Physical Constants

Acceleration of gravity at sea level and equator	g=9.80665 m s^{-2}
Avogadro's number	$N = 6.022045 \times 10^{23}$ $mole^{-1}$
Boltzmann's Constant	$k = 1.38066 \times 10^{-23} JK^{-1} molecule^{-1}$
Electron charge	$e = 1.602189 \times 10^{-19}$ C
Faraday's constant	$F = 96{,}484.6$ C $mole^{-1}$
Gas constant	$R = 8.31441$ J K^{-1} $mole^{-1}$
	$R = 0.08314$ L bar K^{-1} $mole^{-1}$
	$R = 0.082057$ L atm K^{-1} $mole^{-1}$

Conversion Factors

1 atm = 101.3 kPa = 1.01325 bar = 760 mm Hg = 760 torr
0°C = 273.16 K
1 liter atm = 101.325 J

SI Scale Prefixes

Tera(T)	10^{12}	Kilo (k)	10^{3}	Milli (m)	10^{-3}
Giga(G)	10^{9}	Deci (d)	10^{-1}	Micro (μ)	10^{-6}
Mega(M)	10^{6}	Centi (c)	10^{-2}	Nano (n)	10^{-9}
				Pico (p)	10^{-12}

Fundamental Units

1 joule = 1 J = 1 m^2 kg s^{-2}
1 newton = 1 N = 1 m kg s^{-2}
1 pascal = 1 Pa = 1 N m^{-2} = 1 J m^{-3} = 1 kg m^{-1} s^{-2}
1 watt = 1 W = 1 J s^{-1} = 1 m^2 kg s^{-3}
1 volt = 1 V = 1 J C^{-1}

Differentials

$$\frac{dx}{dx} = 1$$

$$\frac{dx^n}{dx} = nx^{n-1}$$

$$\frac{d\ln x}{dx} = 1/x$$

$$\frac{df(x)}{dy} = \frac{df(x)}{dx}\frac{dx}{dy}$$

Integrals

$$\int_{x_1}^{x_2} f(x)dx = -\int_{x_2}^{x_1} f(x)dx$$

$$\int_{x_1}^{x_2} dx = x_2 - x_1$$

$$\int_{x_1}^{x_2} x^n dx = \frac{x_2^{n+1} - x_1^{n+1}}{n+1}$$

$$\int_{x_1}^{x_2} \frac{dx}{x} = \ln\frac{x_2}{x_1}$$

Maxima and Minima of f(x)

At a minimum of f(x), the first derivative is zero and the second derivative is positive.
At a maximum of f(x), the first derivative is zero and the second derivative is negative.
At an inflection point of f(x), both first and second derivatives are zero.