Topic 6.3 Logarithms

Essential Question:
What are logarithms and how are they evaluated?

CONCEPT: Exponential vs. Logarithmic Form

Exponential form shows that a base raised to an exponent equals the result.

$$a^b = c$$

Logarithmic form shows that the log of the result with the given base equals the exponent.

$$\log_a c = b$$

When written in logarithmic form, the number that was the result of the exponential equation is often called the argument.

CONCEPT Summary: Logarithms

	Exponential Form		Logarithmic Form
ALGEBRA	$b^x = y$	$\longleftrightarrow$	$\log_b y = x$
WORDS	The base raised to the exponent is equal to a result.		The logarithm with a base b of the result (or argument) is equal to the exponent.
NUMBERS	$3^4 = 81$	$\longleftrightarrow$	$\log_3 81 = 4$

Q: Explain the relationship between logarithms and exponents.
Q: When is it useful to convert between exponential and logarithmic forms?

Notes:

Examples & Questions

Examples 1

Q: How is solving $2^x = 8$ similar to solving $2x = 8$? Different?

Q: You can calculate the value of x in $2^x = 8$ without rewriting the function as $\log_2 8 = x$. When might it be necessary to use this notation?

Examples 2

Q: Why might you find it necessary to convert from one representation of the relationship in an exponential or logarithmic equation to the other?

Q: What are the exponential and logarithmic equations that show how 2, 4, and 25 are related?

Examples 3

Q: Must all parts of a logarithmic expression be positive?

Examples 4

Q: Why can the exponential form of the expression be used to check your answers?

Examples 5

Q: How is solving exponential and logarithmic equations similar to solving liner equations? How is it different?

Examples 6

Q: How does converting the form of the equation help to find the magnitude of the earthquake?

Practice and Problem Solving

Complete MathXL for School: Practice and Problem Solving (online)
Complete MathXL for School: Enrichment (online)

Challenge: # 13, 15, 17, 18, 57 – key will be posted in Power School Learning.

Lesson Quiz 6.3/Notes