Name

Logarithmic Scales - Magnitude to Measured Value (Power)

1

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

$$I_0 = 10^{-12} W/m^2$$

$$\beta = 80 dB$$

What is the sound intensity of a sound with a sound intensity of 80 dB on the decibel scale?

A $I = 10^{73} W/m^2$

B $I = 10^{68} W/m^2$

2

What is the hydrogen ion concentration of a solution with a pH of 4.7 on the pH scale?

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

$$pH = 4.7$$

A $[H^+] = 10^{-50,118} mL/mol$

B $[H^+] = 10^{-5,011,872} mL/mol$

3

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

$$I_0 = 1\mu m$$

$$M = 2$$

What is the wave height of an earthquake with a magnitude of 2 on the Richter scale?

A $I = 10^{0.5} \mu m$

B $I = 10^{2} \mu m$

4

What is the hydrogen ion concentration of a solution with a pH of 5.5 on the pH scale?

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

$$pH = 5.5$$

A $[H^+] = 10^{-316,227} mL/mol$

B $[H^+] = 10^{-3,162} mL/mol$

5

What is the hydrogen ion concentration of a solution with a pH of 5 on the pH scale?

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

$$pH = 5$$

A $[H^+] = 10^{-10,000,000} mL/mol$

B $[H^+] = 10^{-100,000} mL/mol$

6

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

$$I_0 = 10^{-12} W/m^2$$

$$\beta = 101 dB$$

What is the sound intensity of a sound with a sound intensity of 101 dB on the decibel scale?

A $I = 10^{94} W/m^2$

B $I = 10^{89} W/m^2$

7

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

$$I_0 = 1\mu m$$

$$M = 6.9$$

What is the wave height of an earthquake with a magnitude of 6.9 on the Richter scale?

A $I = 10^{8.9} \mu m$

B $I = 10^{6.9} \mu m$

8

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

$$I_0 = 1\mu m$$

$$M = 9.6$$

What is the wave height of an earthquake with a magnitude of 9.6 on the Richter scale?

A $I = 10^{9.6} \mu m$

B $I = 10^{8.1} \mu m$