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## THE USE OF COMPUTER TECHNOLOGIES IN TEACHING MATHEMATICS

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## ИСПОЛЬЗОВАНИЕ КОМПЬЮТЕРНЫХ ТЕХНОЛОГИЙ В ПРЕПОДАВАНИИ МАТЕМАТИКИ

**Abstract.** The article discusses the role and importance of the use of computer technology in the teaching of mathematics in secondary schools. In mathematics teaching, there are several solutions for creating graphic images in students in graphics programming in the Graph 4.4 application.

**Аннотация.** В статье говорится о применении компьютерных программ в процессе преподавания курса математики в средней общеобразовательной школе для формирования у учащихся представлений о графиках. Рассматривается решение нескольких примеров по построению графиков с помощью прикладной программы Graph 4.4 в преподавании математики.

**Keywords:** Graph software, mathematics, function, graphic, application

**Ключевые слова:** Graph программное обеспечение, математика, функция, графический, применение

**Introduction.** The modern era puts new tasks on education in connection with the development of scientific and technological progress. With the rapid

growth of information flow, training of specialists who can keep up with modern information technology has become a social order. Our education should prepare

professionals who can manage the future so that they can predict events with the help of imagination, thinking and intuition and foresee a way to solve problems. Obviously, training of such specialists should start with secondary schools.

Western civilization leads the world to more technological development. In our globalized world, education is at the forefront of this development. Therefore, the use of computer technology in every educational institution has become a demand now. It is especially difficult to imagine math lessons without a computer. The use of computer technology in training is one of the most sustainable directions in the development of the educational process. The use of computer technology improves the quality of mathematical education, changes the learning process, and improves students' self-development. The use of computer technology in the learning process makes the process more interesting and memorable, increasing students' and students' interest in learning.

Acquiring new knowledge is the main condition for every teacher in the information society to maintain his or her specialty. At the same time, teachers should work to meet the educational needs of students by learning and applying new pedagogical technologies and modern approaches to gain new knowledge and skills. Today's pupil is any professional or professional of the future. So how do we shape teachers?

In the modern world, the life cycle of knowledge and skills is very short. Already in developed countries, future societies are trained by specialists who "never dreamed about." For example, in 2030 and beyond, the University of Singing has been established to study management, robots and future management. So, in our country, as the former US President John Kennedy says, we need to cultivate "people who ... wish they never existed."

Today, there is a great need for upgrading teaching methods to increase the effectiveness of the educational process. However, it is not possible to use any new method, method, technology or tool without computer technology. The use of information and communication technologies as a means of organizing, managing, and teaching math lessons is invaluable. Every teacher should be able to use multimedia tools for explaining

new material, creating motivation, explaining and addressing various problems, homework checking, preparing worksheets, generalizing repetitions, and developing, developing, and developing skills.

It is known that different resources are used in the implementation of standards for each subject. Computer resources as a useful resource in math lessons are the most effective tool. Electronic resources, online assignments, schedules, diagrams, tests, internet resources, e-libraries are also included.

There are various computer math software packages, one of which is the Graph application, which enables students and students to deliver mathematics training more efficiently and visually.

**Research methods.** In this article, we will look at examples of math solutions for learning and application tasks in Mathematics using the Graph 4.4 version and the graph of the quadratic function.

*Task 1.* Make a graph of the given functions. Note the coordinates of the hill point and the axis of symmetry on the graph [3, p. 51].

$$\text{a) } y = (x + 3)(x - 3) \quad \text{b) } y = -2(x - 2)^2 + 4$$

$$\text{c) } y = \frac{1}{2}(x - 3)^2 + 2$$

a) After downloading the Graph 4.4 application to the computer, the main window opens. From the menu bar, the Function item is drawn by reading the bean. The "Insert function" submenu opens with a reading of the beads and a dialog box opens with this name. The dialog box states that the function type is the default. The equations for the "Function equation" field (in front of

$$f(x)) \text{ are written in the programming language: } y = x^2 - 9.$$

In the dialog that opens, the function graphic interval and step, the graph display type, color, thickness, marker type, color, size, and other parameters are selected. After that, the OK command key is automatically set up as a compressed system.

