

Pre Calculus

Date:

Items Needed: .Book,

Objective: The students will be able to evaluate, graph, and recognize logarithmic functions.

PA Common Core: cc.2.2.hs.c.3, cc.2.2.hs.c.5

Lesson:

- In a previous section we talked about the inverse and that if a horizontal line intersects a continuous graph at one point then an inverse exists.
- A logarithmic function is the inverse of an exponential function.
- Graph $f(x) = 10^x$ and graph $f(x) = \log x$
- Discuss the definition of a log function. p. 192.
- The equations $y = \log_a x$ and $x = a^y$ are equivalent.
- When evaluation logarithms, remember that a logarithm is an exponent. This means that $\log_a x$ is the exponent to which a must be raised to obtain x .
- $\log_2 8 = 3$ because 2 must be raised to the third power to get 8.
- Look at Example 1.

- Point out the log button on the calculator. It only deals with the log to base 10. There are other techniques to solve equations with other bases.
- Do one or two examples in example 2.

- Put up the properties of logarithms.
- Talk about each according to the definition of a log.
- Do example 3.
- Look at example 4 to compare the inverse properties of exponential function and the logarithmic function.
- Look at the Library of Parent functions – Logarithmic, and go over its properties.

- The natural logarithmic function is defined by $f(x) = \log_e x = \ln x$ where $x > 0$.
- Graph $f(x) = e^x$ and $f(x) = \ln x$ what can you tell be about these two functions. They are inverses of each other.
- Since they are inverse of each other every logarithmic equation can be written in an equivalent exponential and vice-versa.
- $y = \ln x$ and $x = e^y$ are equivalent equations. Show this from notes on the top of TE 196.

- Point out the \ln button on the calculator.

- Do example 7c.
- Put up on the board the properties of natural logarithms.
- Do example 8.
- Do example 9. Point out that this will be important down the road.
- Look at example 10.

Assignment: .Have students do 9, 12, 15, 18, 23-27, 30, 31-40, 51-54, p.199.
Have students do 63, 66, 69, 72, 77, 80-88, 94, 96, 98, 112, p. 200.

Evaluation: (Could be from any one/several of the following)

Responses from classroom questions
Results of classroom sample problems
Homework responses
Check answer with Calculator
End of the section exam

Enrichment: