape aid, that is, the algebraic method is used to solve the problem involving graphics. Although it has the advantages of image and intuition, it must also rely on the calculation of algebra in quantitative aspects, especially for the more complicated "shape", not only to correctly digitize the graphics, but also to pay attention to the characteristics of the graphics, to explore the topic The implicit conditions, make full use of the nature or geometric meaning of the graph, and correctly represent the "form" as a "number" form for analysis and calculation. Therefore, we should clarify the conditions given in the title and the objectives sought, analyze the characteristics and properties of the given conditions and objectives, understand the important geometric meaning of the conditions or objectives in the graph, and use the knowledge already learned. The graphs used in the questions are expressed in algebraic form, and then the corresponding formulas or theorems are used according to the relationship between the conditions and the conclusions.

In addition, in some mathematical problems, it is not only simple to change the "number" to "shape" or "shape" to "number" but to "shape" and "number" to change each other, not only to think of the "shape" The rigor of becoming "number" is also closely related to the "shape". The essence of the combination of numbers and shapes is to combine abstract mathematical language with intuitive images. The key is the transformation between algebraic problems and graphics. It can make algebra problems geometric and geometric problems algebra. When using the combination of numbers and shapes to analyze and solve

problems, we must pay attention to three points: First, we must thoroughly understand the geometric meaning of concepts and operations and the algebraic features of curves, and analyze the geometric meanings and conclusions of the conditions and conclusions in mathematics topics. The algebraic meaning; the second is to properly set the parameters, use the parameters reasonably, establish the relationship, from the number of thoughts, to the number of shapes, to do the number transformation; the third is to correctly determine the value range of the parameters.

III. SPECIFIC APPLICATION EXAMPLES

1. The application of number and shape combination in equations and inequalities

When dealing with the equation problem, the problem of the root of the equation is regarded as the intersection of the two function images. From this, a specific image can be drawn, so that the analytical solution of the equation can be obtained by referring to the intersection of the images; from the condition and conclusion of the topic, the related function is contacted, and the geometric meaning is analyzed, and the idea of solving the problem is found from the graph. In this way, we can get the desired result more efficiently and accurately. The study of inequalities provides a method reserve and skill for the subsequent study of important inequalities such as Cauchy inequality. Therefore, it is especially important to use the combination of numbers and shapes to better grasp the inequalities.

2. The application of digital combination in analytic geometry

In the process of high school mathematics learning, the study of analytic geometry is an indispensable part, and the basic idea of analytic geometry is the combination of numbers and shapes. In solving problems, we should apply the mathematical ideas of combination of numbers and shapes to points and lines. The nature of the curves and their interrelationships. For example, in the process of learning, we often use the form of curve image to study various properties, and the ellipse, hyperbola and parabola images are the focus of our research. It is because of the existence of its images that we have made our research on its nature more thorough and applied the acquired properties to other deep-seated problems in the future.

3. Application of digital combination in linear programming

The linear programming problem is the problem of finding the maximum value of the objective function under the constraint conditions. This problem is not unfamiliar to all the students who have studied mathematics. Even at the university, some professional scholars are in the course of operations research. There is a deeper research and exploration of linear programming. In the study of university linear programming problems, our main research method, the simplex method, is inseparable from the specific graphics. Only under the specific simplex form, we can get the optimal solution that meets the conditions. Not only that, the branch and bound method and the cut plane method are more vividly applied to the idea of combining numbers and shapes.

IV. CONCLUSION & SUMMARY

In the process of learning mathematics, the two most common words are shown in the figure, which also reflects the importance of the combination of number and shape in mathematics learning. The good application of mathematics can not only cultivate our spatial concept and sensitivity to numbers, but also help us develop our ability to use knowledge flexibly.

REFERENCES

[1] Ladson-Billings, G. (1995). Toward a theory of culturally relevant pedagogy. *American Educational Research Journal, 32*(3), 465–491.
[2] Bassler, O., Beers, M., & Richardson, L. (1975). Comparison of two instructional strategies for teaching the solution of verbal problems. *Journal for Research in Mathematics Education, 6*(3), 170-177.
[3] Cooper, B. & Harries, T. (2002). Children's responses to contrasting 'realistic' mathematics problems: Just how realistic are children ready to be?. *Educational Studies in Mathematics, 49*(1), 1-23.
[4] Kramarski, B. (2004). Making sense of graphs: Does meta cognitive instruction make a difference on students' mathematical conceptions and alternative conceptions?. *Learning and Instruction, 14*, 593-619.
[5] Van Dooren, W., De Bock, D., Janssens, D., & Verschaffel, L. (2007). Pupils' over-reliance on linearity: A scholastic effect?. *British Journal of Educational Psychology, 77*(2), 307-321.
[6] Watson, A. & De Geest, E. (2005). Principled teaching for deep progress: improving mathematical learning beyond methods and materials. *Educational Studies in Mathematics, 58*(2), 209-234.
[7] Sweller, J. & Leung-Martin, L. (1997) Learning from equations or words. *Instructional Science, 25*(1), 37-70.