BRIEF basics of logarithms:

If you don't remember how to do logs, find as many practice problems as you can, or just make them up -- pick a number and then find the log of that number. Then try taking the antilog of it. Do that in both base 10 and base e until you can do it without having to stop and agonize over it.

Problems involving pH use logs to the base 10 (the pH scale involves factors of 10 in H^+ concentration.) **Thermodynamics/bioenergetics problems use natural logs (ln, base e).** Be sure you pay attention to the equation you're using!

1) A **logarithm** is an **exponent.** (If you don't know that "cold", say it 20 times or until you DO know it cold!)

2) There are logs to the **base 10 ($\log_{10}$)** and "natural logs" **(ln)**, which are to the **base e**. We don't normally state the "base"; **log** means base 10, and **ln** means base e. They can be interconverted if you want to do that: **ln *x* = 2.303 log *x*.**

3) Examples (practice with your calculator)

logs to base 10:

If log*x* = *y*, then $10^y = x$

(The **log** is the **exponent**.)

for example, log100 = 2, i.e. $10^2 = 100$

Remember also: **log(*1/x*) = – log*x***

If log100 = 2, then log(1/100) = – 2

$10^{-2} = 1/10^2 = 1/100 = 0.01$

natural logs (ln):

If ln*x* = *y*, then $e^y = x$

(The **log** is the **exponent**.)

For example, ln5 = 1.6, i.e. $e^{1.6} = 5$

Remember also: **ln(*1/x*) = – ln*x***

If ln5 = 1.6, then ln(1/5) = –1.6

$e^{-1.6} = 1/e^{1.6} = 1/5 = 0.20$

FINAL REMINDER:

ANYTHING TO THE ZERO POWER = 1

$10^0 = e^0 = 1$

log1 = ln1 = 0