Thus, the monitor depicts a parabola with a graph of the function  $y = (x + 3)(x - 3)$ . (Figure 1).

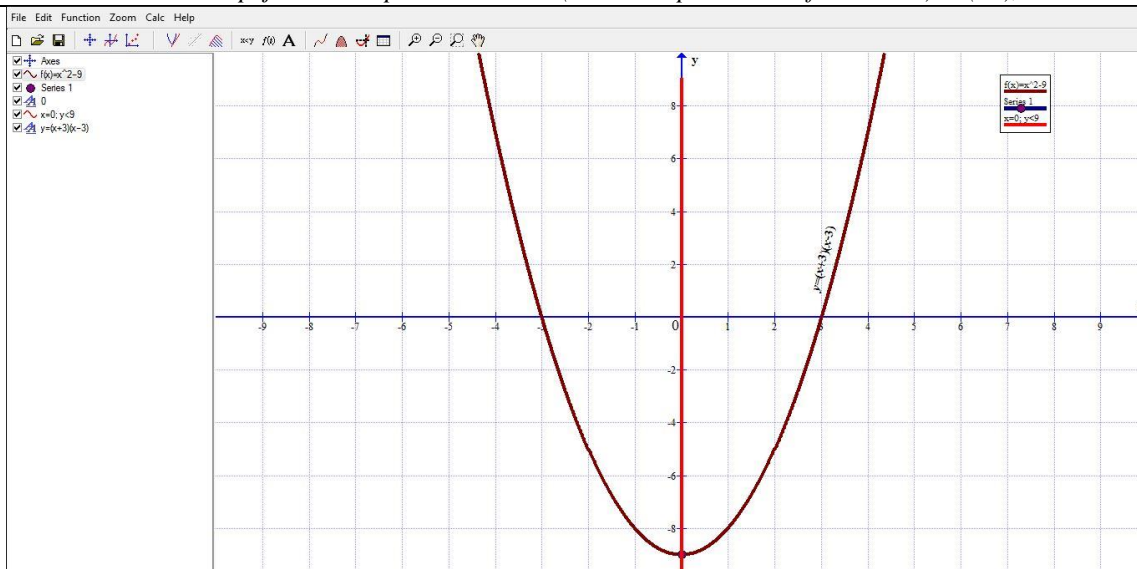


Figure 1

Let's use the combination of <Ctrl + E> keys to find the coordinates of the hill point of the function's

graph, and the "Inert label" submenu of the Function to mark the point on the graph. (Figure 2).

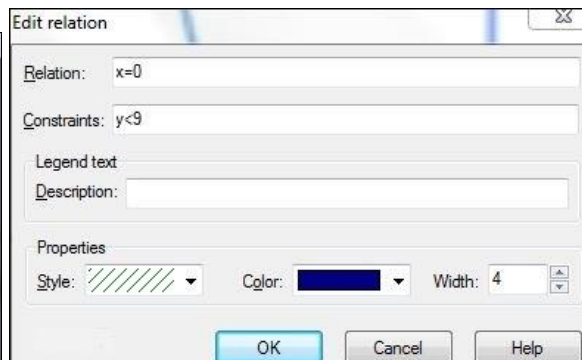
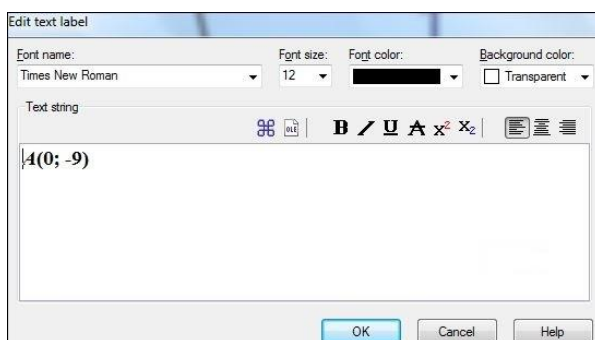


Figure 2. Figure 3.

