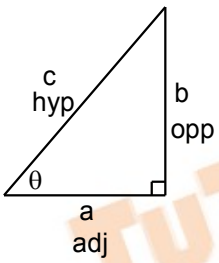
Physics Formula for Grade 11

Trigonometry



$a^2 + b^2 = c^2$

$$\sin\theta = \frac{opp}{hyp}$$

$$\cos\theta = \frac{adj}{hyp}$$

$$\tan\theta = \frac{opp}{adj}$$

$$area = \frac{1}{2}ab$$

Constant Velocity

$$v = \frac{\Delta d}{\Delta t} = \frac{d_f - d_i}{t_f - t_i}$$

Constant Acceleration

$$d = \frac{1}{2}at^2 \text{ (from rest)}$$

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

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

$v_f = v_i + at$

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

$$v_{av} = \frac{v_i + v_f}{2} = \frac{d_f - d_i}{t_f - t_i}$$

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

Percent Error

%diff = diff/average x 100%

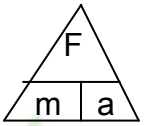
%error = diff/true x 100%

Vectors

$$\vec{h} + \vec{c} = \vec{t}\,(boats)$$
$$\vec{h} + \vec{w} = \vec{t}\,(airplanes)$$

Newton's Laws

$$a = \frac{F_{net}}{m}$$



$a = -\mu g$ (slide to stop)

$W = mg = F_g$

$$\mu = \frac{F_f}{F_N}$$

$$F_g = \frac{Gm_1m_2}{r^2}$$

Energy/Power

$W = Fd$

$$P = \frac{W}{t}$$

$W = \Delta E$

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

$$E_p = mgh$$

$$E_e = P \cdot t$$

$$\%\,eff = \frac{energy\ \ output}{energy\ \ input} \times 100\%$$

Momentum

$p = mv$

$p_i = p_f$

Impulse = $Ft = \Delta p = m\Delta v$

$$p_f = p_i + I$$

Wave Motion

$v = f\lambda$

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

Special Relativity

$$t = \frac{t_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$L = L_0\sqrt{1 - \frac{v^2}{c^2}}$$

$$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$E = mc^2$

Light/Optics

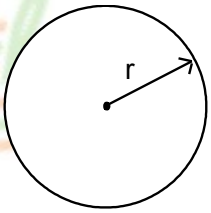
$n\lambda = d\sin\theta$

$$\frac{\sin i}{\sin r} = \frac{N_2}{N_1}$$

$$\sin c = \frac{N_2}{N_1}$$

$$\frac{\sin i}{\sin r} = \frac{\lambda_1}{\lambda_2} = \frac{v_1}{v_2} = \frac{N_2}{N_1}$$

Circles



Circumference = $2\pi r$

Area = πr^2

Constants

$g = 9.8\ m/s^2$

$c = 3.00 \times 10^8\ m/s$

$G = 6.67 \times 10^{-11}\ Nm^2/kg^2$

$\pi = 3.14$

Quadratic Formula

if $ax^2 + bx + c = 0$

then: $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Prefixes

centi (c)	$= 10^{-2}$
milli (m)	$= 10^{-3}$
micro (μ)	$= 10^{-6}$
nano (n)	$= 10^{-9}$
pico (p)	$= 10^{-12}$
kilo (k)	$= 10^{3}$
mega (M)	$= 10^{6}$
giga (G)	$= 10^{9}$