# Unit 9: Logarithm Functions, Expressions and Equations

Content Area: **Math**
Course(s):
Time Period:
Length: **11 classes (CP) 11 classes (Honors)**
Status: **Published**

## State Mandated Topics Addressed in this Unit

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|---|---|
| N/A | N/A |

## Logarithm Functions, Expressions and Equations

## Learning Objectives

- Objective 1 - Define appropriate quantities for the purpose of descriptive modeling.
- Objective 2 - Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
- Objective 3 - Use the properties of exponents to transform expressions for exponential functions. For example the expression 1.15t can be rewritten as (1.151/12)12t ≈1.01212t to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.
- Objective 4 - For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.
- Objective 5 - Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative).
- Objective 6 - Find the value of k given the graphs.
- Objective 7 - Experiment with cases and illustrate an explanation of the effects on the graph using technology.
- Objective 8 - Include recognizing even and odd functions from their graphs and algebraic expressions for them.

## Essential Skills

- Essential Skill 1 - Artists will be able to define quantities for descriptive modeling problems. (Incorporate appropriate units)

- Essential Skill 10 - Artists will be able to experiment with cases using technology.
- Essential Skill 11 - Artists will be able to recognize even and odd functions from their graphs.
- Essential Skill 12 - Artists will be able to recognize even and odd functions given an algebraic expression.
- Essential Skill 2 - Artists will be able to produce an equivalent form of an expression.
- Essential Skill 3 - Artists will be able to explain the properties of the quantity represented by an expression.
- Essential Skill 4 - Artists will be able to explain the properties of the quantity represented by an expression
- Essential Skill 5 - Artists will be able to transform exponential functions using the properties of exponents.
- Essential Skill 6 - Artists will be able to sketch a graph using the key features of a function.
- Essential Skill 7 - Artists will be able to interpret key features from a graph or a table of values. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.
- Essential Skill 8 - Artists will be able to identify the effect on a graph of f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k
- Essential Skill 9 - Artists will be able to find the values of k given a graph.

## Standards

| | |
|---|---|
| MATH.9-12.N.Q.A.2 | Define appropriate quantities for the purpose of descriptive modeling. |
| MATH.9-12.F.BF.B.3 | Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\ f(x)$, $f(kx)$, and $f(x + k)$ for specific values of $k$(both positive and negative); find the value of $k$ given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. |
| MATH.9-12.F.IF.B.4 | For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. |
| MATH.9-12.A.SSE.B.3.c | Use the properties of exponents to transform expressions for exponential functions. |

## Instructional Tasks/Activities

- Homework
- Ladder Activities
- Classwork
- Education Interactive Grades
- Kahoot Activities

## Assessment Procedure

- Class discussions
- Classroom Total Participation Technique

- Classwork/homework
- Compare/contrast journals
- DBQ
- Electronic active responders
- Essay
- Exit Ticket/Entrance Ticket/Do Now
- Identify the error problems
- Journal / Student Reflection
- Kahoot
- Other named in lesson
- Peer Review
- Performance
- Problem Correction
- Project
- Quiz
- Quizzes/Tests
- Response and analysis questions
- Rubric
- Teacher Collected Data
- Teacher observations
- Test
- Worksheet

## Recommended Technology Activities

- Appropriate Content Specific Online Resource
- Chromebook
- Copy/Paste Content Specific Link Here
- Copy/Paste Content Specific Link Here
- Copy/Paste Content Specific Link Here
- Desmos
- Gimkit
- GoGuardian
- Google Classroom
- Google Docs
- Google Forms
- Google Slides
- Kahoot
- MagicSchool AI

- Other- Specified in Lesson
- Quiziz
- Screencastify
- TI-Nspire CX-Cas activities throughout the unit as appropriate

## Accommodations & Modifications & Differentiation

Accommodations and Modifications should be used to meet individual needs. Their IEP and 504 plans should be used in addition to the following suggestions.

## Special Education

Modifications and accommodations to this unit will be based on individual IEP needs and through the collaboration of the
classroom teacher and the special education teacher under the direction of the Supervisor of Special Education.

## Gifted and Talented

- Compare & Contrast
- Conferencing
- Debates
- Jigsaw
- Peer Partner Learning
- Problem Solving
- Structured Controversy
- Think, Pair, Share
- Tutorial Groups

## Instruction/Materials

- alter format of materials (type/highlight, etc.)
- color code materials
- eliminate answers
- extended time
- extended time
- large print

- modified quiz
- modified test
- Modify Assignments as Needed
- Modify/Repeat/Model directions
- necessary assignments only
- Other (specify in plans)
- other- named in lesson
- provide assistance and cues for transitions
- provide daily assignment list
- read class materials orally
- reduce work load
- shorten assignments
- study guide/outline
- utilize multi-sensory modes to reinforce instruction

## Environment

- alter physical room environment
- assign peer tutors/work buddies/note takers
- assign preferential seating
- individualized instruction/small group
- modify student schedule (Describe)
- other- please specify in plans
- provide desktop list/formula

## Honors Modifications

The honors track will move at a faster pace for this unit. They will have more in depth critical thinking and analysis type
questions. They will also be able to use change of base to solve equations and derive the properties of logarithms.

## Resources

- https://education.ti.com/en/timathnspired/us/algebra-2
- https://njctl.org/courses/math/algebra-ii/