American Journal of Education and Information Technology
2022; 6(2): 81-84
http://www.sciencepublishinggroup.com/j/ajeit
doi: 10.11648/j.ajeit.20220602.13

Some Recommendations and Suggestions on the Methods of Solving Geometrical Problems

Nasriddin Shamsiddinov

Academic Lyceum, Tashkent State Technical University named after Islam Karimov, Tashkent City, Republic of Uzbekistan

Email address:
nshamsiddinov1974@gmail.com

To cite this article:
Nasriddin Shamsiddinov. Some Recommendations and Suggestions on the Methods of Solving Geometrical Problems. *American Journal of Education and Information Technology*. Vol. 6, No. 2, 2022, pp. 81-84. doi: 10.11648/j.ajeit.20220602.13

Received: July 18, 2022; **Accepted**: August 25, 2022; **Published**: September 27, 2022

Abstract: Geometrical thinking is concerned with looking at not individual spatial objects, but whole classes of these objects grouped by one or more characteristics. Geometry itself as a science has a millennial history. As a scientific direction, it involves the study of logical connections between concepts with the help of Central consciousness intuition, that is, based on spatial imagination. Geometrical thinking is a very high level of thinking of this abstraction, and therefore it is a combination of spatial thinking, which implies logical thinking, aimed at working with spatial images and establishing the appropriate relationship between these images. The skill of studying geometry is to distinguish different geometric shapes from each other and know their important properties, the relationship between individual elements, draw clear drawings of a simple geometrical state, understand it and call the corresponding conclusions in their imagination on this drawing, solve the problems of constructing and calculating lengths, squares, volumes and their parts, dimensions of the elements, as well as The article gives some recommendations on the development of mathematical thinking, creative compensation of students on solving problems on the subject of geometry.

Keywords: Thinking, Contemplation, Space, Forms, Figures, Triangle, Surface, Ratio

1. Introduction

It is characterized by the fact that in modern living conditions one of the necessary elements of human culture – a certain level of quality education is required. At the same time, the quality of education is assessed on the level of knowledge received by the individual, as well as on the formation of creative qualities aimed at the performance of social and professional actions. Intellekt the first place in the general education of the individual should be occupied by the development of geometric compensations. This is because we live in a world that is structurally geometric. Solving geometrical tables students face a wide range of images and relationships, regardless of the scope of their activities [1]. For understanding the surrounding world, it is important to know the theoretical knowledge that is closely related to everyday practical life and is based on geometrical thinking.

Geometry itself as a science has a millennial history. As a scientific direction, it involves the study of logical connections between concepts with the help of Central consciousness intuition, that is, based on spatial imagination. Geometrical thinking is a very high level of thinking of this abstraction, and therefore it is a combination of spatial thinking, which implies logical thinking, aimed at working with spatial images and establishing the appropriate relationship between these images.

The skill of studying geometry is to distinguish different geometric shapes from each other and know their important properties, the relationship between individual elements, draw clear drawings of a simple geometrical state, understand it and call the corresponding conclusions in their imagination on this drawing, solve the problems of constructing and calculating lengths, squares, volumes and their parts, dimensions of the elements, as well as [2, 3, 5].

In solving the issue, we are given a certain number of sentences. The goal is to find a logical connection between them by linking the information known from the hook to each other when looking for the results arising from these sentences. The more stages of this connection, the more difficult it will be to solve the issue. The solution to the problem is to find the steps in the range izlash, the necessary relationship between the different sentence and the result. Therefore, this is a difficult and creative activity.

In solving the issue, not only creative activity, but also technical activity, for example, drawing and calculating the form on the issue, also plays a certain role. As a result of solving the issue, we will have a mathematical Fakt that is new to ourselves and we will be able to imagine.

It should be noted that there is no general rule in solving geometric issues. Some instructions and recommendations can be given about this simply. The skill in solving the issue is tied to how much everyone has mastered the geometric compensations.

The ways to solve each issue are based on the content of the issue and its specific character. Therefore, before starting to solve the issue, it is necessary to analyze the conditions of the given issue and determine the theorems and formulas that will be needed to solve it.

It is recommended to divide the issues into types that are solved by methods of geometric places, inversion, similarity, etc., depending on the way - method, that is, the structure of the issue. In the division into such types, it is difficult to determine to which type some issues arise. In addition, when issues are divided into types by such characters, the need for creative thinking of the students to solve the issue is reduced.

If the geometrical issues are divided into the same hilda species, the initiative in solving the issue is extinguished, the creative work on the set of issues is transformed into a different, that is, work on a mold in each section. With this, the enthusiasm for resolving the issue will decrease [6-9, 11].