The straight line  $x = 0$  is the symmetry reading of the parabola. To create the symmetry axis of the parabola, the submenu of the function "Edit relation" (Figure 3) and "Inert point series" (Figure 4) are used to give the point.

possible to change the size of the rectangular coordinate system and at the same time to scale the image;

Thus, the graph of the function  $y = (x + 3)(x - 3)$  is recorded by Graph 4.4, and the symmetry axis is set (Figure 5).

With the function of the Zoom menu item, it is

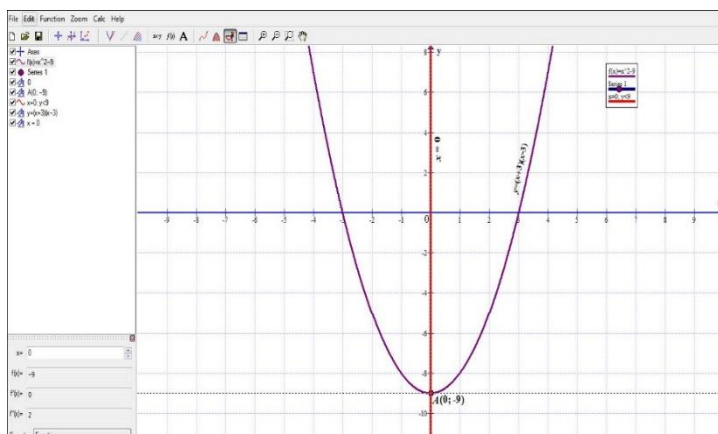


Figure 4.

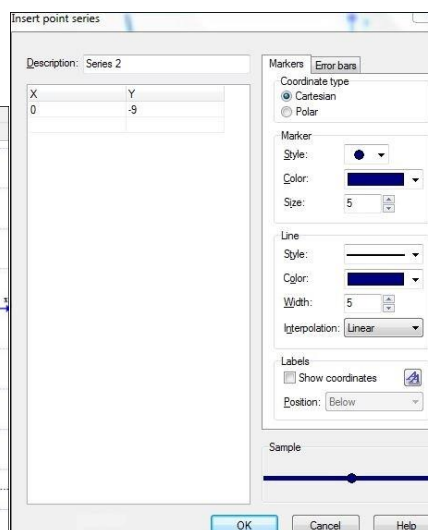


Figure 5.

b) Firstly  $-2(x-2)^2 + 4$  express the "Insert function" of "Function" menu bəndindəki Write the programming language in the "Function equation" field:  $-2(x-2)^2 + 4$ . Graphic set spacing, step, graphic display type, color, thickness, marker

according to parameters, etc. Select and install the schedule automatically on your system. Then, using the appropriate menus, note the coordinates of the hill point and the axis of symmetry on the graph (Figure 6).

