Equations potentially of interest:

Gas law:
PV = nRT

pH and acid base:
pH = -log[H⁺]
pH + pOH = 14
Kw = [H⁺] + [OH⁻] = 1 * 10⁻¹⁴
pH = pK_a + log([C]/[A])

Logarithms:
logA*B = logA + logB
log_aB = C --> A^c = B
alogx = logx^a
log(A/B) = logA - logB

Algebra:
ax² + bx + c = 0 < 2nd degree polynomial for quadratic equation
\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

Equilibrium and free energy:

K_p = K_c(RT)/Δn
ΔG = ΔH - T ΔS
ΔG^o_rxn = ΔG^o_products - ΔG^o_reactants
ΔG_rxn = ΔG^o_rxn + RTlnQ
ΔG_rxn = RTln(Q/K)
K_eq = products/reactants
K = e^-ΔG^o/RT
aA + bB --> cC + dD  Keq \frac{[C]^c[D]^d}{[A]^a[B]^b}
ΔG = -TΔS_univ
ΔG<O --> spontaneous, reaction moves to right
ΔG>O --> not spontaneous, reaction moves to left
Q>K reactant favored, reaction moves to left
Q<K product favored, reaction moves to right

Works Cited


Concentrations:

\[ M_1 V_1 = M_2 V_2 \]

molarity (M) = moles/liter
molality (m) = moles solute/kg solvent
mass percent = mass solute/mass solution
mole fraction (\( X_A \)) = moles solute/moles solution
percent yield = (actual/theoretical)\*100

Others:
\[ \Delta T_b = K_b m_c \]
\[ \Delta T_f = K_f m_c \]
\[ m_c = i \* m \]
\[ S = K_B \ln \Omega \]

Constants that may be of interest:
\[ K_f = -1.86^\circ C \text{ kg/mol} \]
\[ K_b = 0.512^\circ C \text{ kg/mol} \]
\[ R = 0.08206 \text{ L.bar.mol}^{-1}.K^{-1} \]
\[ R = 8.314 \text{ J.mol}^{-1}.K^{-1} \]
Avogadro’s number = 6.022 \times 10^{23}