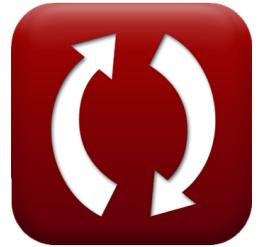




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# Hydrolysis for Weak Acid and Weak Base Formulas

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# List of 13 Hydrolysis for Weak Acid and Weak Base Formulas

## Hydrolysis for Weak Acid and Weak Base

### 1) Acid Ionization Constant of Weak Acid

$$\text{fx } K_a = \frac{K_w}{K_b}$$

[Open Calculator !\[\]\(a870788d6ed9b8fd294b7654a8c8526b\_img.jpg\)](#)

$$\text{ex } 2E^{-5} = \frac{1.0E^{-14}}{5E^{-10}}$$

### 2) Basic Ionization Constant of Weak Base

$$\text{fx } K_b = \frac{K_w}{K_a}$$

[Open Calculator !\[\]\(c50c8b7b2cc2cf9ff925edec0ee94c0d\_img.jpg\)](#)

$$\text{ex } 2E^{-5} = \frac{1.0E^{-14}}{5E^{-10}}$$

### 3) Concentration of Hydronium ion in Salt of Weak Acid and Weak Base

$$\text{fx } C = \sqrt{K_w \cdot \frac{K_a}{K_b}}$$

[Open Calculator !\[\]\(f60b7a900783ac3fd531bfd9c111be6d\_img.jpg\)](#)

$$\text{ex } 1.1E^{-10} \text{mol/L} = \sqrt{1.0E^{-14} \cdot \frac{2.0E^{-5}}{1.77E^{-5}}}$$



#### 4) Constant of Hydrolysis given Ionic Product of Water and Acid Ionization Constant of Weak Acid

$$\text{fx } K_h = \frac{K_w}{K_a}$$

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235\_img.jpg\)](#)

$$\text{ex } 5E^{-10} = \frac{1.0E^{-14}}{2.0E^{-5}}$$

#### 5) Constant of Hydrolysis given Ionic Product of Water and Basic Ionization Constant of Weak Base

$$\text{fx } K_h = \frac{K_w}{K_b}$$

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0\_img.jpg\)](#)

$$\text{ex } 5.6E^{-10} = \frac{1.0E^{-14}}{1.77E^{-5}}$$

#### 6) Degree of Hydrolysis in Salt of Weak Acid and Weak Base

$$\text{fx } h = \sqrt{\frac{K_w}{C_{\text{salt}} \cdot K_a \cdot K_b}}$$

[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f\_img.jpg\)](#)

$$\text{ex } 0.12669 = \sqrt{\frac{1.0E^{-14}}{1.76E^{-6}\text{mol/L} \cdot 2.0E^{-5} \cdot 1.77E^{-5}}}$$



7) Hydrolysis Constant in Weak Acid and Weak Base 

$$\text{fx } K_h = \frac{K_w}{K_a \cdot K_b}$$

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95\_img.jpg\)](#)

$$\text{ex } 2.8E^{-5} = \frac{1.0E^{-14}}{2.0E^{-5} \cdot 1.77E^{-5}}$$

8) Ionic Product of Water given Constant of Hydrolysis and Acid Ionization Constant of Weak Acid 

$$\text{fx } K_w = K_a \cdot K_h$$

[Open Calculator !\[\]\(05be7c7a8995decd503647c99211f7c2\_img.jpg\)](#)

$$\text{ex } 1E^{-14} = 2.0E^{-5} \cdot 5E^{-10}$$

9) Ionic Product of Water given Constant of Hydrolysis and Basic Ionization Constant of Weak Base 

$$\text{fx } K_w = K_b \cdot K_h$$

[Open Calculator !\[\]\(fe3aebe81acea8d45108cd2768939da7\_img.jpg\)](#)

$$\text{ex } 8.9E^{-15} = 1.77E^{-5} \cdot 5E^{-10}$$

10) pH of Salt of Weak Acid and Weak base 

$$\text{fx } \text{pH} = \frac{\text{p}K_w + \text{p}k_a - \text{p}k_b}{2}$$

[Open Calculator !\[\]\(899d8b7697d64725bf017d3296cfcf1b\_img.jpg\)](#)

$$\text{ex } 6 = \frac{14 + 4 - 6}{2}$$



11) pKa of Salt of Weak Acid and Weak base 

$$\text{fx } \text{pk}_a = 2 \cdot \text{pH} - 14 + \text{pk}_b$$

[Open Calculator !\[\]\(e2376d476d06eb31946dc01a69a4403a\_img.jpg\)](#)

$$\text{ex } 4 = 2 \cdot 6 - 14 + 6$$

12) pKb of Salt of Weak Acid and Weak base 

$$\text{fx } \text{pk}_b = -2 \cdot \text{pH} + 14 + \text{pk}_a$$

[Open Calculator !\[\]\(0b5e7e25e8775f7e7e80906ada4f0021\_img.jpg\)](#)

$$\text{ex } 6 = -2 \cdot 6 + 14 + 4$$

13) pOH of Salt of Weak Acid and Weak Base 

$$\text{fx } \text{pOH} = 14 - \frac{\text{pK}_w + \text{pk}_a - \text{pk}_b}{2}$$

[Open Calculator !\[\]\(bd3b31712ad9bab5a241210fa6925cdd\_img.jpg\)](#)

$$\text{ex } 8 = 14 - \frac{14 + 4 - 6}{2}$$



## Variables Used

- **C** Hydronium Ion Concentration (*Mole per Liter*)
- **C<sub>salt</sub>** Concentration of Salt (*Mole per Liter*)
- **h** Degree of Hydrolysis
- **K<sub>a</sub>** Constant of Ionization of Acids
- **K<sub>b</sub>** Constant Of Ionization Of Bases
- **K<sub>h</sub>** Constant Of Hydrolysis
- **K<sub>w</sub>** Ionic Product of Water
- **pH** Negative Log of Hydronium Concentration
- **pk<sub>a</sub>** Negative Log of Acid Ionization Constant
- **pk<sub>b</sub>** Negative Log of Base Ionization Constant
- **pk<sub>w</sub>** Negative Log of Ionic Product of Water
- **pOH** Negative Log of Hydroxyl Concentration



## Constants, Functions, Measurements used

- **Function:** **sqrt**, sqrt(Number)  
*Square root function*
- **Measurement:** **Molar Concentration** in Mole per Liter (mol/L)  
*Molar Concentration Unit Conversion* 



## Check other formula lists

- [Cationic and Anionic Salt Hydrolysis Formulas](#) 
- [Hydrolysis for Weak Acid and Weak Base Formulas](#) 

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