The American Journal of Social Science and Education Innovations
(ISSN – 2689-100x)
Published: March 31, 2021 | **Pages:** 450-455
Doi : https://doi.org/10.37547/tajssei/Volume03Issue03-69

IMPACT FACTOR
2021: 5. 857
OCLC - 1121105668

Teaching Function Graphs To Students Using Educational Methods

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ABSTRACT

This article highlights the role of educational technologies and some recommendations related to developing students 'interest in mathematics through the use of interactive learning technologies in drawing function graphs, quickly and meaningfully mastering the full verification stages before describing a function graph, and developing students' independent and creative abilities in the learning process.

KEYWORDS

Function, function graph, educational method, technology, checkING, monotonous, extremum, asymptote, interval, convex, concave, inflection point, “Cluster”, “Case-study”, “Heuristic learning”, “Water wheel”, interactive, teaching.

INTRODUCTION

Today, as in all areas, special attention is paid to education. Teaching each subject using modern information technology tools and pedagogical teaching methods is becoming a requirement of the times. In this regard, the organization of lessons using interactive educational technologies in the teaching of mathematics is very important and relevant. In

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particular, when drawing a graph of a function, information such as the properties of the function, its monotony, extremum values, asymptotes, the convexity or concavity of the function, and the inflection point are studied.

If the above information is determined using teaching methods, the student will gain more knowledge and skills by drawing a function graph perfectly in the student's imagination. Drawing a graph of a function is done on the basis of a complete test of this function (Figure 1). When checking the function completely, the following values are specified [1, 2]:

