Name: Answer Key Class: Date:

For each given piece of information below, calculate the pH and pOH.
Use the space below the question for your work.
(Each is from a water solution at 25 °C.)

pH and pOH Calculations

1. $[H_3O^+] = 0.01$ M

a. pH = 2

b. pOH = 12

pH = −log (0.01 M)
pH = −(−2)
pH = 2
pH + pOH = 14
2 + pOH = 14
pOH = 12

2. $[OH^-] = 0.00020$ M

a. pH = 10.3

b. pOH = 3.70

pOH = −log (0.00020 M)
pOH = −(−3.70)
pOH = 3.70
pH + pOH = 14
pH + 3.70 = 14
pH = 10.3

3. $[H_3O^+] = 5.0 \times 10^{-7}$ M

a. pH = 6.3

b. pOH = 7.7

pH = −log (5.0×10^{-7} M)
pH = −(−6.3)
pH = 6.3
pH + pOH = 14
6.3 + pOH = 14
pOH = 7.7

4. $[OH^-] = 0.010$ M

a. pH = 12

b. pOH = 2

pOH = −log (0.010 M)
pOH = −(−2)
pOH = 2
pH + pOH = 14
pH + 2 = 14
pH = 12

5. Describe in your own words what happens on the molecular level when a strong acid is added to water (that already has a small amount of hydronium and hydroxide ions in it).

When a strong acid is added to water, the protons from the strong acid do several things:

1. They react with the few hydroxide ions to form water.

2. They react with water to form more hydronium ions.

The result will be very few hydroxide ions and a lot of hydronium ions, lowering the pH.