2. Issue of the Problem

Only we give preference to the principle of grouping by the object of the matter (for example, a straight line, triangle and circle), that is, the transition from an easy form to a difficult, from a simple form to a complex, depends on what the final form was before.

1-problem. If AB side, BC base and BD diagonal of the trapezium $ABCD$ have length 5, CD side is equal to 2, then find the diagonal AC.

Analysis of the issue:

1) the object of the matter is Trapezium: the diagonal of the trapezium divides it into two equilateral triangles;
2) given elements: three sides of the trapezium and one diagonal;
3) it is necessary to find: the diagonal of the trapezium;
4) given ratio: a triangle with equal sides.

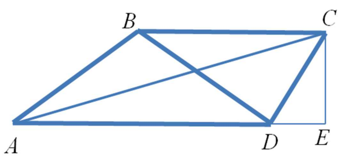

***Figure 1.** Drawing of the first issue.*

Schematic question entry (Figure 1):

Issued by: $AB = BC = BD = 5$; $CD = 2$.

Find: AC *diagonal.*

Solution methods:

Method I. To find the diagonal in the matter, we use the Pythagorean theorem, lowering the height of the tip of the Triangle;

Method II. We find the solution to the problem using the cosine theorem. We find the length of the diagonal using the cosine theorem, since this is a triangle, and since it is; *Method III.* We will solve the issue using the Descartes coordinate system. To do this, place the top A of the trapezoid in the head of the coordinate. With the help of the formula for finding the cut length, we will find the coordinates of the end C;

Method IV. We will solve the issue using a vector. To do this, place the top A of the trapezoid in the head of the coordinate. $|\overrightarrow{AB}| = |\overrightarrow{BC}| = |\overrightarrow{BD}| = 5$; we use $|\overrightarrow{CD}| = 2$ values and calculate $|\overrightarrow{AC}|$ vectors [4].

Then we will proceed to the consolidation and systematization of our data collected during the period of work in the solution of the issue. Finally, we stop at the most characteristic ways and methods of solving issues.

It helps to systematically solve issues, to consciously and thoroughly master the theory, shows its practical value, at the same time, the solution of the issue educates students mathematical competence, logical thinking, creative initiative, knowledge and gives them many necessary practical skills and qualifications.

The solution of the issue involves different goals. Through some issues, a theoretical law is proved. From it, ways of using a concrete case are indicated. Therefore, each geometrical issue yehish turns out to be a proof of a geometrical theorem.

Often the solution of the issues will consist in repeating the foregoing or checking to what extent the students have mastered the material. Depending on the structure, the issue will be simple and complex.

In simple terms, one of the theoretical issues (formulas, rules and theorems) related to this course is involved in the matter. It is sometimes also called an example. The sentence in which it is stipulated should not be heavy.

The difficulty in solving the issue will be the formation of a mutual combination of sentences, the introduction of various substitutions, the arrangement of additional form elements. Sometimes it makes it difficult to express these things with the help of a formula or a mathematical language.

The solution of the problem is either to master the theory well, or to practice the ways in which a theorem is applied in practice. In general, the goal of solving the problem is to develop mathematical thinking, which is the first form of creative verification.

3. In Order for the Issue to Be Resolved, the Following Requirements Must Be Met

3.1. Error-Free Solution

At us initially the following question arises. How to be sure of the correctness of the found solution. This question is often solved by readers immediately looking at the answer given in the book. This is very good, because it saves strength and time. But it is necessary to teach the students self-examination, sometimes there may be no answer to the issues. In the answers given in some books there is a printing error, and the answers and instructions can be mistaken. Therefore, the reader-himself must check whether the formula and the rules he used are used correctly, whether the answer received corresponds to the condition of the equation and the matter, or whether the resulting solution satisfies the requirements, check the accuracy of the forms, compare the calculation work in other ways.

The reader should identify the cause of the error that has arisen, and if the error has arisen as a result of the emptiness of the theory or other characteristic cases, it should eliminate the identified defect.

2-problem. From the base AC of the triangle ABC a point D is taken, then from this point two parallel lines to the sides AB and CB are passed. They cross the side AB and the side CB in points F and E, respectively. If $S_{AFD}=16$, $S_{CBE}=x$ and $S_{FBDE}=x+15$, then find the area of the triangle (Figure 2).