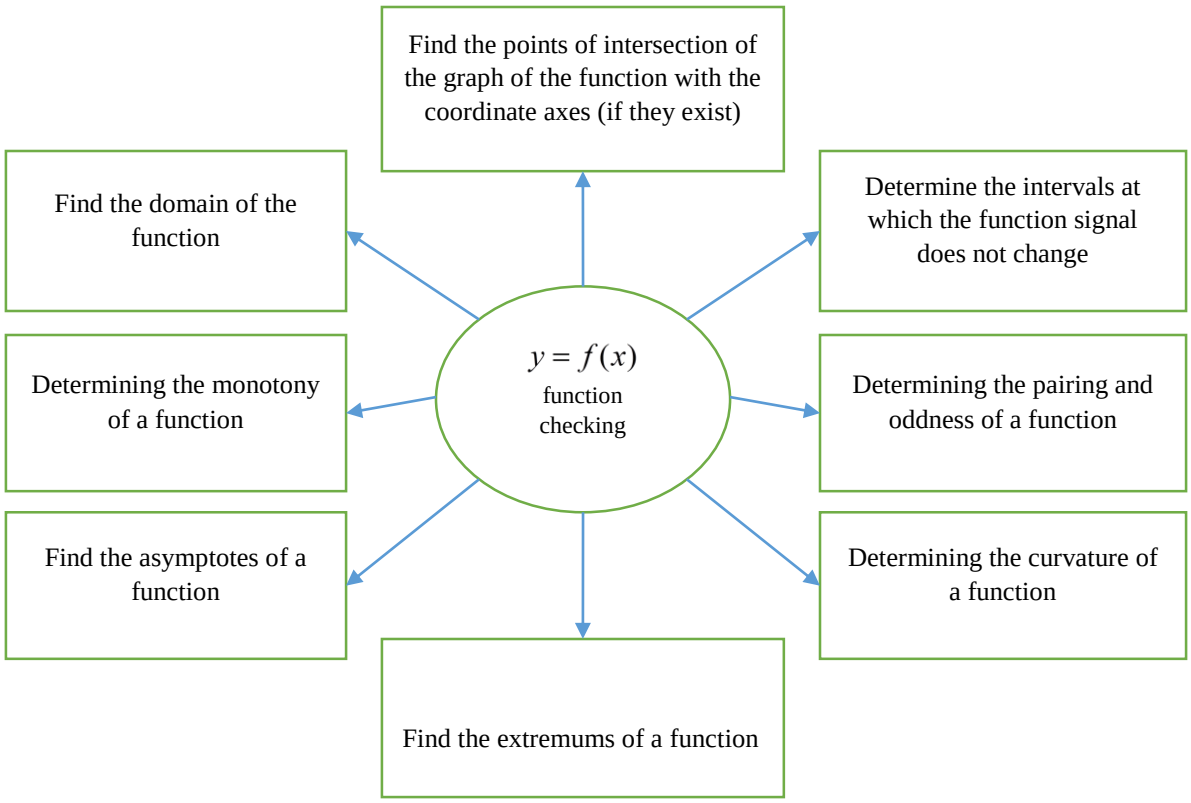

Figure 1. Cluster method of function verification

We will show how to identify some of the information presented in the full function $y = f(x)$ test diagram using teaching methods.

MATERIALS AND METHODS

The use of the Case-study method in determining the monotonic intervals of a function provides learning based on the study and analysis of specific situations. The process of determining the monotonic interval of a function is carried out step by step and based on a specific algorithm (Table 1) [3, 4, 5]:

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Table 1

"Keys-study" method for determining the monotonic intervals of a function

Stages of activity	Form and content of execution
Step 1. Monotony intervals of the function $y = f(x)$	The intervals at which a function increases and decreases are called the monotony intervals of the function.
Step 2. Function $y = f(x)$ increasing (decreasing)	$f(x_1) < f(x_2)$ $f(x_1) > f(x_2)$, when $x_1 < x_2$ for $\forall x_1, x_2 \in A$, the function is called incremental (decreasing) in the set A.
Step 3. Let the function $y = f(x)$ be differentiable in the interval $(a;b)$.	The increase or decrease of the function $y = f(x)$ is determined by the product.
Step 4. $f'(x)$ will be available at $\forall x \in (a;b)$	1) If $f'(x) > 0$, then the function increases in interval $(a;b)$. 2) If $f'(x) < 0$, then decreases in the interval $(a;b)$.

The use of the "Heuristic learning" method in finding the asymptotes of a function graph is not a literal memorization of definitions or formulas, but the study of the essence of vertical asymptotes, horizontal asymptotes and oblique asymptotes as well as the rules of origin forms its character of the depiction of function graph's asymptotes. We can illustrate its essence through this sequence shown in the following diagram (Figure 2) [4, 6, 7]:

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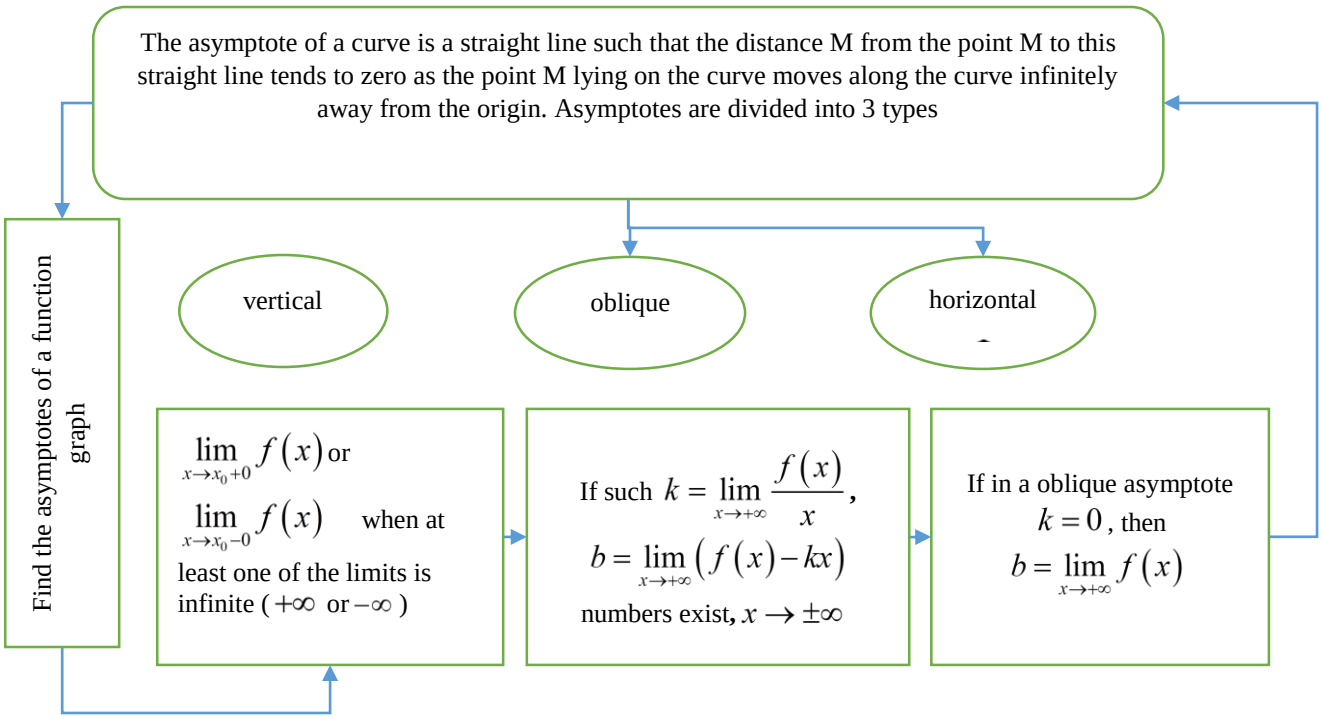

