Prefix	*tera-*	*giga-*	*mega-*	*kilo-*	*hecta-*	*deka-*	BASE UNIT	*deci-*	*centi-*	*milli-*	*micro-*	*nano-*	*pico-*
Sym.	T-	G-	M-	k-	h-	da-		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:

$$\frac{2.4\ \cancel{km}}{1}\times\frac{10^{3}\ \boldsymbol{m}}{1\ \cancel{km}}=\ 2.4\times10^{3}\ \boldsymbol{m}=2400\ \boldsymbol{m}$$

$$\frac{430\ \cancel{nm}}{1}\times\frac{10^{-9}\ \boldsymbol{m}}{1\ \cancel{nm}}=\ 430\times10^{-9}\ \boldsymbol{m}=0.000000430\ \boldsymbol{m}$$

Conversions involving time:

$$\frac{1.1\ \cancel{h}}{1}\times\frac{60\ \cancel{min}}{1\ \cancel{h}}\times\frac{60\ \boldsymbol{s}}{1\ \cancel{min}}=\ 1.1\times3600\ \boldsymbol{s}=3960\ \boldsymbol{s}$$

$$\frac{95\ \cancel{km}}{1\ \cancel{h}}\times\frac{10^{3}\ \boldsymbol{m}}{1\ \cancel{km}}\times\frac{1\ \cancel{h}}{60\ \cancel{min}}\times\frac{1\ \cancel{min}}{60\ \boldsymbol{s}}=\frac{95\times10^{3}\ \boldsymbol{m}}{3600\ \boldsymbol{s}}=26\ \boldsymbol{m/s}$$

KINEMATICS

$$v_{av}=\frac{d}{t}\qquad m=\frac{(y_2)-(y_1)}{(x_2)-(x_1)}$$

$$a=\frac{\Delta v}{t}\qquad \Delta v=\ v_f-v_i$$

$$v_f=\ v_i+at\qquad v_f^2=\ v_i^2+2ad$$

$$d=\ v_it+\frac{1}{2}at^2\qquad d=\frac{(v_f+v_i)t}{2}$$

$$v_{relative}=v_{obj}-v_{obs}$$

DYNAMICS

$$F_{net}=ma_{net}\qquad F_g=ma_g$$

$$F_f=\ \mu F_N\qquad F_{net}=\ F_1+F_2+F_3+\cdots$$
(The sum of all parallel forces)

$$p=mv\qquad J=F\Delta t=\ \Delta p$$

$$p_{Ti}=p_{Tf}\qquad \Delta p=m\Delta v=m(v_f-v_i)$$

$$m_1v_{1i}+m_2v_{2i}+\cdots=m_1v_{1f}+\ m_2v_{2f}+\cdots$$

WORK & ENERGY

$$W=F_{||}\Delta d\qquad P=\frac{W}{t}=\frac{F_{||}d}{t}=F_{||}v$$

$$\%Eff=\frac{output}{input}\times100\qquad E_M=E_K+E_G+E_E$$

$$E_K=\frac{1}{2}mv^2\qquad W=\Delta E_k$$

$$E_G=mgh\qquad W=\ \Delta E_G$$

$$E_E=\frac{1}{2}kx^2\qquad F_R=-kx$$

$$E_{Mi}=E_{Mf}-W_{Friction}$$

$$E_{Ki}+E_{Gi}+E_{Ei}=E_{Kf}+E_{Gf}+E_{Ef}-W_{Friction}$$

WAVES

$$v=\ \lambda f\qquad f=\frac{\#\ cycles}{\Delta t}=\frac{1}{T}$$

$$v_{sound}=331+0.59T_C\qquad T=\frac{\Delta t}{\#\ cycles}=\frac{1}{f}$$
Sound in Air

$$f_{R1}=\frac{v}{2L}\qquad f_{R1}=\frac{v}{4L}\qquad f_{beat}=|f_2-f_1|$$

$$L_{R1}=\frac{1}{4}\lambda\qquad L_{R1}=\frac{1}{2}\lambda$$

$$f_{observed}=f_{source}\left[\frac{v_{sound}\pm v_{observer}}{v_{sound}\mp v_{source}}\right]$$

$$n_i\sin\theta_i=\ n_R\sin\theta_R\qquad n=\frac{c}{v}\qquad \sin\theta_c=\frac{n_R}{n_i}$$

PHYSICAL CONSTANTS

$1\ hour=60\ minutes$ $\qquad a_g=-9.81\ m/s^2$ $\qquad v_{light}=c=3.00\times10^8\ m/s$

$1\ minute=60\ seconds$ $\qquad g=+9.81\ m/s^2$ $\qquad n_{air}=1.00$

Quantity	*Symbol*	*Unit Name*	*Unit*	*Notes…*
Time				
Distance/Displacement				
Speed/Velocity				
Acceleration				
Mass				
Force of gravity				
Net Force				
Frictional Force				
Normal Force				
Coefficient of Friction				
Momentum				
Impulse				
Work				
Power				
Efficiency				
Kinetic Energy				
Gravitational Energy				
Height				
Elastic Energy				
Force constant				
Extension/Compression				
Restoring Force				
Mechanical Energy				
Wavelength				
Frequency				
Period				
Temperature				
Resonance Length				
Resonance Frequency				
Index of Refraction				
Angle				