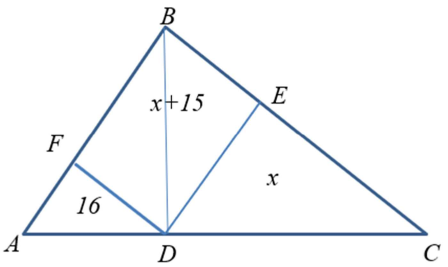

Figure 2. *Drawing of the second issue.*

Solution:

1) To resolve the issue, we use similarities ΔAFD and ΔDEC:

$$\left(\frac{AD}{DC}\right)^2=\frac{S_{AFD}}{S_{DEC}}\Rightarrow\left(\frac{AD}{DC}\right)^2=\frac{16}{x} \qquad (1)$$

2) In ABC triangle BD of the triangle segment in the ratio $\frac{AD}{DC}$, that is, $\frac{AD}{DC}=\frac{S_{ABD}}{S_{DBC}}$. Due to $DFBE$ parallelograms of BD diagonals, his face will be equal to two:

$$S_{ABD}=S_{AFD}+S_{FBD}=16+\frac{x+15}{2}=\frac{x+47}{2},$$

$$S_{CBD}=S_{CED}+S_{EBD}=x+\frac{x+15}{2}=\frac{3x+15}{2}.$$

It follows that

$$\frac{AD}{DC}=\frac{x+47}{3x+15} \qquad (2)$$

by equalizing the right side (1) and (2), we get the following equation:

$$\left(\frac{x+47}{3x+15}\right)^2=\frac{16}{x}\Rightarrow x\left(x+47\right)^2=16\left(3x+15\right)^2.$$

Let's take this equation off and get solutions $x_1=9$, $x_2=16$, $x_3=25$.

Thus, the surface ABC of the triangle will be 47 in $x_1=9$, $x_2=16$ - 63, $x_3=25$ - 81.

How do I check if these solutions are available?

3.2. Substantive Solution of the Issue

Proving the correctness of the solution of the issue will determine whether the issue is solved correctly. In many cases, the reader can not prove it based on the relevant evidence, even if the issue is solved. Sometimes the teacher also becomes impotent in this.

Reasoning is an expression from relying on a certain rule, theorem and results mentioned, or from conducting a logical discussion. The person who does the job must know why everyone is doing what he / she has done and is doing what he / she is doing. In particular, this position holds an important place in solving geometrical issues.

Having analyzed the solution to issue 2, we cannot solve $x=16$ issues. If there are $x=16$, then ΔAFD and ΔDEC triangles will be equal. For $AD=DC$ and $FD \parallel CB$ here the FD kesma is the midline of the ΔABC triangles and will be $S_{ABC}=4S_{AFD}$. But with $x=16$ - $S_{ABC}=2x+31=63$ and $63\neq 4\cdot 16$ - "equality". Thus, $x=16$ of these issues cannot be resolved.

3.3. Browse All Cases and Characters in the Solution

After the issue has been resolved and an answer has been generated again check that whether there may be a different answer or not, if you have other answers, you must identify them and indicate that this answer is generated on the kanday condition. Especially after solving geometric issues related to mining, it is required to be checked.

3.4. Search for a Way to Solve the Issue More Easily

One issue can be solved in different ways. Among them it is necessary to determine the light, understandable. In solving some problems, artificial methods and auxiliary forms are also used, which help to solve the problem lightly.

3- problem. 2-we will consider another way to solve the issue.

Solution:

1) To solve the issue, we use similarities ΔAFD and ΔABC (Figure 2):

$$\left(\frac{AD}{AC}\right)^2=\frac{S_{AED}}{S_{ABC}}\Rightarrow\frac{AD}{AC}=\sqrt{\frac{S_{AED}}{S_{ABC}}}=\sqrt{\frac{16}{2x+31}}.$$

2) To resolve the issue, we use similarities ΔCED and

ΔABC :

$$\left(\frac{CD}{AC}\right)^2 = \frac{S_{CED}}{S_{ABC}} \Rightarrow \frac{DC}{AC} = \sqrt{\frac{S_{CED}}{S_{ABC}}} = \sqrt{\frac{x}{2x+31}} .$$

3) will Let's create the following equation in the form of the two above equations:

$$AC = AD + DC \Rightarrow \frac{AD}{AC} + \frac{DC}{AC} = 1 .$$

Let's create the following equation in the form of the two above equations:

$$\sqrt{\frac{x}{2x+31}} + \sqrt{\frac{16}{2x+31}} = 1 \Rightarrow \sqrt{x} + 4 = \sqrt{2x+31} .$$

We take off the equation and get solutions $x_1 = 9$, $x_2 = 25$.

