pH Scale

Name_____

1) Fill in the table below with the appropriate values.

Formula	pH	Acid, Base or Neutral?	$[H^{+1}]$
KCl	7		
HF	2		
NH_4OH	11		
H_2CO_3	4		
NaOH	14		

2) Household vinegar (a solution of acetic acid $HC_2H_3O_2$) has a pH of about 3. Classify vinegar as acidic, basic or neutral and estimate the hydrogen ion concentrations in vinegar.

3) Describe the mathematical relationship between pH values and H^{+1} concentrations.

4) Some common aqueous solutions and their typical pH values appear in the following list. Classify each solution as acidic, basic or neutral. Predict the color of universal indicator in the solution.

Substance	pH	Acid, Base or Neutral?	Color w/ Universal
Milk	6.7		
Stomach fluid	1.3		
Drain cleaner	14		
Egg white	8.2		

5) How many times more acidic is cola drink (pH = 3) than black coffee (pH= 5)?

6) Classify each solution as acidic, basic or neutral and estimate the hydrogen ion concentration and

Substance	pH	Acid, Base or Neutral?	$[H^{+1}]$
Soda	3.0		
Sugar in water	7.0		
Ammonia	12		
Acid Rain	5.0		

7) Clouds over Clingmans Dome, a peak in Great Smoky Mountains National Park, have had pH levels as low as 2.0. Compared to rainfall at pH 5.5, estimate how many times more acidic the moisture has been in the clouds.

8) Household ammonia has a pH of 11.0. A solution of drain cleaner has a pH of 13.0. How many more times basic is drain cleaner than ammonia?

9) Phenolphthalein indicator changes color between a pH of 8.2 (colorless) and 10.0 (hot pink). What colors would each solution appear from question #6?

10) The pH scale has a mirror opposite scale called the pOH scale. The pOH scale numbers are the same distance from 7, just in the opposite direction. For instance, a solution of antacid has a pH of 10 (3 above 7) and a pOH of 4. What are the pOH values for the solutions in #4?