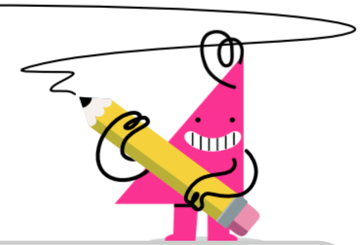
Name ______________________



Logarithmic Scales - Magnitude Difference to Measured Value Ratio

1

If an earthquake has a magnitude 0.1 higher on the Richter scale what is the ratio of their wave size measurements?

$$M = \log\left(\frac{I}{I_0}\right)$$

$$M_2 - M_1 = 0.1$$

A	B
$\frac{I_2}{I_1} = 39.8$	$\frac{I_2}{I_1} = 1.26$

2

If an earthquake has a magnitude 3.2 higher on the Richter scale what is the ratio of their wave size measurements?

$$M = \log\left(\frac{I}{I_0}\right)$$

$$M_2 - M_1 = 3.2$$

A	B
$\frac{I_2}{I_1} = 1,585$	$\frac{I_2}{I_1} = 15.8$

3

If an earthquake has a magnitude 2.1 higher on the Richter scale what is the ratio of their wave size measurements?

$$M = \log\left(\frac{I}{I_0}\right)$$

$$M_2 - M_1 = 2.1$$

A	B
$\frac{I_2}{I_1} = 126$	$\frac{I_2}{I_1} = 12,589$

4

If an earthquake has a magnitude 3.1 higher on the Richter scale what is the ratio of their wave size measurements?

$$M = \log\left(\frac{I}{I_0}\right)$$

$$M_2 - M_1 = 3.1$$

A	B
$\frac{I_2}{I_1} = 1,259$	$\frac{I_2}{I_1} = 39,811$

5

If an earthquake has a magnitude 3.7 higher on the Richter scale what is the ratio of their wave size measurements?

$$M = \log\left(\frac{I}{I_0}\right)$$

$$M_2 - M_1 = 3.7$$

A	B
$\frac{I_2}{I_1} = 501$	$\frac{I_2}{I_1} = 5,012$

6

If an earthquake has a magnitude 7.3 higher on the Richter scale what is the ratio of their wave size measurements?

$$M = \log\left(\frac{I}{I_0}\right)$$

$$M_2 - M_1 = 7.3$$

A	B
$\frac{I_2}{I_1} = 2 \times 10^8$	$\frac{I_2}{I_1} = 2 \times 10^7$

7

If a sound has a dB magnitude 46 higher on the decibel scale what is the ratio of their sound energy measurements?

$$dB = 10\log\left(\frac{I}{I_0}\right)$$

$$\beta_2 - \beta_1 = 46$$

A	B
$\frac{I_2}{I_1} = 158,489$	$\frac{I_2}{I_1} = 39,811$

8

If a sound has a dB magnitude 27 higher on the decibel scale what is the ratio of their sound energy measurements?

$$dB = 10\log\left(\frac{I}{I_0}\right)$$

$$\beta_2 - \beta_1 = 27$$

A	B
$\frac{I_2}{I_1} = 501$	$\frac{I_2}{I_1} = 2,512$