Rules for Logarithms

If $x = a^y$ then $y = \log_a (x)$

$$\log_a(xy) = \log_a(x) + \log_a(y)$$

$$\log_a(x/y) = \log_a(x) - \log_a(y)$$

$$\log_a (x^n) = n \log_a(x)$$

THE DECIBEL SCALE (reports intensity *level*, perceived by human ear, in dB)

$$\beta = 10 \log (I/I_o)$$

Where $I_o = 1.0 * 10^{-12}$ W/m^2

Q: What does OSHA regulate, Intensity (watts/sq. meter) or Intensity Level (decibels) ?

Ex: What is the intensity of sound from a vacuum cleaner (70dB)?

$$70 = 10 \log (I/I_o)$$

$$70/10 = \log (I/I_o)$$

$$7 = \log (I/I_o)$$

$$10^7 = I/I_o$$

$$I = I_o * 10^7$$

$$I = 1 * 10^{-5} \text{ W/m}^2$$