

Prefix	tera-	giga-	mega-	kilo-	hecta-	deka-	BASE	deci-	centi-	milli-	micro-	nano-	pico-
Sym.	T-	G-	M-	k-	h-	da-	UNIT	d-	c-	m-	μ-	n-	p-
Scale	10 ¹²	10 ⁹	10 ⁶	10 ³	10 ²	10 ¹	10 ⁰	10 ⁻¹	10 ⁻²	10 ⁻³	10 ⁻⁶	10 ⁻⁹	10 ⁻¹²

Metric conversions:

$$\frac{2.4 \text{ km}}{1} \times \frac{10^3 \text{ m}}{1 \text{ km}} = 2.4 \times 10^3 \text{ m} = 2400 \text{ m}$$

$$\frac{430 \text{ nm}}{1} \times \frac{10^{-9} \text{ m}}{1 \text{ nm}} = 430 \times 10^{-9} \text{ m} = 0.000000430 \text{ m}$$

Conversions involving time:

$$\frac{1.1 \text{ h}}{1} \times \frac{60 \text{ min}}{1 \text{ h}} \times \frac{60 \text{ s}}{1 \text{ min}} = 1.1 \times 3600 \text{ s} = 3960 \text{ s}$$

$$\frac{95 \text{ km}}{1 \text{ h}} \times \frac{10^3 \text{ m}}{1 \text{ km}} \times \frac{1 \text{ h}}{60 \text{ min}} \times \frac{1 \text{ min}}{60 \text{ s}} = \frac{95 \times 10^3 \text{ m}}{3600 \text{ s}} = 26 \text{ m/s}$$

DYNAMICS EXTENSION

$$F_{net} = ma$$

$$F_g = ma_g$$

$$F_f = \mu F_N$$

$$F_{net} = F_1 + F_2 + \dots$$

$$v_f = v_i + at$$

$$d = \frac{(v_f + v_i)t}{2}$$

$$d = v_i t + \frac{1}{2} at^2$$

$$v_f^2 = v_i^2 + 2ad$$

MOMENTUM & TORQUE

$$p = mv$$

$$p_i = p_f$$

$$\tau = r_{\perp} F$$

$$J = Ft = \Delta p$$

$$m_1 v_{1i} + m_2 v_{2i} = m_1 v_{1f} + m_2 v_{2f} \quad \tau_{net} = \tau_1 + \tau_2 + \dots$$

PROJECTILES

$$v_{fy} = v_{iy} + a_g t$$

$$d_x = v_x t$$

$$d_y = v_{iy} t + \frac{1}{2} a_g t^2$$

$$v_{fy}^2 = v_{iy}^2 + 2a_g d_y$$

$$T = \frac{2v_i \sin \theta}{g}$$

$$R = \frac{v_i^2 \sin(2\theta)}{g}$$

$$H = \frac{v_i^2 (\sin \theta)^2}{2g}$$

UNIVERSAL GRAVITATION

$$\frac{r^3}{T^2} = \frac{GM}{4\pi^2}$$

$$\frac{r_a^3}{T_a^2} = \frac{r_b^3}{T_b^2}$$

$$F_g = \frac{Gm_1 m_2}{r^2}$$

$$v^2 = \frac{GM}{r}$$

CIRCULAR MOTION & SIMPLE HARMONIC MOTION

$$f = \frac{1}{T}$$

$$v = \frac{2\pi r}{T}$$

$$a_c = \frac{v^2}{r}$$

$$a_c = \frac{4\pi^2 r}{T^2}$$

$$F_c = \frac{mv^2}{r}$$

$$F_c = \frac{4m\pi^2 r}{T^2}$$

$$\tan \theta = \frac{v^2}{rg}$$

$$F_R = -kx$$

$$T = 2\pi \sqrt{\frac{l}{g}}$$

$$T = 2\pi \sqrt{\frac{m}{k}}$$

$$E_k = \frac{1}{2} mv^2$$

$$E_G = mgh$$

$$E_E = \frac{1}{2} kx^2$$

FIELDS & CIRCUITS

$$F_Q = \frac{kq_1q_2}{r^2} \qquad V = IR \qquad P = IV$$

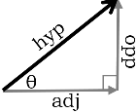
SERIES CIRCUITS

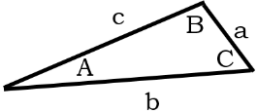
$$R_T = R_1 + R_2 + \dots \qquad I_T = I_1 = I_2 = \dots \qquad V_T = V_1 + V_2 + \dots$$

PARALLEL CIRCUITS

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \dots \qquad I_T = I_1 + I_2 + \dots \qquad V_T = V_1 = V_2 + \dots$$

TRIGONOMETRY

$$\sin \theta = \frac{\text{opp}}{\text{hyp}} \quad \cos \theta = \frac{\text{adj}}{\text{hyp}} \quad \tan \theta = \frac{\text{opp}}{\text{adj}}$$


$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$


PHYSICAL CONSTANTS

1 hour = 60 min	1 min = 60 s	$a_g = -9.81 \text{ m/s}^2 \text{ [↓]}$	$g = 9.81 \text{ m/s}^2$
Earth's mass = $M_{\oplus} = 5.98 \times 10^{24} \text{ kg}$	Earth's radius = $r_{\oplus} = 6.38 \times 10^6 \text{ m}$	Earth's av. orb radius = $r = 1.49 \times 10^{11} \text{ m}$	
$v_{\text{light}} = c = 3.00 \times 10^8 \text{ m/s}$	$k = 9.00 \times 10^9 \text{ Nm}^2/\text{C}^2$	$G = 6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$	

Sym	Quantity	Units
F_{net}		
m		
a		
F_g		
a_g		
F_f		
μ		
F_N		
v_f		
v_i		
t		
d		
p		
v		
p_i		
p_f		

Sym	Quantity	Units
τ		
θ_r		
g		
T		
R		
H		
θ		
r		
G		
M		
f		
V		
a_c		
F_c		
k		
x		

Sym	Quantity	Units
l		
F_Q		
q		
E_Q		
F_B		
B		
I		
L		
E_P		
V		
Q		
k		
R		
P		
E_T		
A		