Methodical Features of Using Innovative Technologies in Teaching Mathematics Using Geogebra Software

Kuchkarova Arofathon
Andijan State Pedagogical Institute Basic Doctoral Student (PhD)
Altinkol District, Andijan Region Special School Mathematics Teacher

Abstract

Graphing functions is an essential aspect of mathematics and is often used to represent and analyze various real-world phenomena. In recent years, technology has made graphing functions easier and more accessible. One of the most powerful tools available for graphing functions is Geogebra, a free, open-source software program that allows users to create and manipulate graphs with ease. In this article, we will explore how to use Geogebra to graph functions, including the steps involved and examples of different functions that can be graphed.

Keywords: Geogebra, graphing functions, software program, mathematics.

Introduction

Graphing functions is a critical tool for mathematics and is used in various fields, including physics, engineering, and economics. Traditionally, graphing functions required a significant amount of time and effort, but with the advent of technology, graphing functions has become much more comfortable and more accessible. One of the most popular software programs for graphing functions is Geogebra, which is an open-source and free software program that can be used to create and manipulate graphs easily. In this article, we will explore how to use Geogebra to graph functions and provide examples of different functions that can be graphed. Using Geogebra to Graph Functions: To use Geogebra to graph functions, the first step is to open the software program and create a new file. Once the file is created, select the "Algebra" tab and click the "+" icon to create a new function. In the "Input" box, enter the equation for the function you want to graph, such as "y = x^2." Geogebra will then create a new function with that equation.

To graph the function, click on the function in the Algebra tab, and then select the "Graphics" tab. In the Graphics tab, click the "Show object" checkbox to display the graph. The graph will be displayed in the coordinate plane in the Graphics tab, and you can adjust the size, color, and other parameters as desired.

Geogebra also allows you to graph multiple functions on the same coordinate plane. To do this, create a new function as described above and then select both functions in the Algebra tab. Next, click the "Graphics" tab and then click the "New graph" icon. The two functions will then be graphed on the same coordinate plane.

Examples of Functions Graphed in Geogebra: Geogebra can graph a wide variety of functions, including polynomial, trigonometric, exponential, logarithmic, and rational functions. Here are three examples of functions graphed in Geogebra:

