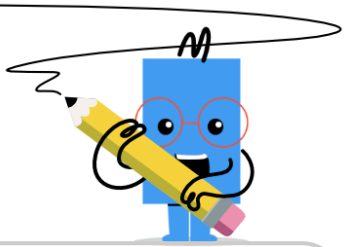
Name

Logarithmic Scales - Magnitude to Measured Value (Power)



1

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

What is the wave height of an earthquake with a magnitude of 5 on the Richter scale?

$$I_0 = 1\mu m$$
$$M = 5$$

A	B
$I = 10^5 \mu m$	$I = 10^4 \mu m$

2

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

What is the wave height of an earthquake with a magnitude of 9 on the Richter scale?

$$I_0 = 1\mu m$$
$$M = 9$$

A	B
$I = 10^9 \mu m$	$I = 10^{11} \mu m$

3

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

What is the sound intensity of a sound with a sound intensity of 60 dB on the decibel scale?

$$I_0 = 10^{-12} W/m^2$$
$$\beta = 60dB$$

A	B
$I = 10^{48} W/m^2$	$I = 10^{58} W/m^2$

4

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

What is the sound intensity of a sound with a sound intensity of 120 dB on the decibel scale?

$$I_0 = 10^{-12} W/m^2$$
$$\beta = 120dB$$

A	B
$I = 10^{108} W/m^2$	$I = 10^{118} W/m^2$

5

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

What is the wave height of an earthquake with a magnitude of 4 on the Richter scale?

$$I_0 = 1\mu m$$
$$M = 4$$

A	B
$I = 10^4 \mu m$	$I = 10^{3.5} \mu m$

6

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

What is the sound intensity of a sound with a sound intensity of 110 dB on the decibel scale?

$$I_0 = 10^{-12} W/m^2$$
$$\beta = 110dB$$

A	B
$I = 10^{93} W/m^2$	$I = 10^{98} W/m^2$

7

What is the hydrogen ion concentration of a solution with a pH of 1 on the pH scale?

$$pH = -\log[H^+]$$
$$pH = 1$$

A $[H^+] = 10^{-100} mL/mol$

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

8

What is the hydrogen ion concentration of a solution with a pH of 9 on the pH scale?

$$pH = -\log[H^+]$$
$$pH = 9$$

A $[H^+] = 10^{-1,000,000,000} mL/mol$

B $[H^+] = 10^{-316,227,766} mL/mol$