

**Title**

Logarithms are not difficult

Logaritmi nisu teški

**Author(s)**

Name: Sladana Trajković Organization: Tehnička škola „15.maj“ Prokuplje Role: nastavnik matematike

**Short description/ main idea**

The logarithm is perhaps the single, most useful arithmetic concept in all the sciences; and an understanding of them is essential to an understanding of many scientific ideas. Logarithms may be defined and introduced in several different ways. This is one of the way to learn them easier.

**Learning objectives**

Cognitive - Knowledge: Factual, Conceptual, Procedural, Meta cognitive

Cognitive - Process: To remember, To understand, To apply, To think critically and creatively

Affective: To pay attention, To respond and participate, To organize values, To form and follow a system of values

Psychomotor: To imitate and try, To perform confidentially following instructions, To perform independently, skillfully and precisely, To adapt and perform creatively

**Learning activities**

Phase 1: New function

Description of phase: The teacher introduce students to some examples from the world of science through which observed a new function

Activities

1.1: I want to know

1.2: Laws of logarithms

Phase 1: Nova funkcija

Description of phase: Nastavnik upoznaje učenike sa nekim primerima iz sveta nauke preko kojih uočavaju novu funkciju

Activities

1.1: Hoću da znam

1.2: Pravila logaritmovanja

Phase 2: What we learned?

Description of phase: Discussion about homework. Examples from the world of science that students get, now can do. Students represent and solve the examples they found that use of logarithms.

Phase 2: Šta smo naučili?

Description of phase: Čas početi diskusijom o domaćem zadatku. Primere iz sveta nauke koje su učenici dobili , sada uraditi. Učenici predstavljaju i rešavaju primere koje su pronašli u kojima se koriste logaritmi.

**Language**

English

Serbian

**Grade & Age**

Age: Age 15-16

Age: 15-16 godina

Grade: secondary education

**Special need**

Visual, Auditive, Psychomotor

**Domain**

Mathematics>Numbers and Computation>Arithmetic>Number

**Keywords/subject**

logarithm, the use of logarithms, the decimal logarithms, natural logarithms

logaritam, primena logaritama, dekadni logaritmi, prirodni logaritmi

**Prerequisites**

Exponential functions

Eksponencijalne funkcije

**Difficulty**

medium

**Duration**

1 Hours & 15 Minutes

**Teaching approach**

Behaviourist: Programmed instruction, Drill and practise

Cognitivist: Direct instruction, Collaborative learning, Inquiry learning, Problem based, Reciprocal teaching

Constructivist: Action research, Communities of practice, Design-based learning

**Assessment strategy**

Diagnostic-assessment, Peer-assessment, Self-assessment, Summative assessment

**Phases**

1.New function

1.Nova funkcija

**Description of phase**

The teacher introduce students to some examples from the world of science through which observed a new function

Nastavnik upoznaje učenike sa nekim primerima iz sveta nauke preko kojih uočavaju novu funkciju

**Learning activities**

1.1 I want to know

## 1.1 Hoću da znam

Description: Teacher lesson begins with a presentation I want to know. It contains a number of questions: how to measure the strength of earthquakes, how to determine the age of archaeological finds? , how to measure the brightness of a star? how to determine the neutrality of the solution, etc. Through discussion, students talking about earthquakes and how they begin to lead a task which should be determined that the earthquake was stronger. To solve the task, students should be familiar with the formula for determining the magnitude of the earthquake. In this formula, the students perceive the function of the logarithm. Another problem that the teacher presents to students the process of determining the age of archaeological finds. The teacher introduces students to the method of determining the age of samples using radiocarbon C14 (in archeology, but also in other sciences) used since the mid-twentieth century. The task for students is to help archeologists to estimate how old a tree from which he made a tool that served early man if physicists measure the value of the isotope S-14 four times smaller than that of living things today? The problem of determining how to measure the brightness of a star? The teacher presents to students the concept of apparent stellar size or magnitude. Teacher ask students how can to determine the absolute magnitude of the Sun. Next question is: how to know which is the wind speed near the center of tornado. Here is the presentation: <https://www.youtube.com/watch?v=s1mPo8epXu8> Homework: Students should look at the video tutorial about logarithm and law of logarithms and try to do the examples they give. Video tutorial is here: <https://www.youtube.com/watch?v=y1lyTQmilJl>

Description: Through discussion, students talking about earthquakes and how they begin to lead a task which should be determined that the earthquake was stronger. To solve the task, students should be familiar with the formula for determining the magnitude of the earthquake. In this formula, the students perceive the function of the logarithm. Teacher lesson begins with a presentation I want to know. It contains few questions: how to measure the strength of earthquakes, how to determine the age of archaeological finds, how to measure the brightness of a star, how to determine the neutrality of the solution, how to know which is wind speed near the center of tornado. Students noticed a new function - logarithm. Presentation is here: <https://www.youtube.com/watch?v=s1mPo8epXu8> Resources

Educational objects (as file):

1. I want to know

Educational objects (as url):

1. <https://www.youtube.com/watch?v=s1mPo8epXu8>
2. Logarithms - video tutorial

Duration: 45 Minutes

## 1.2 Laws of logarithms

### 1.2 Pravila logaritmovanja

Description: Start discussion about the lessons that students are supposed to look. Repeat what logarithms and which are the basic rules of logarithmic. If it was an example that students were unable to do so, the teacher works with the students or for example a student who has done the examples. Students divided into four groups. The task for the first group: 2,4,8,16,64,256 using numbers and mathematical operations of addition, subtraction, multiplication and division, assemble logarithmic expressions (7 - 10 terms). The task for the second group: 3,9,18,27,63,81,6561 using numbers and mathematical operations of addition, subtraction, multiplication and division, assemble logarithmic expressions (7-10 terms). The task for the third group: Using the numbers 5,10, 25,625,64,15625 and mathematical operations of addition, subtraction, multiplication and division, assemble logarithmic expressions (7 - 10 terms). The task for the fourth group: Using the numbers 7,14, 28,49,343,2401 and arithmetic operations of addition, subtraction, multiplication and division, assemble logarithmic expressions (7-10 terms). The third part of the class: Students choose a group to do the tasks that they are put together. Each group sets the selected group task. 4. Winning group that has most accurately performed tasks. Homework: Each group solved tasks was compiled. View video tutorial on decimal and natural logarithms. Solved examples that students saw the first class using knowledge: 1 To measure the strength of earthquakes? 2 To determine the age of archaeological finds? 3 to determine the absolute magnitude of the Sun 4 Determine the pH value of the solution. Find similar examples of the application of logarithms.

Duration: 45 Minutes

## **PhasesPhases**

2.What we learned?

2.Šta smo naučili?

## **Description of phaseDescription of phase**

Discussion about homework. Examples from the world of science that students get, now can do. Students represent and solve the examples they found that use of logarithms.

Čas početi diskusijom o domaćem zadatku. Primere iz sveta nauke koje su učenici dobili , sada uraditi. Učenici predstavljaju i rešavaju primere koje su pronašli u kojima se koriste logaritmi.