1. y = x^2 - This is a basic polynomial function that can be graphed using Geogebra with ease. The resulting graph is a parabola that opens upward:
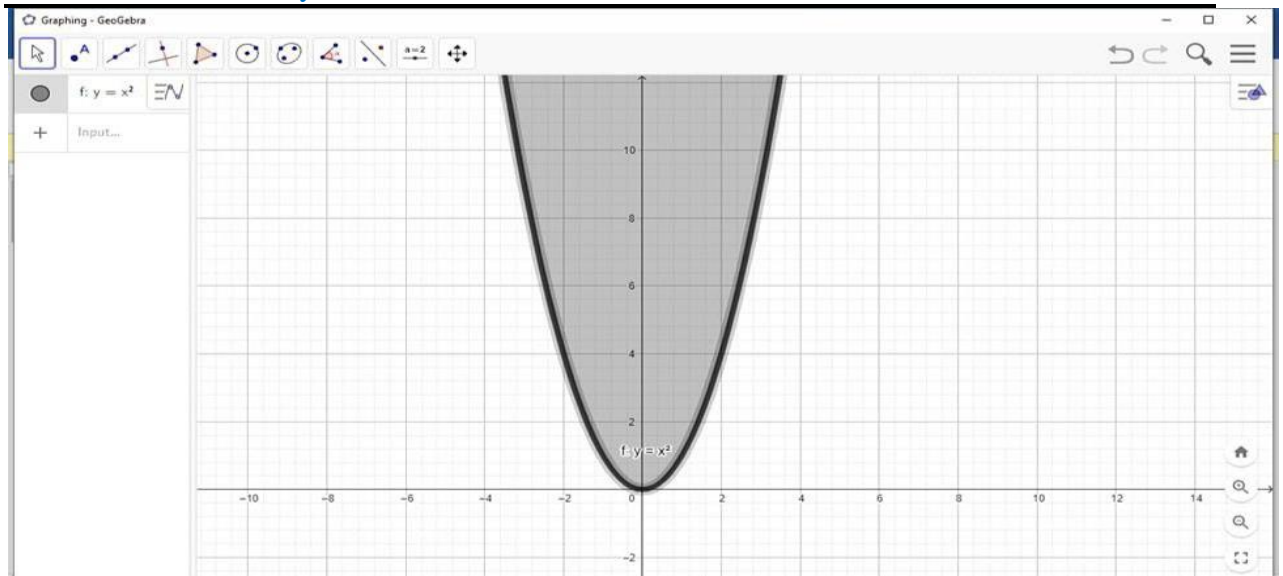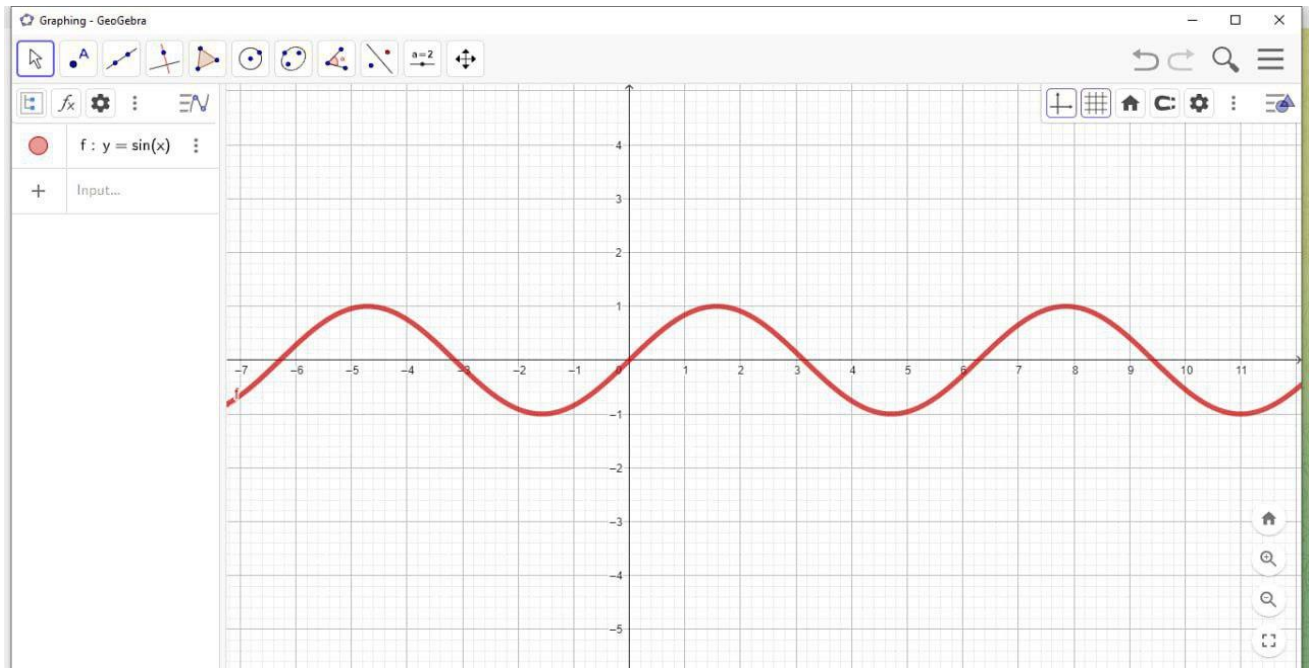
