Name

Logarithmic Scales - Measured Value (Power) to Magnitude

1

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

$$I_0 = 1\mu m$$

$$I = 10^6 \mu m$$

What is the magnitude on the Richter scale when the wave height is 10^6 micrometers?

A	B
$M = 6$	$M = 7$

2

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

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

What is the pH on the pH scale when the hydrogen ion concentration is 10^-100,000,000 mL/mol?

A	B
$pH = 8$	$pH = 7.5$

3

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

$$I_0 = 1\mu m$$

$$I = 10^9 \mu m$$

What is the magnitude on the Richter scale when the wave height is 10^9 micrometers?

A	B
$M = 9$	$M = 9.5$

4

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

$$I_0 = 1\mu m$$

$$I = 10^4 \mu m$$

What is the magnitude on the Richter scale when the wave height is 10^4 micrometers?

A	B
$M = 4$	$M = 4.5$

5

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

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

$$I = 10^{38} W/m^2$$

What is the dB magnitude on the decibel scale when the sound energy is 10^38 W/m^2?

A	B
$\beta = 52dB$	$\beta = 50dB$

6

What is the pH on the pH scale when the hydrogen ion concentration is 10^-2,147,483,647 mL/mol?

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

$$[H^+] = 10^{-2,147,483,647} mL/mol$$

A	B
$pH = 11$	$pH = 9$

7

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

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

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

What is the dB magnitude on the decibel scale when the sound energy is 10^58 W/m^2?

A	B
$\beta = 77dB$	$\beta = 70dB$

8

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

$$I_0 = 1\mu m$$

$$I = 10^1 \mu m$$

What is the magnitude on the Richter scale when the wave height is 10^1 micrometers?

A	B
$M = 1$	$M = -0.5$