

Determining pH & pOH

Honors Chemistry

1. Find the Hydrogen Ion Concentration for the following and then determine the pH and pOH.

a. $1.0 \times 10^{-5} M$ acid, 10.0% ionized

$$H^+ = 1.0 \times 10^{-6}$$

$$pH = 6 \quad pOH = 8$$

b. $1.0 \times 10^{-5} M$ acid, 100% ionized

$$H^+ = 1.0 \times 10^{-5}$$

$$pH = 5 \quad pOH = 9$$

c. $0.050 M$ acid, 5.0% ionized

$$H^+ = 2.5 \times 10^{-3}$$

$$pH = 2.6 \quad pOH = 11.4$$

d. $3.0 M$ acid, 100% ionized

$$H^+ = 3.0$$

$$pH = 0 \quad pOH = 14$$

e. $3.0 \times 10^{-3} M$ acid, 4.0% ionized

$$H^+ = 1.2 \times 10^{-4}$$

$$pH = 3.9 \quad pOH = 10.1$$

f. $2.5 M$ acid, 100% ionized

$$H^+ = 2.5$$

$$pH = 0 \quad pOH = 14$$

g. $4.0 \times 10^{-3} M$ acid, 8.3% ionized

$$H^+ = 3.32 \times 10^{-4}$$

$$pH = 3.5 \quad pOH = 10.5$$

h. $3.5 \times 10^{-2} M$ acid, 1.5% ionized

$$H^+ = 5.25 \times 10^{-4}$$

$$pH = 3.3 \quad pOH = 10.7$$

2. Find the Hydroxide Ion Concentration for the following and then determine the pH and pOH.

a. $1.0 \times 10^{-3} M$ base, 100% ionized

$$OH^- = 1.0 \times 10^{-3}$$

$$pOH = 3 \quad pH = 11$$

b. $2.5 \times 10^{-2} M$ base, 2.50% ionized

$$OH^- = 6.3 \times 10^{-4}$$

$$pOH = 3.2 \quad pH = 10.8$$

c. $3.5 \times 10^{-3} M$ base, 3.0% ionized

$$OH^- = 1.05 \times 10^{-4}$$

$$pOH = 4.0 \quad pH = 10$$

d. $2.5 \times 10^{-2} M$ base, 2.5% ionized

$$OH^- = 6.25 \times 10^{-4}$$

$$pOH = 3.2 \quad pH = 10.8$$

e. $4.0 \times 10^{-3} M$ base, 2.0% ionized

$$OH^- = 8 \times 10^{-5}$$

$$pOH = 4.1 \quad pH = 9.9$$

f. $3.2 \times 10^{-6} M$ base, 100% ionized

$$OH^- = 3.2 \times 10^{-6}$$

$$pOH = 5.5 \quad pH = 8.5$$

g. $4.5 \times 10^{-5} M$ base, 10.0% ionized

$$OH^- = 4.5 \times 10^{-6}$$

$$pOH = 5.3 \quad pH = 8.7$$

h. $5.8 M$ base, 8.0% ionized

$$OH^- = .464$$

$$pOH = .3 \quad pH = 13.7$$

pH and pOH calculations

Honors Chemistry

	Hydrogen-Ion Concentration	Hydroxide-Ion Concentration	pH	pOH
a.	2.5×10^{-9}	4.0×10^{-6}	8.6	5.4
b.	1.0×10^{-2}	1.0×10^{-12}	2.0	12.0
c.	1.02×10^{-4}	9.8×10^{-11}	4.0	10.0
d.	1.0×10^{-7}	1.0×10^{-7}	7.0	7.0
e.	1.5×10^{-3}	6.67×10^{-12}	2.8	11.2
f.	1.0×10^{-5}	1.0×10^{-9}	5.0	9.0
g.	5.0×10^{-8}	2.2×10^{-7}	7.3	6.7
h.	2.5×10^{-5}	4.0×10^{-10}	4.6	9.4
i.	1.7×10^{-13}	5.9×10^{-2}	12.77	1.23
j.	2.5×10^{-5}	3.98×10^{-10}	4.6	9.4
k.	2.5×10^{-13}	3.98×10^{-2}	12.6	1.4
l.	4.4×10^{-9}	2.5×10^{-6}	8.4	5.6
m.	2.0×10^{-13}	5.0×10^{-2}	12.7	1.3
n.	1.0×10^{-3}	1.0×10^{-11}	3.0	11.0