In general, if we see the graph of the function $y=ax^2+bx+c$, then we can see the state of change of the graph by assigning numerical values to the coefficients of the function in different intervals.
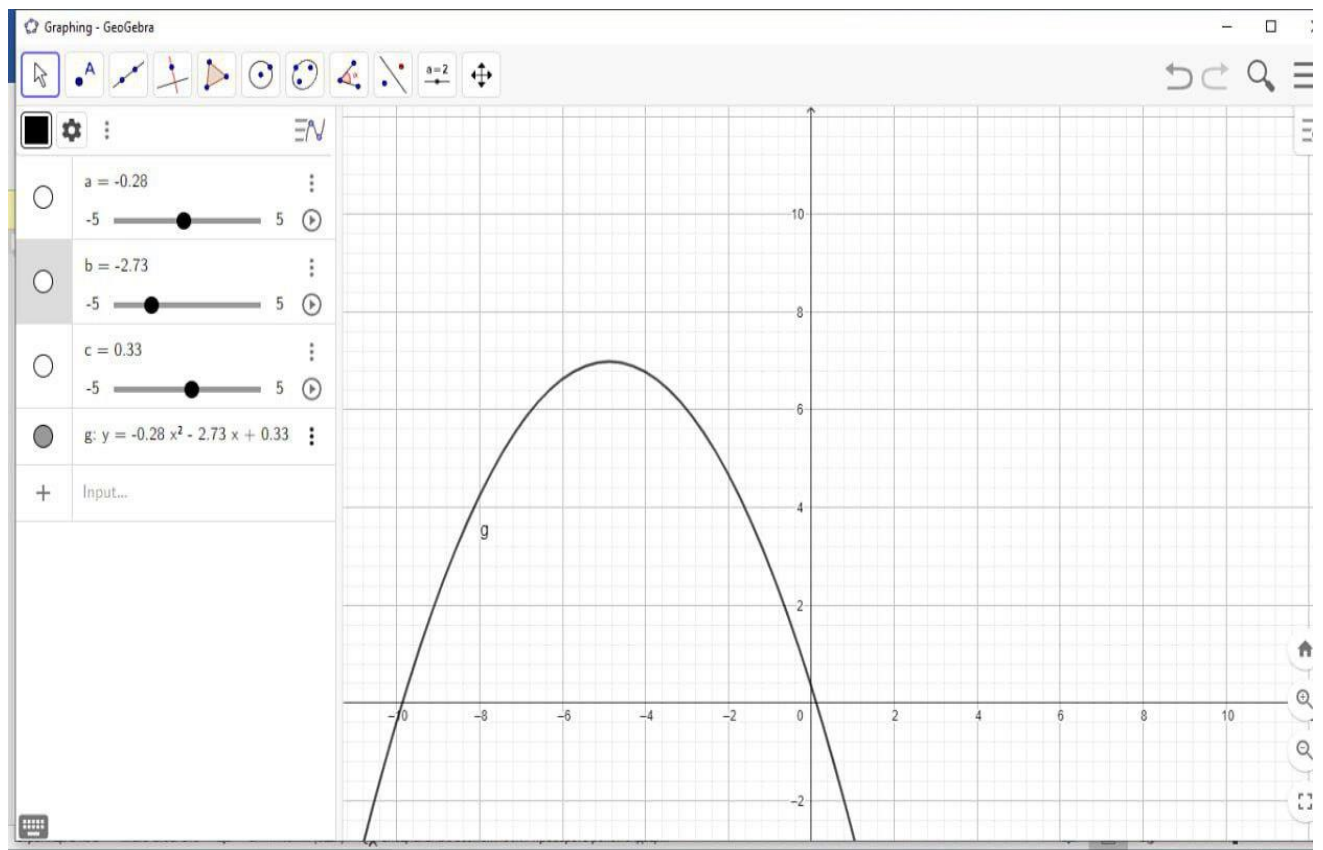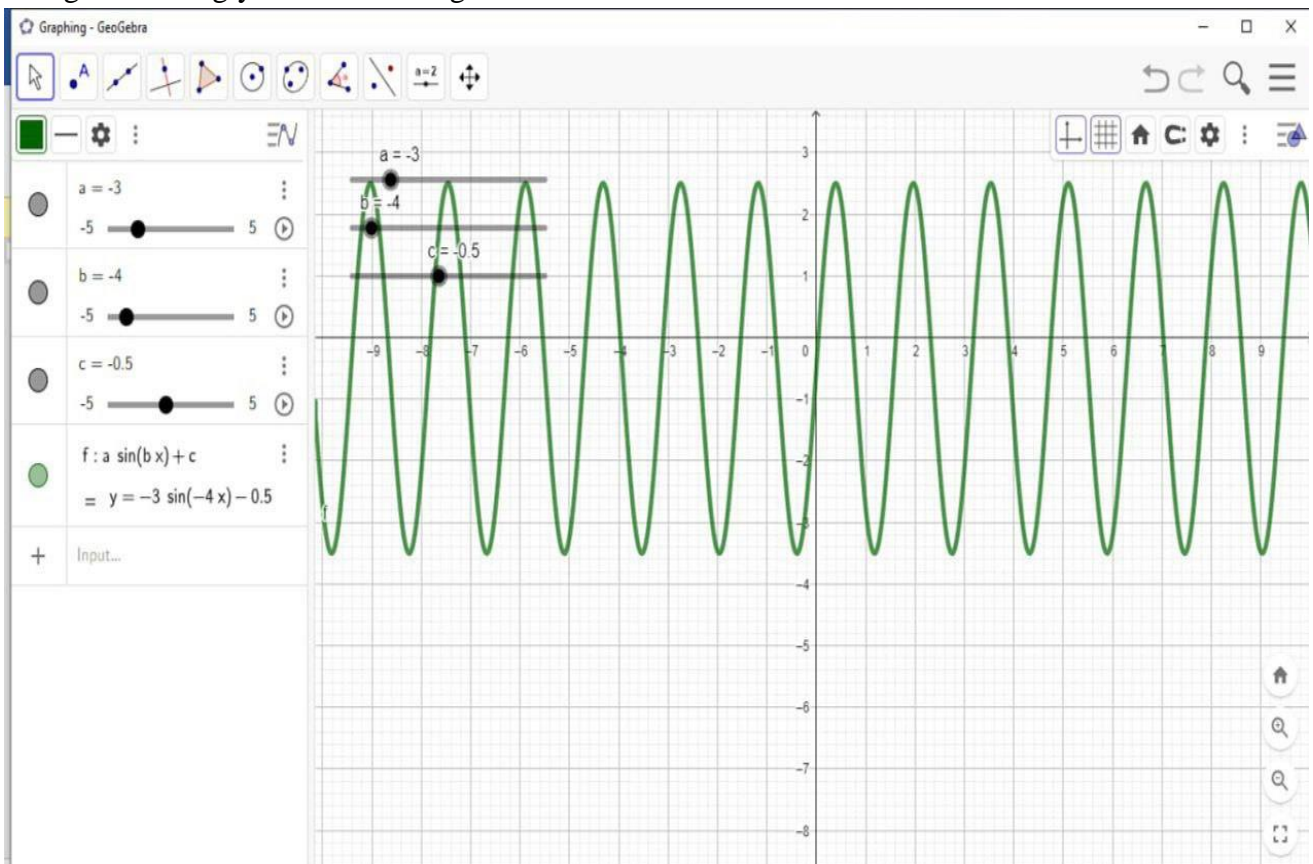
