

Exponential and Logarithmic Functions

Curriculum Expectations

By the end of this course, students will:

- recognize the logarithm of a number to a given base as the exponent to which the base must be raised to get the number, recognize the operation of finding the logarithm to be the inverse operation of exponentiation, and evaluate simple logarithmic expressions
- determine the approximate logarithm of a number to any base, including base 10
- make connections between related logarithmic and exponential equations, and solve simple exponential equations by rewriting them in logarithmic form
- make connections between the laws of exponents and the laws of logarithms, verify the laws of logarithms, and use the laws of logarithms to simplify and evaluate numerical expressions
- determine key features of the graphs of logarithmic functions, and make connections between the algebraic and graphical representations of these logarithmic functions
- recognize the relationship between an exponential function and the corresponding logarithmic function to be that of a function and its inverse, deduce that the graph of a logarithmic function is the reflection of the graph of the corresponding exponential function in the line $y=x$, and verify the deduction
- determine the roles of the parameters c and d in functions of the form $y=\log(x-c)+d$ and the roles of the parameters a and b in functions of the form $y=a\log(bx)$, and describe these roles in terms of transformations
- pose problems based on real-world applications of exponential and logarithmic functions, and solve these and other such problems by using a graph or from its equation
- recognize equivalent algebraic expressions involving logarithms and exponents, and simplify these expressions
- solve exponential equations in one variable by determining a common base and by using logarithms
- solve simple logarithmic equations in one variable algebraically
- solve real-world problems involving exponential and logarithmic equations algebraically

Schedule of Topics

Day	Topic	Reading	Homework	Questions?
1	Exponential Functions and Their Inverses	§6.1	p.318 #1,2,5-12,21	
2	Introduction to Logarithms	§6.2	p.328 #1-11,13-15	
3	Transformations of Logarithmic Functions	§6.3	p.338 #1-13	
4	Properties of Logarithms	§6.4, §7.3	Worksheet	
5	Solving Exponential Equations: Change of Base	§7.1	p.368 #1-13	
6	Solving Exponential Equations: Other Methods	§7.2	p.375 #1-4,6-11,13-16	
7	Solving Logarithmic Equations	§7.4	p.391 #1-3,5,6,8-11	
8	Applications of Logarithms	§6.5	p.353 #1-4,6-12	
9	Unit Review	None	p.356, p.408 as covered	

Assessment and Evaluation

Quiz/Test/Task	Date	K	A	T	C

Skills Checklist

At the end of this strand, I am able to:

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| • Graph an exponential function and its inverse | [] Always | [] Often | [] Seldom |
| • Write exponential equations in logarithmic form, and <i>vice versa</i> | [] Always | [] Often | [] Seldom |
| • Estimate the value of a logarithmic expression | [] Always | [] Often | [] Seldom |
| • Identify transformations to $f(x)=\log(x)$, given an equation | [] Always | [] Often | [] Seldom |
| • Graph a logarithmic function, given a transformed equation | [] Always | [] Often | [] Seldom |
| • State an equation for the graph of a transformed log. function | [] Always | [] Often | [] Seldom |
| • Use the power law to simplify/evaluate a logarithmic expression | [] Always | [] Often | [] Seldom |
| • Change a logarithmic expression's base to simplify/evaluate it | [] Always | [] Often | [] Seldom |
| • Use the product/quotient laws to simplify/evaluate logarithms | [] Always | [] Often | [] Seldom |
| • Solve an exponential equation by changing base | [] Always | [] Often | [] Seldom |
| • Solve an exponential equation using logarithms | [] Always | [] Often | [] Seldom |
| • Identify extraneous solutions to logarithmic equations | [] Always | [] Often | [] Seldom |
| • Solve log. equations by rewriting them in exponential form | [] Always | [] Often | [] Seldom |
| • Solve log. equations by applying the laws of logarithms | [] Always | [] Often | [] Seldom |
| • Recognize applications of log. functions (e.g. pH, intensity) | [] Always | [] Often | [] Seldom |
| • Solve word problems involving exponential/logarithmic functions | [] Always | [] Often | [] Seldom |

Student Comments

Parent/Guardian Comments

Teacher Comments