

ALEX Lesson Plan

Logarithms: Undo the Exponential

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This lesson provided by:

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General Lesson Information

Lesson Plan ID:	35700
Title:	Logarithms: Undo the Exponential
Overview/Annotation:	In this lesson, students are asked to provide a written description of both an exponential function and its inverse. They are then introduced to the logarithmic function and will practice writing exponential functions as logarithms and logarithms as exponential functions. Students will evaluate logarithmic expressions and will solve logarithmic equations. <i>This lesson results from the ALEX Gap Resource Project.</i>

Associated Standards and Objectives

Content Standard(s):	Mathematics MA2015 (2016) Grade: 9-12 Precalculus	24) (+) Understand the inverse relationship between exponents and logarithms, and use this relationship to solve problems involving logarithms and exponents. [F-BF5]
Local/National Standards:		
Primary Learning Objective(s):	Students will recognize that a logarithm is the inverse of an exponential function. Students will be able to write an exponential function as a logarithmic function and vice versa. Students will be able to evaluate exponential expressions. Students will be able to solve logarithmic equations.	
Additional Learning Objective(s):		

Preparation Information

Total Duration:	31 to 60 Minutes
Materials and Resources:	Teachers: Index card for each student with round 0 labeled for rumor simulation. Computer connected to a Projector Exponential and Logarithms PowerPoint Presentation Copy of Exponential/Logarithms Worksheet (1 per student) Exponential and Logarithmic Exit Slip (1 per student/ 4 copies per page) Students: Index card for Rumor Simulation Copy of Exponential/Logarithms Worksheet Exponential and Logarithmic Exit Slip
Technology Resources Needed:	Teacher: Computer Projector PowerPoint Program Exponential and Logarithms PowerPoint Presentation
Background/Preparation:	Teacher: Prepare one index card per student. Label Round 0 on each card. On one of the cards write "yes" by Round 0 and on every other card write "no". Read the instructions for the simulation and be familiar with the procedure. Make copies of the Exponential/Logarithmic worksheet for each student. Make copies of the Exponential and Logarithmic Exit Slip for each student. Open the PowerPoint Presentation and be familiar with each slide. Students will need to: know how to find the inverse of a function. know how to find the answer to a number raised to a power.

Procedures/Activities:

Before: Conduct a [simulation](#) on the spread of a rumor. Each student is given a card with Round 0, Round 1, Round 2 etc. They will either have a *yes* or a *no* on their card by round 0. Students will stand up and mill around the room to look at the card of one other student. If they have *no* on their card, but the student whose card they look at has *yes* they now know the rumor. Continue round by round until all students know the rumor. Following the simulation, create a chart of each round and the number of students who knew the rumor. Graph the information and discuss with students that this is an example of an exponential function, more specifically, exponential growth. Explain to them that we will be solving problems involving exponential functions.

During: Open the [PowerPoint Presentation](#) and distribute the [Exponential/Logarithm worksheet](#) to students. Pair students to allow them to share ideas.

Slide 1: Introductory slide - Remind students that they will be learning more about exponential functions and how to find their inverses.

Slide 2: Ask students to examine the given function and provide a description of what process is performed by the function. Allow students to confer with each other and come to a consensus. Have them write their description on the

function. Allow students to confer with each other and come to a consensus. Have them write their description on the [Exponential/Logarithmic worksheet](#).

Slide 3: This slide and slide 4 ask students to consider the given function and reverse the processes. They are going to describe the domain and the range of the function and reverse them to find the inverse.

Slide 4: Now students are asked to take the reversed domain and range and write a description of what the inverse should do.

Slide 5: Give students the definition of a logarithm. Have students write the definition on their [worksheet](#). Explain that this is what the inverse is called.

Slide 6: Provide students with the correct form for both an exponential and a logarithmic function and show how they relate to each other. Allow students to discuss the procedure for changing an exponential function to a logarithmic function and vice versa and write the process on their [worksheet](#).

Slide 7: Ask students to evaluate logarithmic expressions. This should be an application of what they have just discussed. Circulate around the room and help any pairs that may be having difficulty.

Slide 8: Have students convert exponential functions to logarithmic functions. Allow students to work together to complete the problems.

Slide 9: Introduce the procedure for solving a logarithmic equation.

Slide 10: Ask students to solve the logarithmic equations on the [worksheet](#). Have them write their thinking in words as they solve the equations.

After:

Ask students to complete the [Exponential/Logarithmic exit slip](#). Use this exit slip to check for understanding.

Attachments:

**Some files will display in a new window.
Others will prompt you to download.

[Logarithms-Worksheet.docx](#)

[Logarithms-and-Exponents.pptx](#)

[Exponential-and-Logarithmic-Exit-Slip.docx](#)

Assessment

Assessment Strategies	Informal: The Exponential/Logarithmic worksheet can be used to assess student progress. Formal: The exit slips can be used to check for understanding.
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Acceleration:	Accelerated students can read or watch the video reading of the book, <i>One Grain of Rice: A Mathematical Folktale</i> . They can share this story with the rest of the class.
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Intervention:	Extra practice can be found here for students who are struggling. This website provides extra practice and an explanation if needed.
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View the [Special Education resources](#) for instructional guidance in providing modifications and adaptations for students with significant cognitive disabilities who qualify for the Alabama Alternate Assessment.