REFERENCE SHEET: Math, Chemistry, Physics

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MATH

Circle Area: πr^2	**Sphere Vol.:** $4/3\pi r^3$	**Sphere Surf. Area:** $4\pi r^2$	**Circum.:** $2\pi r$
Pythagorean: $L^2 + L^2 = Hyp^2$	**Slope:** $\frac{y_2 - y_1}{x_2 - x_1}$	**Quadratic:** $x = \frac{-B \pm \sqrt{B^2 - 4AC}}{2A}$	**Line:** $y = mx + b$
Sin: $\frac{Opp}{Hyp}$	**Cos:** $\frac{Adj}{Hyp}$	**Tan:** $\frac{Opp}{Adj}$	**Commutative:** $a(b) = b(a)$
Associative: $a(bc) = (ab)c$	**Distributive:** $ab + ac = a(b + c)$	**Exponents (I):** $x^0 = 1$	**Exponents (II):** $(x^a)^b = x^{ab}$
Exponents (III): $x^a \bullet x^b = x^{a+b}$	**Exponents (IV):** $x^a \div x^b = x^{a-b}$	**Exponents (V):** $x^{-a} = \frac{1}{x^a}$	**Exponents (VI):** $x^{a/b} = \sqrt[b]{x^a}$

CHEMISTRY

Equilibrium: $k = \frac{[C]^c[D]^d}{[A]^a[B]^b}$	**Molarity:** $\frac{Moles\ Solute}{Liters\ Solution}$	**Molality:** $\frac{Moles\ Solute}{Kilogram\ Solvent}$	**Calorimetry:** $q = mc\Delta T$
Ideal Gas Law: $PV = nRT$	**Temperature (I):** $K = ℃ + 273.15$	**Temperature (II):** $°F = \frac{9}{5}℃ + 32$	**Acid/Base:** $pH + pOH = 14$
pH: $pH = -log[H^+]$	**Osmotic:** $\Pi = iMRT$	**Boiling:** $\Delta T = ik_b m_{solute}$	**Freezing:** $\Delta T = ik_f m_{solute}$
Enthalpy: $\Delta H = H_{prod} - H_{react}$	**Gibbs Free Energy:** $\Delta G = \Delta H - T\Delta S$	**Raoult's law:** $P_{soln} = X_{solv} P^0_{solv}$	**Dalton's Law:** $P_{tot} = P_A + P_B + \ldots$

PHYSICS

Kinematics (I): $x = x_0 + v_0 t + \frac{1}{2}at^2$	**Kinematics (II):** $v = v_0 + at$	**Kinematics (III):** $v^2 = v_0^2 + 2a(x - x_0)$	**Newton's 2nd:** $\Sigma\vec{F} = m\vec{a}$
Gravitation: $F_G = G\frac{m_1 m_2}{r^2}$	**Friction:** $F_{Fr} = \mu F_N$	**Spring Force:** $\vec{F}_s = -k\vec{x}$	**Acceleration (II):** $a_c = \frac{v^2}{r}$
Work: $W = F_{\parallel} s = s_{\parallel} F = FsCos\theta$	**Energy:** $E = KE + PE$	**Cons. of Energy:** $E_1 = W_{NC} = E_2$	**Kinetic Energy:** $KE_T = \frac{1}{2}mv^2$
PE Gravity: $PE_G = mgy$	**PE Spring:** $PE_s = \frac{1}{2}kx^2$	**Momentum:** $\vec{p} = m\vec{v}$	**Impulse:** $\vec{J}_{net} = \vec{F}_{net}\Delta t = \Delta\vec{p}$