

Eq. ID	Formula	Symbols	SI Derived Unit		SI Unit		Properties		Distributions	
					Original	Ours	Original	Ours		
I.8.14	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	d	Distance	m	m	V, F	V, F, NN	N/A	N/A	
		x_2	Position	m	m	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		x_1	Position	m	m	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		y_2	Position	m	m	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		y_1	Position	m	m	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
I.10.7	$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$	m	Mass	kg	kg	V, F	V, F, P	N/A	N/A	
		m_0	Invariant mass	kg	kg	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		v	Velocity	m/s	$m \cdot s^{-1}$	V, F	V, F, P	$\mathcal{U}(1, 2)$	$\mathcal{U}_{\log}(10^5, 10^8)$	
		c	Speed of light	m/s	$m \cdot s^{-1}$	V, F	C, F, P	$\mathcal{U}(3, 10)$	2.998×10^8	
		A	Inner product	1	1	V, F	V, F	N/A	N/A	
I.11.19	$A = x_1y_1 + x_2y_2 + x_3y_3$	x_1	Element of a vector	1	1	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		y_1	Element of a vector	1	1	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		x_2	Element of a vector	1	1	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		y_2	Element of a vector	1	1	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		x_3	Element of a vector	1	1	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		y_3	Element of a vector	1	1	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		F	Electrostatic force	N	$kg \cdot m \cdot s^{-2}$	V, F	V, F	N/A	N/A	
I.12.2	$F = \frac{q_1q_2}{4\pi\epsilon r^2}$	q_1	Electric charge	C	$s \cdot A$	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-3}, 10^{-1})$	
		q_2	Electric charge	C	$s \cdot A$	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-3}, 10^{-1})$	
		r	Distance	m	m	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-2}, 10^0)$	
		ϵ	Vacuum permittivity	F/m	$kg^{-1} \cdot m^{-3} \cdot s^4 \cdot A^2$	V, F	C, F, P	$\mathcal{U}(1, 5)$	8.854×10^{-12}	
		F	Force	N	$kg \cdot m \cdot s^{-2}$	V, F	V, F	N/A	N/A	
I.12.11	$F = q(E + Bv \sin(\theta))$	q	Electric charge	C	$s \cdot A$	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		E	Electric field	V/m	$kg \cdot m \cdot s^{-3} \cdot A^{-1}$	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		B	Magnetic field strength	T	$kg \cdot s^{-2} \cdot A^{-1}$	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		v	Velocity	m/s	$m \cdot s^{-1}$	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		θ	Angle	rad	1	V, F	V, F, NN	$\mathcal{U}(1, 5)$	$\mathcal{U}(0, 2\pi)$	
		K	Kinetic energy	J	$kg \cdot m^2 \cdot s^{-2}$	V, F	V, F, P	N/A	N/A	
		m	Mass	kg	kg	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-2}, 10^0)$	
I.13.4	$K = \frac{1}{2}m(v^2 + u^2 + w^2)$	v	Element of velocity	m/s	$m \cdot s^{-1}$	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		u	Element of velocity	m/s	$m \cdot s^{-1}$	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		w	Element of velocity	m/s	$m \cdot s^{-1}$	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		m	Mass	kg	kg	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		U	Potential energy	J	$kg \cdot m^2 \cdot s^{-2}$	V, F	V, F, P	N/A	N/A	
I.13.12	$U = Gm_1m_2 \left(\frac{1}{r_2} - \frac{1}{r_1} \right)$	G	Gravitational constant	$m^3 \cdot kg^{-1} \cdot s^{-2}$	$kg^{-1} \cdot m^3 \cdot s^{-2}$	V, F	C, F, P	$\mathcal{U}(1, 5)$	6.674×10^{-11}	
