


Write your questions  
and thoughts here!

**BIG IDEA**

$$\begin{aligned} \log_b c &= a \\ \text{if and only if} \\ b^a &= c \\ b > 0 \text{ and } b &\neq 1 \end{aligned}$$

Let's rewrite the following logarithms as exponents.

Ex 1:  $\log_3 81 = 4$

Ex 2:  $\log_{16} 4 = \frac{1}{2}$

Let's rewrite the following exponents as logarithms.

Ex 3:  $125^{\frac{1}{3}} = 5$

Ex 4:  $10^3 = 1000$

Find the value of each log.

Ex 5:  $\log 100$

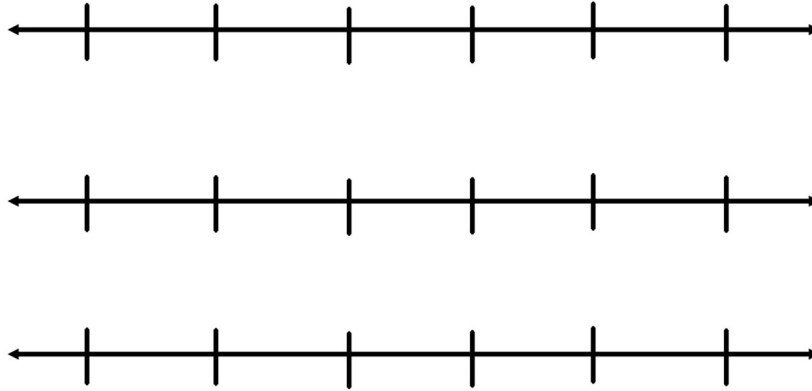
Ex 6:  $\log_2 \frac{1}{32}$

Ex 7:  $\log_4 25$

Ex 8:  $\log 39$

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Algebro	Average Length of Video in seconds
Sully	505 seconds
Brust	830 seconds
Bean	1440 seconds
Kelly	10,160 seconds



Try These:

Rewrite the exponent as a log.

1)  $16^{\frac{3}{4}} = 8$

Rewrite the log as an exponent

2)  $\log_{32} 4 = \frac{2}{5}$

Evaluate each log

3)  $\log_{25} x$ , when  $x = 5$

4)  $\log_6 x$ , when  $x = 12$

## 2.9 Logarithmic Expressions

## 2.9 Practice

AP Precalculus

**Directions: Rewrite the following logarithms as exponents.**

1)  $\log_2 64 = 6$

2)  $\log_4 \frac{1}{64} = -3$

3)  $\log_{25} 125 = \frac{3}{2}$

**Directions: Rewrite the following exponents as logarithms.**

4)  $10^3 = 1000$

5)  $16^{\frac{5}{2}} = 1024$

6)  $10^{-2} = \frac{1}{100}$

**Directions: WITHOUT using a CALCULATOR, find the value of logarithm. SHOW WORK.**

7)  $\log_5 625$

8)  $\log 100,000$

9)  $\log_{27} 81$

**Directions: Use a CALCULATOR to find the value of logarithm. Round to three decimal places.**

10)  $\log 140$

11)  $\log_9 120$

12)  $\log_3 18$

**Directions: For the given data construct a plot using a LOGARITHMIC scale using the given bases. Be sure to label your axis and show your math.**

12) Logarithmic Scale of base 10.

Person	Midichlorians Found in Cells
Chewbacca	1
Han Solo	330
Luke Skywalker	125,000
Yoda	2,750,000
Anakin Skywalker	20,000



13) Logarithmic Scale of Base 2

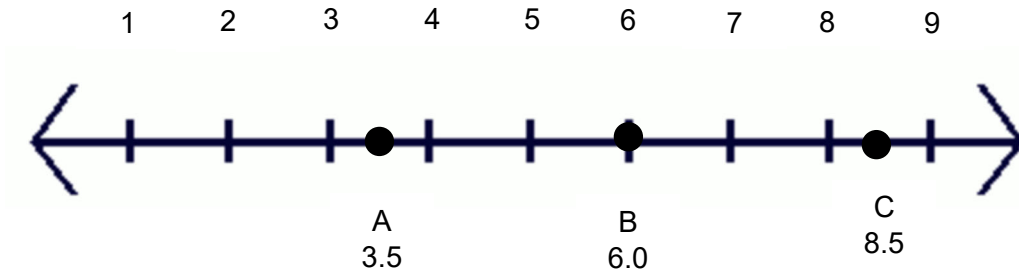
Person	Errors Per Section
Bean	5
Brust	68
Sullivan	24
Kelly	15
New Teacher	300



## 2.9 Logarithmic Expressions

## 2.9 Test Prep

The Richter Scale is a common way of measuring earthquakes around the world. The scale measures the amplitude of the waves from the seismic activity. The Richter Scale uses a logarithmic scale of base 10. Since it uses this scale it means that each order of magnitude is 10 times greater than the previous one. So a 6.0 earthquake is ten times intense then a 5.0 earthquake.



14. Which statements most accurately describes how much more intense Earthquake C was than Earthquake A.
- Earthquake C is 5 times more intense.
  - Earthquake C is  $5 \times 10$  or 50 times more intense.
  - Earthquake C is  $10^5$  or 100,000 more intense.
  - Earthquake C is log 5 times more intense.
15. Which of the following statements is true.
- The increase in intensity from Earthquake A to B is greater than the increase in intensity from Earthquake B to C.
  - The increase in intensity from Earthquake A to B is less than the increase in intensity from Earthquake B to C.
  - The increase in intensity from Earthquake A to B is the same as the increase in intensity from Earthquake B to C.