Figure 2. Heuristic learning method for finding the graphs of a function graph

Using the "Water wheel" method to determine the curvature and concavity intervals and bending points of a function, students develop the ability to assess, repeat, and reinforce the level of mastery of the topics covered. The function $y=f(x)$ has a second-order product in the interval, if $\forall x\in(a;b)$ $f''(x)<0$, the function is convex in the interval $(a;b)$; if $f''(x)>0$, the function is sunk in the interval [1, 3].

RESULT AND DISCUSSION

We know that $f''(x_0)=0$ and $f'''(x_0)\neq 0$ when the condition is satisfied, the point $M(x_0;f(x_0))$ becomes the inflection point of the function $f(x)$. It can be seen that the values of the function $y=f(x)$ are determined by expressing the curvature or concavity intervals and the inflection points in the following sequence (Figure 3) [3, 8, 9]:

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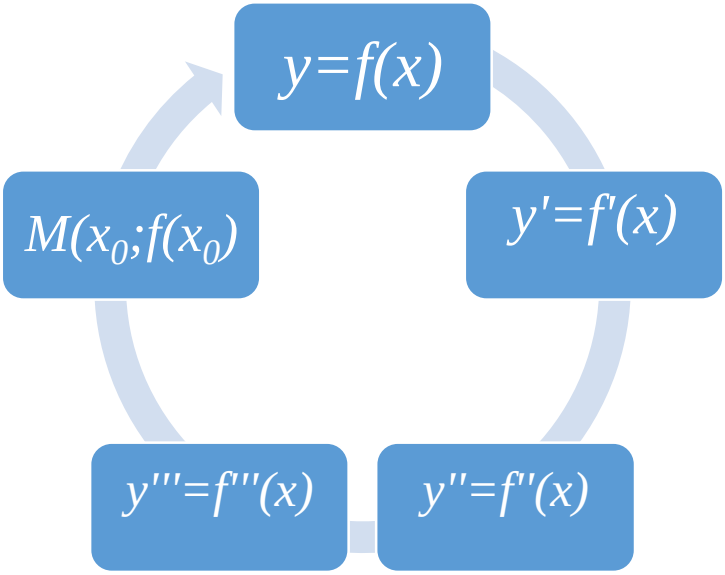

Figure 3. "Water wheel" method for determining the intervals of convexity and concavity of the function and the points of inflection

When we use teaching methods to plot functions, we organize teaching purposefully, meaningfully and divided into levels. This not only makes it interesting and understandable for students, but also serves to modernize the lesson [10]. Such training develops the student's ability to think independently on the topic. Also, the result of solid knowledge and skills can be gained for students to have some experience in the application of step-by-step calculations in drawing graphs of various functions in the future, and they can be directed to scientific research and studies. A meaningful lesson ensures that the goals are achieved and that students develop solid knowledge and skills.

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