Name Mine Date _____

Math 111: Final Review 5

1. In chemistry, C denotes the concentration of hydrogen ions (measured in moles/liter) in a solution; $C \in (0, 1)$. The pH of a solution is calculated as:

$$pH = -\log C$$

a) A moderately acidic solution, like coffee, has a $pH = 5$. Find the concentration of hydrogen ions in a solution with a pH of 5.

$5 = -\log C$

$-5 = \log C$

$10^{-5} = \cancel{10^{\log}} C$

$C = 10^{-5}$

b) A highly alkaline solution, like ammonia, has a $pH = 11$. Find the concentration of hydrogen ions in a solution with a pH of 11.

$11 = -\log C$

$C = 10^{-11}$

D: $(0,1)$

R $(0,\infty)$

c) Find the inverse function for the function $pH(C)$ including the domain & range.

$pH = -\log C$

$-pH = \log C$

$10^{-pH} = \cancel{10^{\log}} C$

$10^{-pH} = C$

D: $(0,\infty)$

R: $(0,1)$

d) How many times greater is the hydrogen ion concentration in a solution with a $pH = 2.3$ than the hydrogen ion concentration in a solution with a $pH = 9.5$? State the exact answer, then give the answer rounded to two places.

$2.3 = -\log C$

$C = 10^{-2.3}$

$9.5 = -\log C$

$C = 10^{-9.5}$

$10^{9.5-2.3}$

$10^{7.2}$ times

$\frac{10^{-2.3}}{10^{-9.5}}$ = 15,848,931.92 times greater = $10^{7.2}$