Jenny Au
Lesson 5
10/11/12

Summary of Lesson: Log what is it?

I began the topic by briefly reminding the students that logarithms were mentioned before in previous lectures. Students were shown two graphs that depict linear scale and log scale. They were asked what the difference between the two graphs was. Logarithms and exponents are shown that they are inverse of one another. At the end of class, they were shown a slide rule as a historic logarithmic calculator.

GK-12 Lesson Plan

Teacher: Eileen Montbleau
Period: Class: Lowell High School Freshman Physics
Date(s): 10/11/12

SETTING THE STAGE	
Essential Question	What are logarithms?
Content Objective(s) (Student-friendly)	Objective is to have students understand how to use logarithms
Connection to previous or future lessons	Logarithm is related to dB which is related to sound
Critical Thinking Questions	Why use logarithms?
Key Vocabulary	Logarithms, logarithmic scale, linear scale, exponent
Materials Needed/Safety	Power point, slide rule
ACTIVE INSTRUCTION	
• Launch (Engage)	Two simple line graphs are shown. One is the linear scale and the other is the logarithmic scale. On the linear line graph, values on the x-axis are in increments of +10 or -10. This shows addition or subtraction. On the log line graph, values on the x-axis are in multiples of 10 or 1/10. This shows multiplication or division.
• Investigation (Explore)	Logarithm is explained using a simple math example of exponential function and its inverse (logarithmic function). The definition for logarithmic function was given. A data table of different values of log based 10 was shown. A graph of linear scale and
TIME FOR REFLECTION	
• Summarization (Explain & Extend)	Students were shown linear scale and log scale. They were asked what the difference between the two graphs was. They were shown a slide rule as a historic logarithmic calculator.
• Assessment (Evaluate)	Active Feedback.
• Homework	None

Logarithms: What is it?

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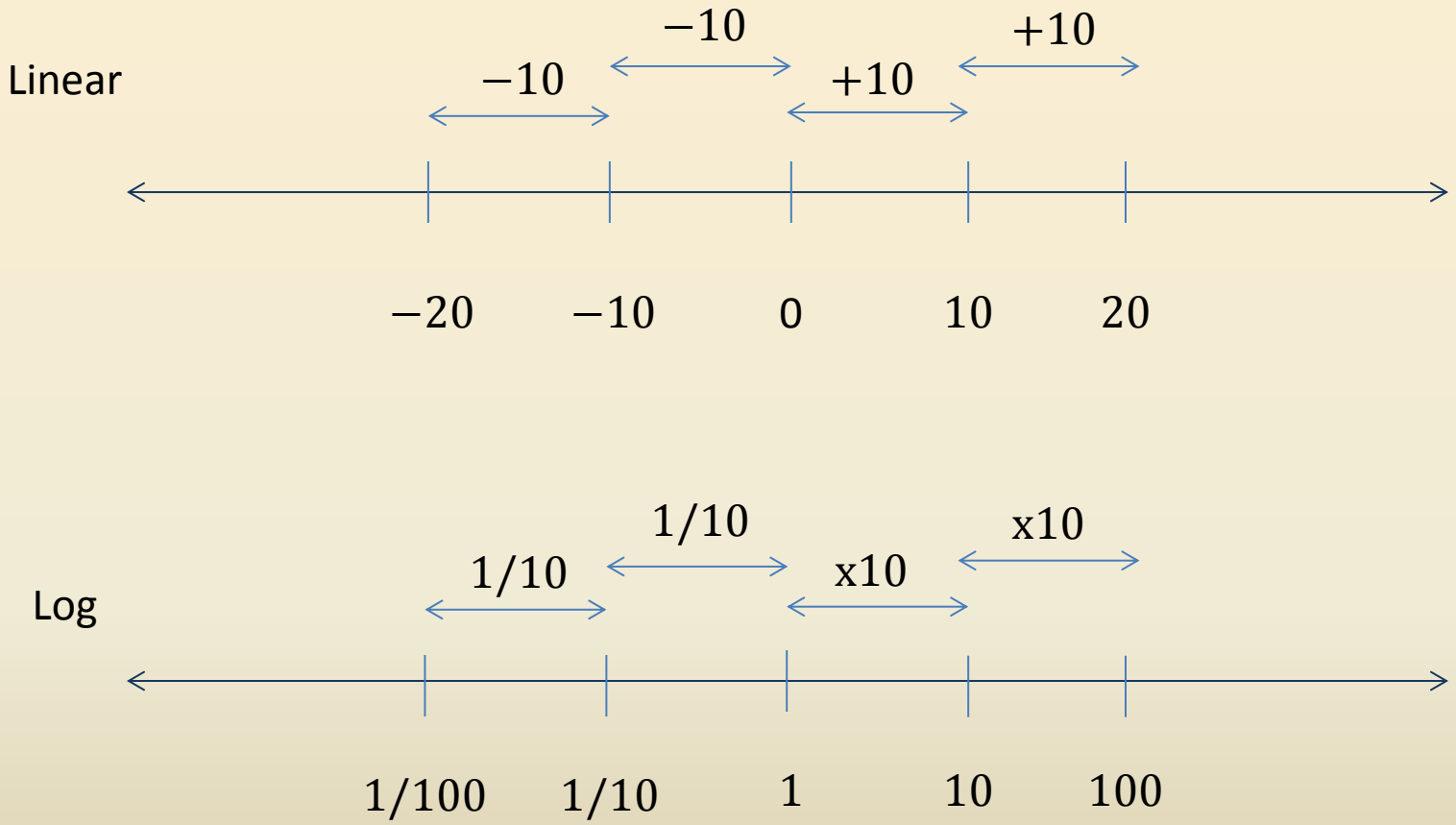
Linear vs Logarithmic Scale