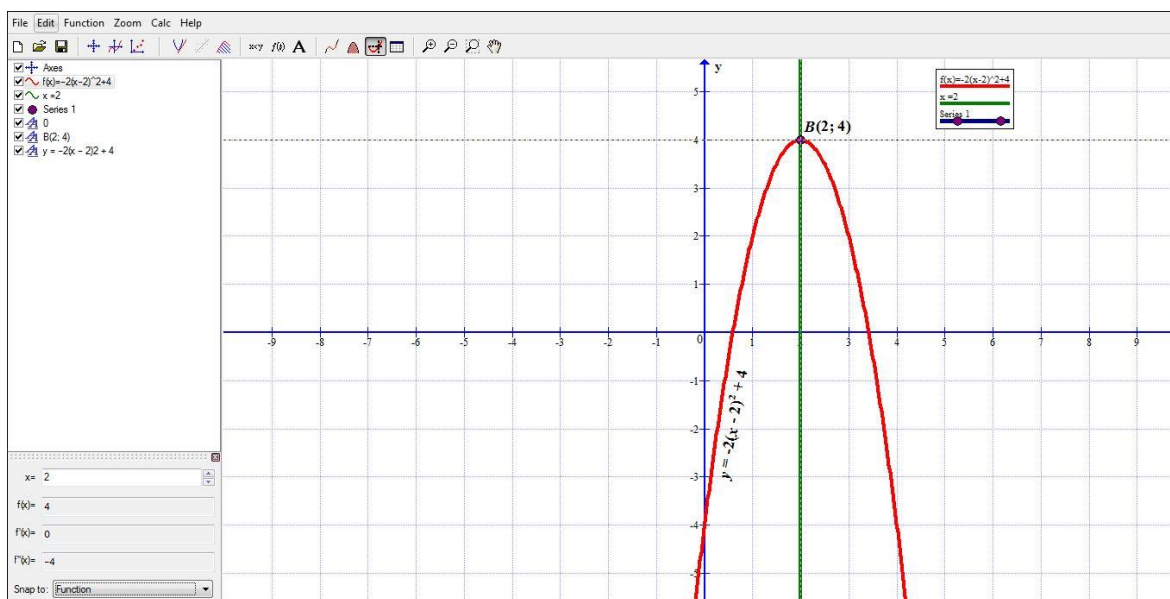


Figure 6.

c) The graph of the function is also constructed in the same way, the coordinates of the hill point of the

parabola and the symmetry axis are recorded on the graph (Figure 7).

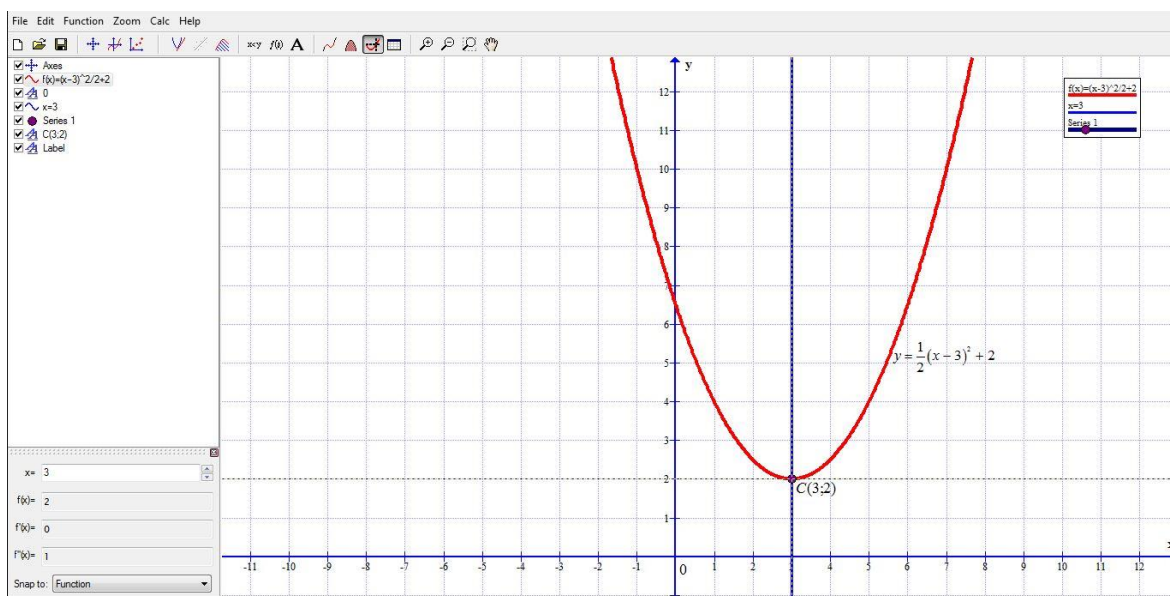


Figure 7.