Thus, the triangle surface ABC will be 47 in $x_1 = 9$ and 81 in $x_2 = 25$.

3.5. Edit the Record of the Issue Solution

The solution of a simple issue does not require editing. But it is necessary to write out the solution of complex, questions, of course, in order to make different forms and participate in the replacement of various theoretical materials and algebraic forms [10, 12, 13].

When addressing the issues, attention should be paid to the preparatory state of the students. To do this, the teacher must first show examples from typical issues. This work is carried out in a well-prepared way with a question-answer, in a well-thought-out method (under the guidance of the teacher). In this, the teacher must skillfully regulate the thought, make an understandable statement. The condition of the issue should be given clearly and clearly and orderly, all questions, details should be made sure that they are understandable to the readers.

Sometimes when there are students who offer a quick method of solving the result, it is best not to give him a whim. It is useful to indicate different ways of solving the issue and choose the most convenient of them.

It is desirable to repeat it after the teacher has indicated that the difficult issue is solved, or after the pupils have solved the issue, the teacher will explain it in an orderly manner.

4. Conclusion

If each step is taken through negotiation and discussion, the active participation of readers in solving this issue is ensured when the reader solves the issue. The house is given independent work for the purpose of thorough study and consolidation of the methods of solution of the issues. The work given to the house, the continuation of the work done in the classroom, that is, it is necessary to ensure consistency.

How much the mentioned topic is mastered, new issues are determined by performance. Let the whole class participate in the solution of the issue, each pupil of the bunda must participate with his own feedback. There should not be those who do not understand the issue that is being solved in the classroom among students. Today, we have been able to explain the causes of the object and subject of the difficulties encountered during the study of geometrical concepts and phenomena, the possibility of superficiality in the understanding of the information studied in the courses of geometry, and the fact that students perform without understanding the actions performed.

The degree of development of spatial thinking, characterized by the ability of students to work with spatial images, serves the formation of geometric compensations.

References

[1] L. M. Fridman Ye. N. Tureskiy. “Kak nauchitsya reshat zadachi”, Moskva «Prosveshenie», 1989.

[2] O. Karimiy. Planimetriyadan hisoblashga va isbotlashga doir tanlangan masalalar. “O'qituvchi”. Toshkent-1955 y.

[3] D. Xusanov, N. B. Shamsiddinov “Yoshlarning mustaqil ijodiy fikrlash faoliyatini rivojlantirishda geometrik masalalarning o'rni”. “Halq ta'limi” ilmiy-metodik jurnal. 2020 yil. 5-son.

[4] D. Xusanov, N. B. Shamsiddinov “Geometrik masalani turli yechish usullari yordamida o'quvchilarning ijodiy fikrlash faoliyatini rivojlantirish”. “Halq ta'limi” ilmiy-metodik jurnal. 2022 yil. 3-son.

[5] J. Adamar Issledovanie psixologii prosessa izobreteniya v oblasti matematiki. M., 1970.

[6] V. Tixomirov - Andrey Nikolaevich Kolmogorov//Kvant.-1993.- № 3/4.-S 3-10.

[7] N. V. Agapova Perspektivi razvitiya novix texnologiy obucheniya. – M.: TK Velbi, 2005. – 247 s.

[8] Mario Lucentini Technological Concepts and Mathematical Models in the Evolution of Modern Engineering Systems. Germany, 2012.

[9] J. Husanov, N. Shamsiddinov, B. Quvonov, Geometriya fanidan uslubiy ishlanmalar tayyorlashda axborot kommunikatsiya texnologiyalaridan foydalanish samaradorligi, Xalq ta'limi ilmiy-metodik jurnal. 2021 yil 6-son. 33-36 bet.

[10] J. Husanov, N. Shamsiddinov, On the role average values in solving geometric extreme. International journal on integrated edication. vol. 6. 2022.

[11] D. M. Makhmudova On the role of problem tasks in the development of independent analytical and creative thinking of students. American journal of scientific and educational research. 2014.-№1 (4).-p. 325-330.

[12] J. Husanov, N. Shamsiddinov. Geometrik masalani turli yechish usullari yordamida o‘quvchilarning ijodiy fikrlash faoliyatini rivojlantirish Xalq ta'limi ilmiy-metodik jurnal. 2022 yil 3-son. 25-32 bet.

[13] N. Shamsiddinov. The Effectiveness of Information and Communication Technology in Finding the Distance Between Straight Lines Non-Intersecting in Space. International Journal of Mathematics Trends and Technology. Volume-68 Issue-6. 2022.