		m_1	Mass (The Earth)	kg	kg	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-2}, 10^0)$	
		m_2	Mass	kg	kg	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-2}, 10^0)$	
		r_2	Distance	m	m	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-2}, 10^0)$	
		r_1	Distance	m	m	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-2}, 10^0)$	
		p	Relativistic momentum	$kg \cdot m/s$	$kg \cdot m \cdot s^{-1}$	V, F	V, F, P	N/A	N/A	
		m_0	Rest Mass	kg	kg	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-2}, 10^0)$	
I.15.10	$p = \frac{m_0v}{\sqrt{1 - v^2/c^2}}$	v	Velocity	m/s	$m \cdot s^{-1}$	V, F	V, F	$\mathcal{U}(1, 2)$	$\mathcal{U}_{\log}(10^5, 10^7)$	
		c	Speed of light	m/s	$m \cdot s^{-1}$	V, F	C, F, P	$\mathcal{U}(3, 10)$	2.998×10^8	
		v_1	Velocity	m/s	$m \cdot s^{-1}$	V, F	V, F	N/A	N/A	
		u	Velocity	m/s	$m \cdot s^{-1}$	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^5, 10^8)$	
		v	Velocity	m/s	$m \cdot s^{-1}$	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^5, 10^8)$	
I.16.6	$v_1 = \frac{u+v}{1 + uv/c^2}$	c	Speed of light	m/s	$m \cdot s^{-1}$	V, F	C, F, P	$\mathcal{U}(1, 5)$	2.998×10^8	
		r	Center of gravity	m	m	V, F	V, F	N/A	N/A	
		m_1	Mass	kg	kg	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		r_1	Position	m	m	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		m_2	Mass	kg	kg	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
I.18.4	$r = \frac{m_1r_1 + m_2r_2}{m_1 + m_2}$	r_2	Position	m	m	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		m_2	Mass	kg	kg	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		E	Energy	J	$kg \cdot m^2 \cdot s^{-2}$	V, F	V, F, P	N/A	N/A	
		m	Mass	kg	kg	V, F	V, F, P	$\mathcal{U}(1, 3)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		ω	Angular velocity	rad/s	s^{-1}	V, F	V, F	$\mathcal{U}(1, 3)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
I.24.6	$E = \frac{1}{4}m(\omega^2 + \omega_0^2)x^2$	ω_0	Angular velocity	rad/s	s^{-1}	V, F	V, F	$\mathcal{U}(1, 3)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		x	Position	m	m	V, F	V, F	$\mathcal{U}(1, 3)$	$\mathcal{U}_{\log}(10^{-1}, 10^1)$	
		k	Wavenumber	$1/m$	m^{-1}	V, F	V, F, P	N/A	N/A	
		ω	Frequency of electromagnetic waves	rad/s	s^{-1}	V, F	V, F, P	$\mathcal{U}(1, 10)$	$\mathcal{U}_{\log}(10^9, 10^{11})$	
		c	Speed of light	m/s	$m \cdot s^{-1}$	V, F	C, F, P	$\mathcal{U}(1, 10)$	2.998×10^8	
I.32.5	$P = \frac{q^2\omega^2}{6\pi\epsilon c^3}$	P	Radiant energy	W	$kg \cdot m^2 \cdot s^{-3}$	V, F	V, F, P	N/A	N/A	
		q	Electric charge	C	$s \cdot A$	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-3}, 10^{-1})$	
		a	Magnitude of direction vector	m/s^2	$m \cdot s^{-2}$	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^5, 10^7)$	
		ϵ	Vacuum permittivity	F/m	$kg^{-1} \cdot m^{-3} \cdot s^4 \cdot A^2$	V, F	C, F, P	$\mathcal{U}(1, 5)$	8.854×10^{-12}	
		c	Speed of light	m/s	$m \cdot s^{-1}$	V, F	C, F, P	$\mathcal{U}(1, 5)$	2.998×10^8	
I.34.8	$\omega = \frac{qvB}{p}$	ω	Angular velocity	rad/s	s^{-1}	V, F	V, F	N/A	N/A	
		q	Electric charge	C	$s \cdot A$	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-11}, 10^{-9})$	
		v	Velocity	m/s	$m \cdot s^{-1}$	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^5, 10^7)$	
		B	Magnetic field	T	$kg \cdot s^{-2} \cdot A^{-1}$	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^1, 10^3)$	
