CONCEPT: AUTO-IONIZATION

- **Auto-Ionization** occurs when _____ molecules react with one another in an aqueous solution.
  - □ Recall: water is amphoteric $H_2O\ (l) + H_2O\ (l) \rightleftharpoons H_3O^+\ (aq) + OH^-\ (aq)$ (Base / Acid) Pure water: $[H_3O^+]$ $[OH^-]$
- **Kw**: ionization _____of water:

Kw Formula

$K_w = \frac{\text{products}}{\text{reactants}} = $ _____

$K_w = 1.0 \times 10^{-14}$ at 25° C

pH + pOH = 14

  - □ As temperature _____, Kw _____

Kw & Temperature	
T (°C)	Kw
0	1.14×10^{-15}
10	2.93×10^{-15}
20	6.81×10^{-15}
30	1.471×10^{-14}
50	5.476×10^{-14}
100	51.3×10^{-14}

EXAMPLE: A particular aqueous solution at 50°C contains 3.7×10^{-4} M of hydronium ions. Calculate the $[OH^-]$ and identify solution as acidic, basic, or neutral.

PRACTICE: Chemistry student prepared an aqueous solution at 30°C. If the solutions contains 7.42×10^{-9} M of hydroxide ions, calculate the pH.

PRACTICE: Calculate the K_w of pure water given the pH = 6.34.