2. $y = \sin(x)$ This is a trigonometric function that can also be graphed in Geogebra. The resulting graph is a wave-like function that oscillates between -1 and 1.
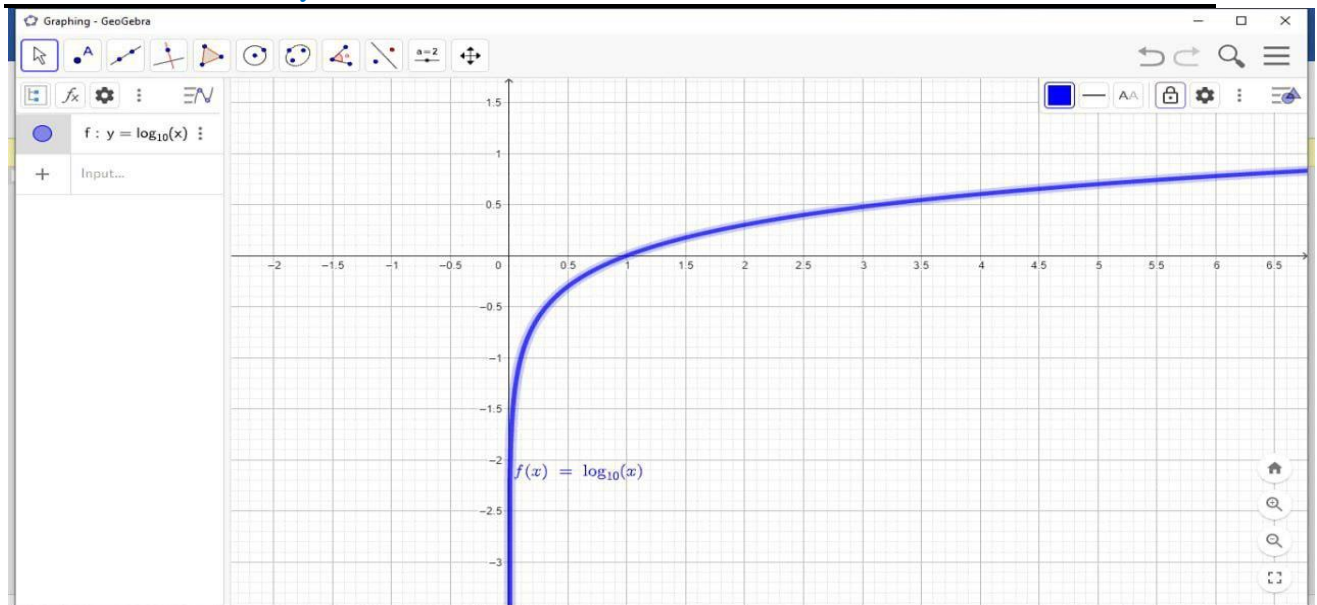

