

Acids and Bases

Recall: The product of the $[H_3O^+][OH^-] = 1.0 \times 10^{-14} = K_w$

The *ion-product constant*
for water.

To simplify this
notation we often
write H_3O^+ as H^+ .

$$[\quad] [\quad] = 1.0 \times 10^{-14} = K_w$$

$$[H^+][OH^-] = 1.0 \times 10^{-14}$$

$$-\log \left([H^+][OH^-] \right) = -\log \left(1.0 \times 10^{-14} \right)$$

$$\left(-\log [H^+] \right) + \left(-\log [OH^-] \right) = - \left(\quad \right)$$

$$+ =$$

Therefore, the sum of pH and pOH is 14.00.

The " p scale" is based on common logarithms (base 10 logs).

The symbol p means $-\log$.

$$[H^+] = 4.3 \times 10^{-9} M$$

$$[OH^-] = \frac{1.0 \times 10^{-14}}{[]}$$

$$[OH^-] = \frac{1.0 \times 10^{-14}}{[]}$$

$$[OH^-] =$$

Note: $\frac{[H^+][OH^-]}{[] []} = \frac{1.0 \times 10^{-14}}{[] []}$

$$[OH^-] = \frac{1.0 \times 10^{-14}}{[]}$$

$$[H^+] = 4.3 \times 10^{-9} \text{ M} = 0.0000000043 \text{ M}$$

$$[OH^-] = 2.3 \times 10^{-6} \text{ M} = 0.0000023 \text{ M}$$

$$pH = -\log \left[\quad \right] = -\log(\quad) =$$

$$pOH = -\log \left[\quad \right] = -\log(\quad) =$$

$$pH + pOH = 14.00$$

$$pOH = 14.00 -$$

$$= 14.00 -$$

$$=$$

$$pOH = 9.42$$

$$pH + pOH = 14.00$$

$$pH = 14.00 -$$

$$pH =$$

$$pH = -\log [H^+]$$

$$-pH = \log [\quad] \xrightarrow[\text{Form}]{\text{Exponential}} 10 = [\quad]$$

$$10 = [\quad]$$

$$2.6 \times 10^{-5} M = [\quad]$$

$$\left[H^+ \right] = 2.6 \times 10^{-5} \text{ M}$$

$$\left[OH^- \right] = \frac{1.0 \times 10^{-14}}{\left[\right]}$$

$$\left[OH^- \right] = \text{_____}$$

$$\left[OH^- \right] =$$

$$pOH = -\log \left[OH^- \right]$$

Exponential
Form

$$-pOH = \log \left[\right] \longrightarrow 10^{-pOH} = \left[\right]$$

$$10^{-9.42} = \left[\right]$$

$$3.8 \times 10^{-10} \text{ M} = \left[\right]$$