**Task 2.** Determine how many solutions of a system of equations graphically [3, səh. 96]:

$$a) \begin{cases} x^2 + y^2 = 25 \\ y - 5 = 0 \end{cases} \quad b) \begin{cases} y = |x| \\ y - x^2 + 2 = 0 \end{cases}$$

a) In Graph 4.4, refer to the Function equation field in the Insert function submenu of the Function item  $y = -\sqrt{25 - x^2}$ ;  $y = \sqrt{25 - x^2}$  and  $y = 5$  let's write the

equations in programming language. Range, step, type of graphic display, color, thickness, marker according to parameters, etc. select and set the graphs in the same coordinate system (Figure 8). The first equation entering the system is the equation of the circle and the second equation of the straight line. The straight line touches the circle and is the coordinates of the touch point (0; 5). So there is a solution to the given system of equations.

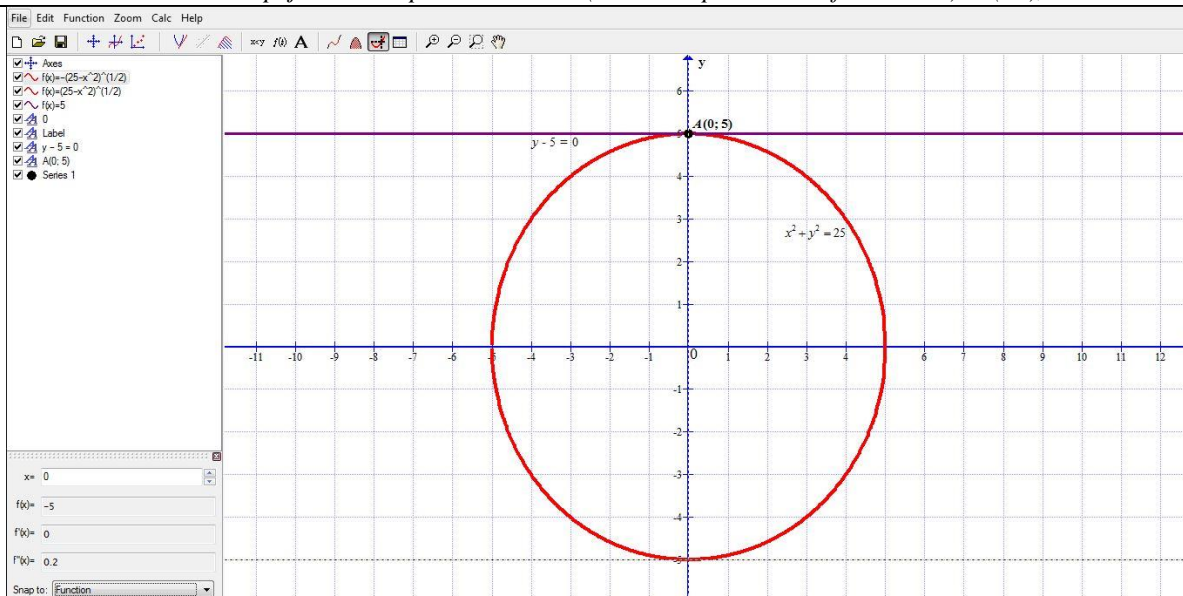


Figure 8.

b) In the program  $\begin{cases} y = |x| \\ y - x^2 + 2 = 0 \end{cases}$  system equations in the form of programming languages  $y = \text{abs}(x)$  and  $y = x^2 - 2$  «Function» item «Insert function» submenu in the paragraph «Function equation» Let's write the sequence in the field. Build

graphs in a similar way (Figure 9). The graphs intersect at two points. By placing an arrow on the intersection of the graphs, it is easy to determine that the coordinates of those points are A (-2; 2) and B (2; 2). So, there are two solutions of the given system of equations.