Logarithm

- The inverse of taking the exponent of something

Exponential Function $2^3 = 2 \times 2 \times 2 = 8$

Logarithmic Function $\log_2 8 = 3$

Logarithmic Function

DEFINITION

If $b > 0$ and $b \neq 1$, then

$$y = \log_b x$$

for every $x > 0$ and every real number y.

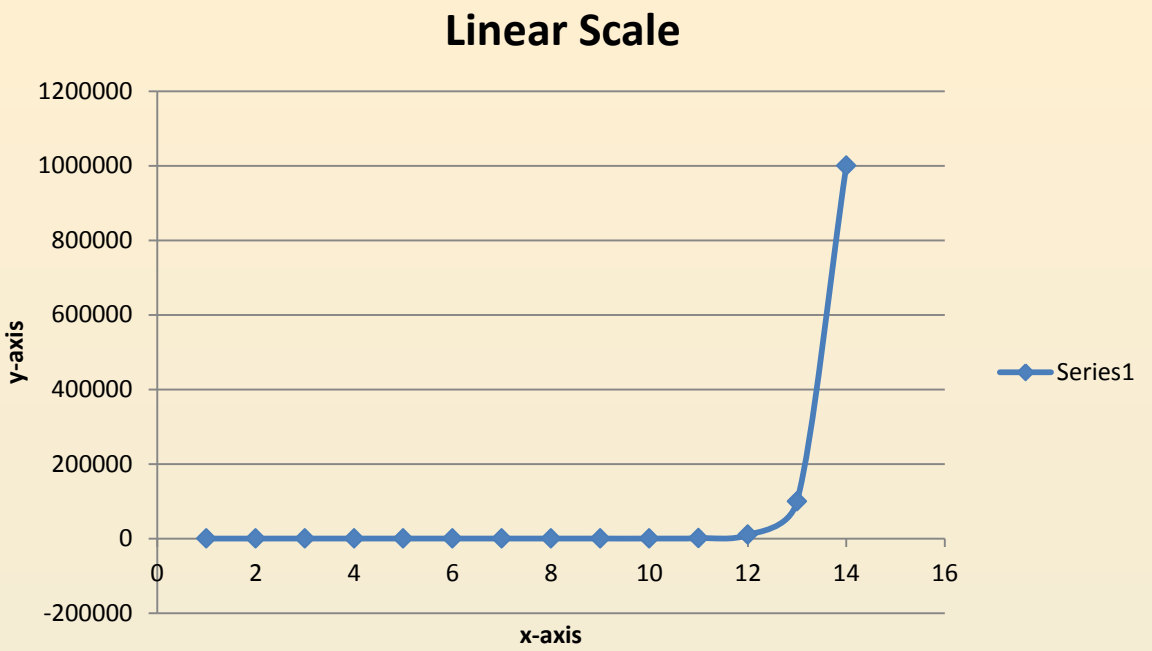
Exponential Function

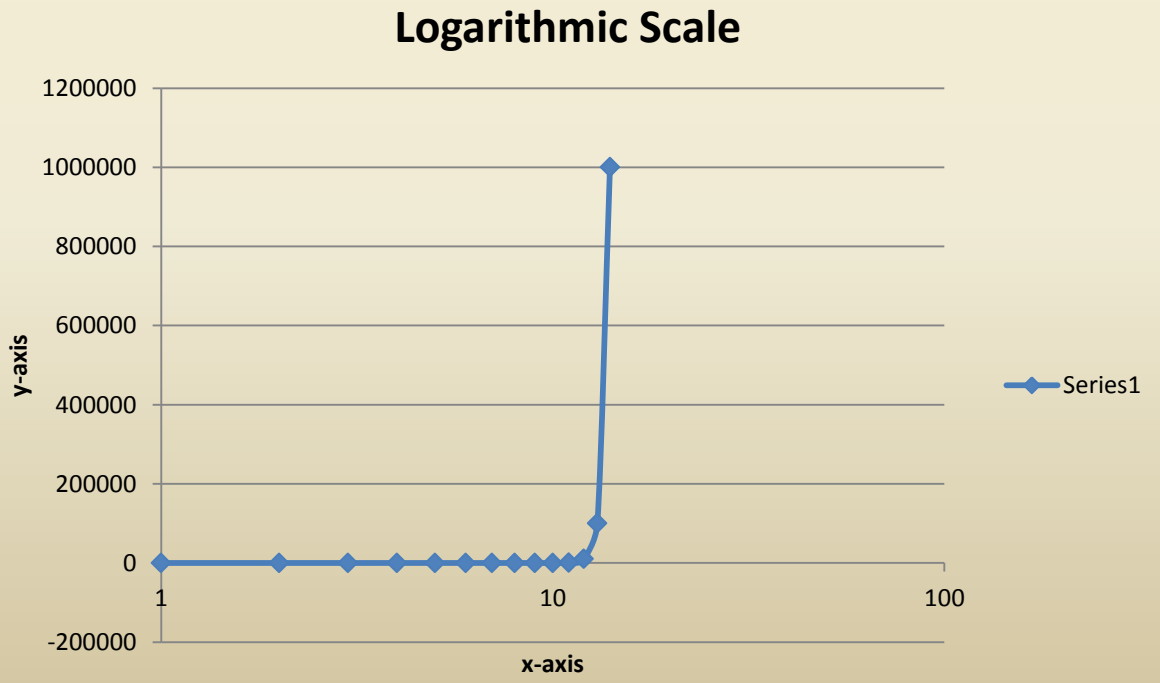
$$x = b^y$$

Logarithms

$log_b x$	y	$x = by$
$\log_{10}0$	undefined	$0 = 10^y$
$\log_{10}1$	0	$1 = 10^0$
$\log_{10}2$	0.3	$2 = 10^{0.3}$
$\log_{10}3$	0.48	$3 = 10^{0.48}$
$\log_{10}4$	0.6	$4 = 10^{0.6}$
$\log_{10}5$	0.7	$5 = 10^{0.7}$
