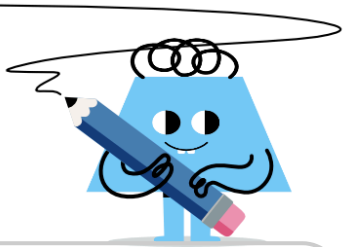
Name



Logarithmic Scales - Measured Value Ratio to Magnitude Difference

1

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

$$\frac{[H^+]_2}{[H^+]_1} = 398$$

If a solution has 398 times the Hydrogen ion concentration as another what is their difference on the pH scale?

A $pH_2 - pH_1 = -2.6$

B $pH_2 - pH_1 = -0.6$

2

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

$$\frac{I_2}{I_1} = 15.8$$

If a sound has 15.8 times the sound energy as another what is their difference on the decibel scale?

A $\beta_2 - \beta_1 = 12$

B $\beta_2 - \beta_1 = 8$

3

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

$$\frac{I_2}{I_1} = 79.4$$

If an earthquake has 79.4 times the wave size as another what is their difference on the Richter scale?

A $M_2 - M_1 = 0.9$

B $M_2 - M_1 = 1.9$

4

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

$$\frac{I_2}{I_1} = 1.26 \times 10^7$$

If an earthquake has 1.26 x 10^7 times the wave size as another what is their difference on the Richter scale?

A $M_2 - M_1 = 7.6$

B $M_2 - M_1 = 7.1$

5

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

$$\frac{I_2}{I_1} = 631$$

If a sound has 631 times the sound energy as another what is their difference on the decibel scale?

A $\beta_2 - \beta_1 = 28$

B $\beta_2 - \beta_1 = 29$

6

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

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

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

A $M_2 - M_1 = 3.5$

B $M_2 - M_1 = 4$

7

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

$$\frac{[H^+]_2}{[H^+]_1} = 630,957$$

If a solution has 630,957 times the Hydrogen ion concentration as another what is their difference on the pH scale?

A $pH_2 - pH_1 = -5.3$

B $pH_2 - pH_1 = -5.8$

8

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

$$\frac{I_2}{I_1} = 251$$

If an earthquake has 251 times the wave size as another what is their difference on the Richter scale?

A $M_2 - M_1 = 1.4$

B $M_2 - M_1 = 2.4$