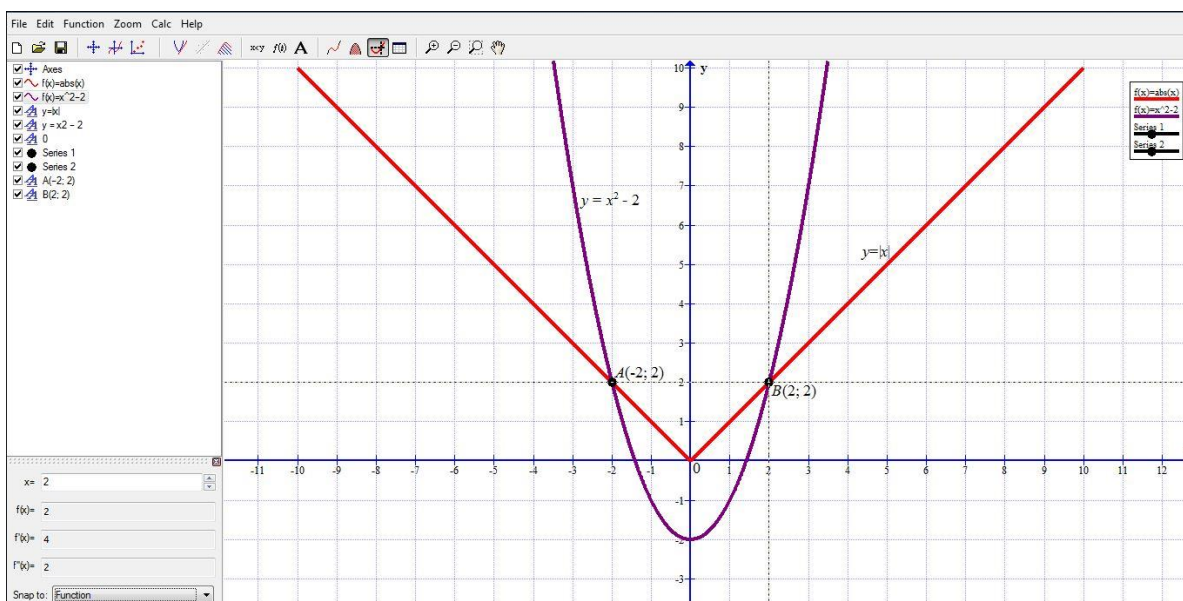


Figure 9.

**Task 3.**  $y = \frac{8}{x}$  with hyperbola  $y = x - 2$  find the intersection points of the straight line [3, p. 98].  $y = \frac{8}{x}$  and  $y = x - 2$  let us write the equations in the programming language in the "Function equation" field in the function of the function of the program in the

"insert function" submenu. Range, step, type of graphic display, color, thickness, marker according to parameters, etc. select the hyperbola and straight line graphs in the same coordinate system (Figure 10). The graphs intersect at two points. The coordinates of the intersection of the straight line graphs with the hyperbola are M (-2; -4) and N (4; 2).