If we modify the above function based on its values, i.e. $y = a\sin(bx) + c$, then its graph will change accordingly in the following form:
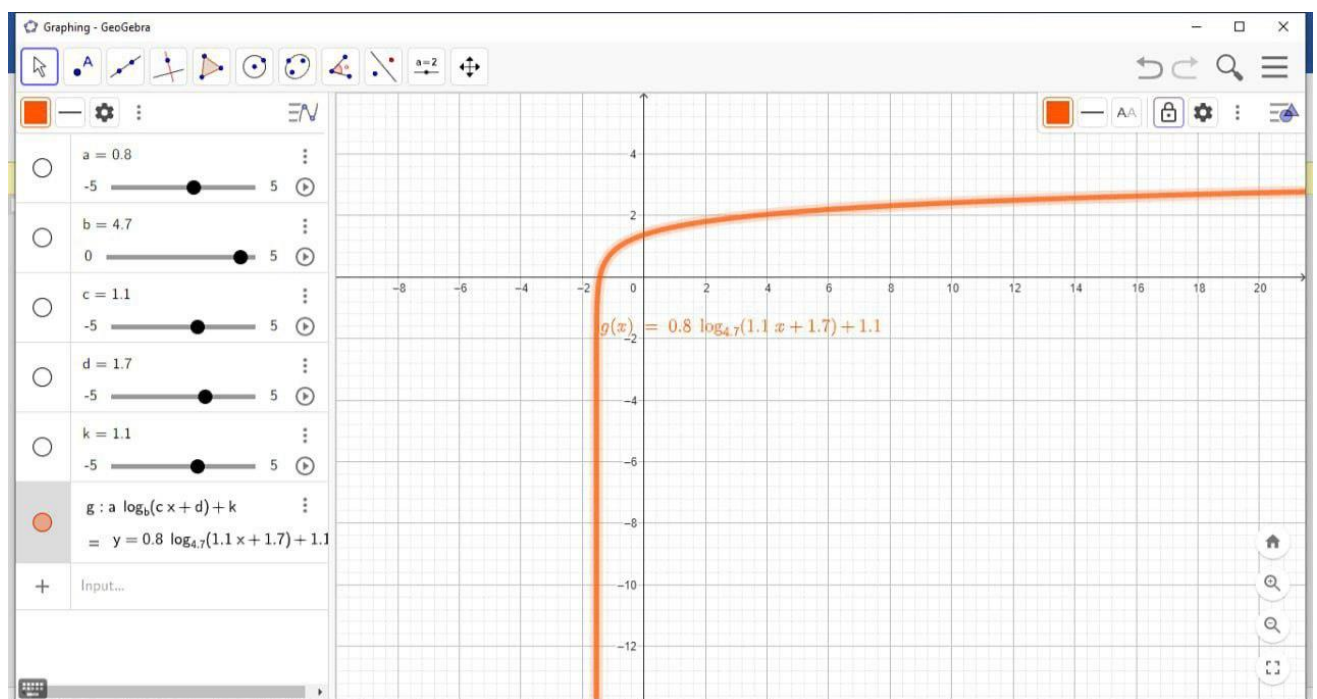

3. $y = \log(x)$ - This is a logarithmic function that can be graphed in Geogebra. The resulting graph is a curve that increases very slowly at first and then rapidly as x approaches infinity.

We can modify this function as well, i.e. We will express it in the form $y = a \, log_b(c \cdot x) + k$ and then plot its graph using geogebra software. The graph of this function is shown in the following image:

Conclusion:

Geogebra is a powerful tool for graphing functions, and it is easy to use for both beginners and advanced users. With Geogebra, users can create and manipulate graphs quickly and easily, and it is an excellent tool for exploring different functions and their properties. In this article, we explored how to use Geogebra to graph functions.

List of Used Literature

1. Tay Vaughan, Multimedia: Making It Work, 8th Edition, 2011
2. A. V. Krapivenko, «Methods and tools for processing audio and video data». Tutorial. Moscow M:. "University Book", 2010
3. "Mathematicians and the computer," a short textbook by Richard A. Tapia. "SIAM", 1998 y.
4. "GeoGebra: Mathematics in Motion" by Markus Hohenwarter. Springer, New York. 2013 y.
5. "GeoGebra for Beginners" by Markus Hohenwarter va Judith Preiner. CreateSpace Independent Publishing Platform Amazon.com Inc. 2012 y.