

Physics Equations 1st Semester

Metric Prefixes

Pico	p	1 / 1,000,000,000,000	10 ⁻¹²
Nano	n	1 / 1,000,000,000	10 ⁻⁹
Micro	μ	1 / 1,000,000	10 ⁻⁶
Milli	m	1 / 1,000	10 ⁻³
Centi	c	1 / 100	10 ⁻²
Deci	d	1 / 10	10 ⁻¹
Unit	L,m,g	1	10 ⁰
Deka	da,dk	10	10 ¹
Hecto	H	100	10 ²
Kilo	k	1000	10 ³
Mega	M	1,000,000	10 ⁶
Giga	G	1,000,000,000	10 ⁹
Tera	T	1,000,000,000,000	10 ¹²

Trig Equations

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

Law of cosines: $c = \sqrt{a^2 + b^2 - (2ab \cos \theta)}$

Motion

Velocity: $v = \frac{\Delta d}{\Delta t} \quad \frac{(d_f - d_i)}{(t_f - t_i)}$

Acceleration: $a = \frac{\Delta v}{\Delta t} \quad \frac{(v_f - v_i)}{(t_f - t_i)}$

Component

X, horizontal component: $A_x = A \cos \vartheta$

Y, vertical component: $A_y = A \sin \vartheta$

Angle: $\tan \vartheta = R_y/R_x \quad \theta = \tan^{-1} (\text{opp/adj})$

X, horizontal component on hill $F_{gx} = F_g \sin \theta$

Y, vertical component on hill $F_{gy} = F_g \cos \theta$

Algebraic Addition of Vectors

$$R_x = A_x + B_x + C_x + \dots$$

$$R_y = A_y + B_y + C_y + \dots$$

Newton's Laws

$$a = F_{\text{net}} / m \quad \text{or} \quad F_{\text{net}} = ma \quad F_g = mg$$

$$F_{gx} - F_f = ma \quad F_{gy} - F_N = F_{\text{net}y}$$

$$a = g(\sin \theta - \mu_k \cos \theta)$$

Friction

$$F_f = \mu_k F_N$$

Force

$$F_N = mg$$

Projectile Motion

$$V_y = v \sin \theta \quad V_x = v \cos \theta$$

$$V_y = -gt \quad R \text{ or } x = x_i + v_{xi}t$$

$$y = y_i - (1/2)gt^2$$

$$t = \frac{(-2)(y_f - y_i)}{g}$$

$$y = y_i + v_{yi}t - (1/2)gt^2$$

Pendulum

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