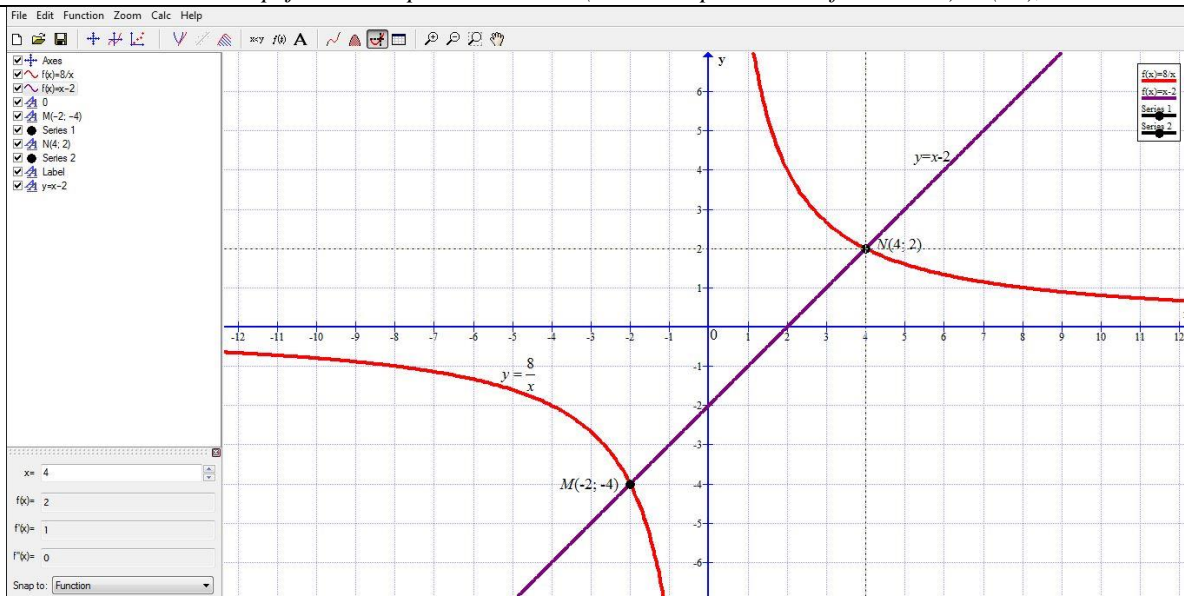


Figure 10.

**Task 4.** Solve the system of equations graphically

[3, p. 101]: 
$$\begin{cases} xy = 3 \\ y - x^2 = 2 \end{cases}$$

First of all given equations  $\begin{cases} y = \frac{3}{x} \\ y = x^2 + 2 \end{cases}$  let's draw a

picture and then write in the programming language

Graph. Set graphs with the same rule (Figure 11).  $y = \frac{3}{x}$  graphic hyperbola of the equation,  $y = x^2 + 2$  the graph of the equation is parabola. These graphs intersect at some point. The coordinates of the intersection points of the graphs are  $K(1; 3)$ . Hence, there is a solution to the given system of equations:  $(1; 3)$ .

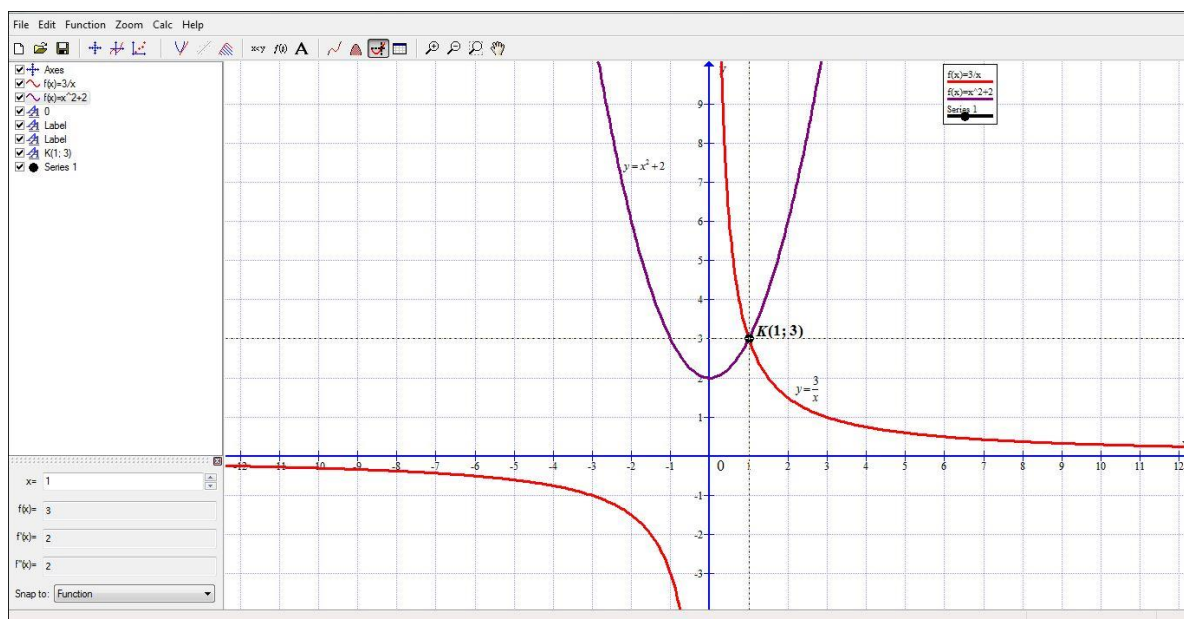


Figure 11.

From the solutions, it is clear that solving the equation system using the Graph 4.4 application is very cost effective.

**Conclusion.** The use of computer technology for learning and applying mathematical knowledge should be one of the main requirements of the modern course. The use of computer technology in math lessons helps students to develop and develop knowledge, skills and habits on topics they have learned, and to apply them to

real-world situations. It plays an important role in the formation of vital skills.

The society puts educational institutions at the forefront of education as a very important task to develop an independent, competitive, competitive creative personality. It is up to the teachers to carry out these tasks. Each teacher should be able to collect the latest practical knowledge, organize the pedagogical process based on the basic requirements for the

training, be able to implement training strategies, transfer knowledge to modern students with the use of modern learning technologies, and educate the future person.

Our goal as a teacher is to prepare our students and students not just for the final exams, but also for the future world, to develop their 21st-century skills and to develop a competitive, community-based identity.

It's hard to imagine the world without technology. Information technology has greatly simplified people's work, encompassing all areas of our lives. We can solve our problems by getting the right information at any site, without leaving our home, office, or where we are. Therefore, every student graduating from secondary schools must have basic knowledge in computer technology and be able to apply it in their future education or profession.

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## THE ESSENCE AND CONTENT OF THE DEFINITION "ORGANIZATIONAL FORMS OF TRAINING"

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## СУТНІСТЬ І ЗМІСТ ДЕФІНІЦІЇ «ОРГАНІЗАЦІЙНІ ФОРМИ НАВЧАННЯ»

**Анотація.** У статті представлено й теоретично обґрунтовано зміст і сутність дефініції «організаційні форми навчання», проаналізовано історію її розвитку в освіті від XVI ст. до сьогодення, розкрито різні підходи до визначення поняття в дослідженнях вітчизняних і зарубіжних учених, які згруповано у два напрями.

На основі проведеного аналізу автором встановлено залежність розуміння феномену форми організації навчання від філософського трактування категорії «форма» й «форма руху матерії» та на основі визначення сутності навчального процесу.

Особливу увагу приділено виокремленню зовнішніх і внутрішніх ознак категорії організаційні форми навчального процесу, інтеграція яких сприяє виконанню специфічних функцій.

**Abstract.** The content and essence of the definition of "organizational forms of learning" are presented and theoretically substantiated, the history of its development in education from the 16th century is analyzed. to date, various approaches to the definition of the concept in the research of domestic and foreign scientists are grouped in two directions.

The author analyzes the dependence of understanding the phenomenon of the form of the organization of learning on the philosophical interpretation of the category "form" and "form of movement of matter" and on the basis of determining the essence of the educational process.

Particular attention is paid to the separation of external and internal features of the category of organizational forms of the educational process, the integration of which promotes the performance of specific functions.

*Ключові слова: організаційні форми навчання, форма, філософське трактування, форма руху матерії, сутність навчального процесу, зовнішні ознаки, внутрішні ознаки*

*Keywords: organizational forms of learning, form, philosophical interpretation, form of movement of matter, essence of the educational process, external signs, internal signs.*

**Постановка проблеми:** Посилення ролі педагогічної науки на сучасному етапі модернізації української школи й розвитку суспільства обумовлює підвищення інтересу педагогів до організації освітнього середовища початкової школи, створення умов для його ефективного

формування й розвитку, встановлення відношень між всіма учасниками освітнього процесу в їх спільній діяльності. Разом з тим, учителі усвідомлюють залежність підвищення якості навчання від ряду факторів, серед яких значне місце займають організаційні форми навчання. По