		p	Angular momentum	$J \cdot s$	$kg \cdot m^2 \cdot s^{-1}$	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^9, 10^{11})$	
I.34.10	$\omega = \frac{\omega_0}{1 - v/c}$	ω	Frequency of electromagnetic waves	rad/s	s^{-1}	V, F	V, F, P	N/A	N/A	
		ω_0	Frequency of electromagnetic waves	rad/s	s^{-1}	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^9, 10^{11})$	
		v	Velocity	m/s	$m \cdot s^{-1}$	V, F	V, F	$\mathcal{U}(1, 2)$	$\mathcal{U}_{\log}(10^5, 10^7)$	
		c	Speed of light	m/s	$m \cdot s^{-1}$	V, F	C, F, P	$\mathcal{U}(3, 10)$	2.998×10^8	
		W	Energy	J	$kg \cdot m^2 \cdot s^{-2}$	V, F	V, F, P	N/A	N/A	
I.34.27	$W = \frac{h}{2\pi}\omega$	h	Planck constant	$J \cdot s$	$kg \cdot m^2 \cdot s^{-1}$	V, F	C, F, P	$\mathcal{U}(1, 5)$	6.626×10^{-34}	
		ω	Frequency of electromagnetic waves	$1/s$	s^{-1}	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^9, 10^{11})$	
		r	Bohr radius	m	m	V, F	V, F, P	N/A	N/A	
		ϵ	Vacuum permittivity	F/m	$kg^{-1} \cdot m^{-3} \cdot s^4 \cdot A^2$	V, F	C, F, P	$\mathcal{U}(1, 5)$	8.854×10^{-12}	
		h	Planck constant	$J \cdot s$	$kg \cdot m^2 \cdot s^{-1}$	V, F	C, F, P	$\mathcal{U}(1, 5)$	6.626×10^{-34}	
I.38.12	$r = 4\pi\epsilon \frac{(h/(2\pi))^2}{mq^2}$	m	Mass	kg	kg	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-28}, 10^{-26})$	
		q	Electric charge	C	$s \cdot A$	V, F	V, F	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-11}, 10^{-9})$	
		U	Internal energy	J	$kg \cdot m^2 \cdot s^{-2}$	V, F	V, F, P	N/A	N/A	
		P	Pressure	Pa	$kg \cdot m^{-1} \cdot s^{-2}$	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^4, 10^6)$	
		V	Volume	m^3	m^3	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-5}, 10^{-3})$	
I.39.10	$U = \frac{3}{2}PV$	U	Energy	J	$kg \cdot m^2 \cdot s^{-2}$	V, F	V, F	N/A	N/A	
		γ	Heat capacity ratio	1	1	V, F	V, F, P	$\mathcal{U}(2, 5)$	$\mathcal{U}(1, 2)$	
		P	Pressure	Pa	$kg \cdot m^{-1} \cdot s^{-2}$	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^4, 10^6)$	
		V	Volume	m^3	m^3	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-5}, 10^{-3})$	
		D	Diffusion coefficient	m^2/s	$m^2 \cdot s^{-1}$	V, F	V, F, P	N/A	N/A	
I.43.31	$D = \mu kT$	μ	Viscosity	$Pa \cdot s$	$kg \cdot m^{-1} \cdot s^{-1}$	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{13}, 10^{15})$	
		k	Boltzmann constant	J/K	$kg \cdot m^2 \cdot s^{-2} \cdot K^{-1}$	V, F	C, F, P	$\mathcal{U}(1, 5)$	1.381×10^{-23}	
		T	Temperature	K	K	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^1, 10^3)$	
		κ	Thermal conductivity	$W/(m \cdot K)$	$kg \cdot m \cdot s^{-3} \cdot K^{-1}$	V, F	V, F, P	N/A	N/A	
		γ	Heat capacity ratio	1	1	V, F	V, F, P	$\mathcal{U}(2, 5)$	$\mathcal{U}(1, 2)$	
I.43.43	$\kappa = \frac{1}{\gamma - 1} \frac{kv}{\sigma_c}$	k	Boltzmann constant	J/K	$kg \cdot m^2 \cdot s^{-2} \cdot K^{-1}$	V, F	C, F, P	$\mathcal{U}(1, 5)$	1.381×10^{-23}	
		v	Velocity	m/s	$m \cdot s^{-1}$	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^2, 10^4)$	
		σ_c	Molecular collision cross section	m^2	m^2	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-21}, 10^{-19})$	
		E	Energy	J	$kg \cdot m^2 \cdot s^{-2}$	V, F	V, F, P	N/A	N/A	
		m	Mass	kg	kg	V, F	V, F, P	$\mathcal{U}(1, 5)$	$\mathcal{U}_{\log}(10^{-29}, 10^{-27})$	
I.48.2	$E = \frac{mc^2}{\sqrt{1 - v^2/c^2}}$	c	Speed of light	m/s	$m \cdot s^{-1}$	V, F	C, F, P	$\mathcal{U}(3, 10)$	2.998×10^8	
		v	Velocity	m/s	$m \cdot s^{-1}$					