

Physics Formula Sheet

Mechanics

$$x = x_0 + v_{x0}t + \frac{1}{2}a_x t^2$$

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

$$|\vec{F}_{\text{spring}}| = k|\bar{x}|$$

$$v = v_0 + at$$

$$\theta = \theta_0 + \omega_0 t + \frac{1}{2}\alpha t^2$$

$$PE_{\text{spring}} = \frac{1}{2}kx^2$$

$$v_x^2 - v_{x0}^2 = 2a(x - x_0)$$

$$\omega = \omega_0 + \alpha t$$

$$T_{\text{spring}} = 2\pi\sqrt{\frac{m}{k}}$$

$$\bar{a} = \frac{\Sigma \vec{F}}{m} = \frac{\vec{F}_{\text{net}}}{m}$$

$$T = \frac{2\pi}{\omega} = \frac{1}{f}$$

$$T_{\text{pendulum}} = 2\pi\sqrt{\frac{\ell}{g}}$$

$$|\vec{F}_{\text{friction}}| \leq \mu |\vec{F}_{\text{Normal}}|$$

$$v = f\lambda$$

$$\bar{p} = m\bar{v}$$

$$x = A\cos(2\pi ft)$$

$$|\vec{F}_{\text{gravity}}| = G \frac{m_1 m_2}{r^2}$$

$$\Delta \bar{p} = \vec{F} \Delta t$$

$$\bar{\alpha} = \frac{\Sigma \vec{\tau}}{I} = \frac{\vec{\tau}_{\text{net}}}{I}$$

$$|\vec{F}_{\text{gravity}}| = m\bar{g}$$

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

$$\vec{\tau} = r \times F$$

$$PE_{\text{gravity}} = -G \frac{m_1 m_2}{r}$$

$$\Delta PE = mg\Delta y$$

$$L = I\omega$$

$$\rho = \frac{m}{V}$$

$$\Delta E = W = Fd\cos\theta$$

$$\Delta L = \tau\Delta t$$

$$KE = \frac{1}{2}I\omega^2$$

Electricity

$$|\vec{F}_E| = k \left| \frac{q_1 q_2}{r^2} \right|$$

$$\Delta V = IR$$

$$R = \frac{\rho \ell}{A}$$

$$I = \frac{\Delta q}{\Delta t}$$

$$P = I\Delta V$$

$$R_{\text{series}} = R_1 + R_2 + \dots + R_n$$

$$\frac{1}{R_{\text{parallel}}} = \frac{1}{R_1} + \frac{1}{R_2} + \dots + \frac{1}{R_n}$$

Geometry

Rectangle $A = bh$

Rectangular Solid $V = \ell wh$

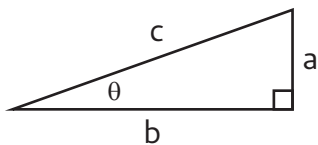
Triangle $A = \frac{1}{2}bh$

Circle $A = \pi r^2$
 $C = 2\pi r$

Cylinder $V = \pi r^2 \ell$
 $S = 2\pi r \ell + 2\pi r^2$

Sphere $V = \frac{4}{3}\pi r^3$
 $S = 4\pi r^2$

Trigonometry



$$c^2 = a^2 + b^2 \quad \sin\theta = \frac{a}{c} \quad \cos\theta = \frac{b}{c} \quad \tan\theta = \frac{a}{b}$$

θ	0°	30°	37°	45°	53°	60°	90°
$\sin\theta$	0	$1/2$	$3/5$	$\sqrt{2}/2$	$4/5$	$\sqrt{3}/2$	1
$\cos\theta$	1	$\sqrt{3}/2$	$4/5$	$\sqrt{2}/2$	$3/5$	$1/2$	0
$\tan\theta$	0	$\sqrt{3}/3$	$3/4$	1	1	$\sqrt{3}$	∞

Variables

a = acceleration

A = amplitude

A = Area

b = base length

C = circumference

d = distance

E = energy

f = frequency

F = force

h = height

I = current

I = rotational inertia

KE = kinetic energy

k = spring constant

L = angular momentum

ℓ = length

m = mass

P = power

p = momentum

q = charge

r = radius

R = resistance

S = surface area

T = period

t = time

PE = potential energy

V = electric potential

V = volume

v = velocity

w = width

W = work

x = position

y = height

α = angular acceleration

λ = wavelength

μ = coefficient of friction

v = wave speed

θ = angle

ρ = density

ρ = resistivity

τ = torque

ω = angular speed