$\log_{10}6$	0.78	$6 = 10^{0.78}$
$\log_{10}7$	0.85	$7 = 10^{0.85}$
$\log_{10}8$	0.9	$8 = 10^{0.9}$
$\log_{10}9$	0.95	$9 = 10^{0.95}$
$\log_{10}10$	1	$10 = 10^1$
$\log_{10}1000$	3	$1000 = 10^3$
$\log_{10}1000000$	6	$1000000 = 10^6$

x-axis	y-axis
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	1000
12	10000
13	100000
14	1000000

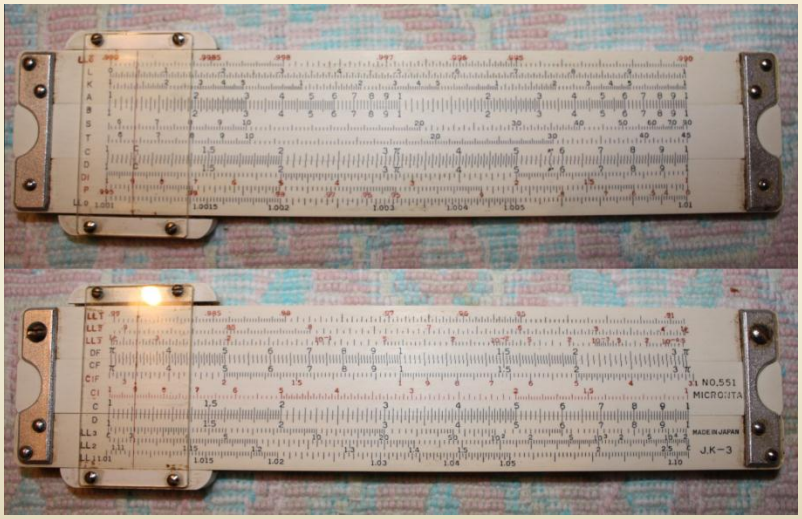




How can you calculate Logarithms?

Slide Rule

- Mechanical analog computer (1620-1630)-(1974)
  - Multiplication and division
  - Roots, logarithms, trigonometry



- 2000 BC - 1600 BC: Babylonians
- 1614 AD: John Napier - Inventor of Logarithms