Name

Logarithmic Scales - Measured Value Ratio to Magnitude Difference

1

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

$$\frac{I_2}{I_1} = 10$$

If a sound has 10 times the sound energy as another what is their difference on the decibel scale?

A	B
$\beta_2 - \beta_1 = 10$	$\beta_2 - \beta_1 = 11$

2

$$pH = -\log[H^+]$$

$$\frac{[H^+]_2}{[H^+]_1} = 100$$

If a solution has 100 times the Hydrogen ion concentration as another what is their difference on the pH scale?

A	B
$pH_2 - pH_1 = -2$	$pH_2 - pH_1 = -3$

3

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

$$\frac{I_2}{I_1} = 100,000$$

If a sound has 100,000 times the sound energy as another what is their difference on the decibel scale?

A	B
$\beta_2 - \beta_1 = 48$	$\beta_2 - \beta_1 = 50$

4

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

$$\frac{I_2}{I_1} = 100$$

If an earthquake has 100 times the wave size as another what is their difference on the Richter scale?

A	B
$M_2 - M_1 = 4$	$M_2 - M_1 = 2$

5

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

$$\frac{I_2}{I_1} = 10,000$$

If an earthquake has 10,000 times the wave size as another what is their difference on the Richter scale?

A	B
$M_2 - M_1 = 4$	$M_2 - M_1 = 5$

6

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

$$\frac{I_2}{I_1} = 1 \times 10^8$$

If an earthquake has 1 x 10^8 times the wave size as another what is their difference on the Richter scale?

A	B
$M_2 - M_1 = 7.5$	$M_2 - M_1 = 8$

7

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

$$\frac{I_2}{I_1} = 1,000,000$$

If an earthquake has 1,000,000 times the wave size as another what is their difference on the Richter scale?

A	B
$M_2 - M_1 = 8$	$M_2 - M_1 = 6$

8

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

$$\frac{I_2}{I_1} = 10$$

If an earthquake has 10 times the wave size as another what is their difference on the Richter scale?

A	B
$M_2 - M_1 = 1$	$M_2 - M_1 = -0.5$