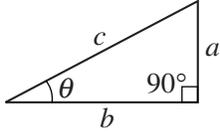


# AP<sup>®</sup> PHYSICS 1 EQUATIONS

MECHANICS	ELECTRICITY
$v_x = v_{x0} + a_x t$ $x = x_0 + v_{x0} t + \frac{1}{2} a_x t^2$ $v_x^2 = v_{x0}^2 + 2a_x(x - x_0)$ $\vec{a} = \frac{\sum \vec{F}}{m} = \frac{\vec{F}_{net}}{m}$ $ \vec{F}_f  \leq \mu  \vec{F}_n $ $a_c = \frac{v^2}{r}$ $\vec{p} = m\vec{v}$ $\Delta\vec{p} = \vec{F} \Delta t$ $K = \frac{1}{2} m v^2$ $\Delta E = W = F_{\parallel} d = F d \cos \theta$ $P = \frac{\Delta E}{\Delta t}$ $\theta = \theta_0 + \omega_0 t + \frac{1}{2} \alpha t^2$ $\omega = \omega_0 + \alpha t$ $x = A \cos(2\pi f t)$ $\vec{\alpha} = \frac{\sum \vec{\tau}}{I} = \frac{\vec{\tau}_{net}}{I}$ $\tau = r_{\perp} F = r F \sin \theta$ $L = I \omega$ $\Delta L = \tau \Delta t$ $K = \frac{1}{2} I \omega^2$ $ \vec{F}_s  = k  \vec{x} $ $U_s = \frac{1}{2} k x^2$ $\rho = \frac{m}{V}$	$a = \text{acceleration}$ $A = \text{amplitude}$ $d = \text{distance}$ $E = \text{energy}$ $f = \text{frequency}$ $F = \text{force}$ $I = \text{rotational inertia}$ $K = \text{kinetic energy}$ $k = \text{spring constant}$ $L = \text{angular momentum}$ $\ell = \text{length}$ $m = \text{mass}$ $P = \text{power}$ $p = \text{momentum}$ $r = \text{radius or separation}$ $T = \text{period}$ $t = \text{time}$ $U = \text{potential energy}$ $V = \text{volume}$ $v = \text{speed}$ $W = \text{work done on a system}$ $x = \text{position}$ $y = \text{height}$ $\alpha = \text{angular acceleration}$ $\mu = \text{coefficient of friction}$ $\theta = \text{angle}$ $\rho = \text{density}$ $\tau = \text{torque}$ $\omega = \text{angular speed}$  $\Delta U_g = mg \Delta y$ $T = \frac{2\pi}{\omega} = \frac{1}{f}$ $T_s = 2\pi \sqrt{\frac{m}{k}}$ $T_p = 2\pi \sqrt{\frac{\ell}{g}}$ $ \vec{F}_g  = G \frac{m_1 m_2}{r^2}$ $\vec{g} = \frac{\vec{F}_g}{m}$ $U_G = -\frac{G m_1 m_2}{r}$
	$ \vec{F}_E  = k \left  \frac{q_1 q_2}{r^2} \right $ $I = \frac{\Delta q}{\Delta t}$ $R = \frac{\rho \ell}{A}$ $I = \frac{\Delta V}{R}$ $P = I \Delta V$ $R_s = \sum_i R_i$ $\frac{1}{R_p} = \sum_i \frac{1}{R_i}$  $A = \text{area}$ $F = \text{force}$ $I = \text{current}$ $\ell = \text{length}$ $P = \text{power}$ $q = \text{charge}$ $R = \text{resistance}$ $r = \text{separation}$ $t = \text{time}$ $V = \text{electric potential}$ $\rho = \text{resistivity}$
	<b>WAVES</b> $\lambda = \frac{v}{f}$ $f = \text{frequency}$ $v = \text{speed}$ $\lambda = \text{wavelength}$
	<b>GEOMETRY AND TRIGONOMETRY</b>  <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Rectangle <math>A = bh</math></p> <p>Triangle <math>A = \frac{1}{2} bh</math></p> <p>Circle <math>A = \pi r^2</math> <math>C = 2\pi r</math></p> <p>Rectangular solid <math>V = \ell wh</math></p> <p>Cylinder <math>V = \pi r^2 \ell</math> <math>S = 2\pi r \ell + 2\pi r^2</math></p> <p>Sphere <math>V = \frac{4}{3} \pi r^3</math> <math>S = 4\pi r^2</math></p> </div> <div style="width: 45%;"> <p><math>A = \text{area}</math> <math>C = \text{circumference}</math> <math>V = \text{volume}</math> <math>S = \text{surface area}</math> <math>b = \text{base}</math> <math>h = \text{height}</math> <math>\ell = \text{length}</math> <math>w = \text{width}</math> <math>r = \text{radius}</math></p> <p><b>Right triangle</b>  <math>c^2 = a^2 + b^2</math>  <math>\sin \theta = \frac{a}{c}</math>  <math>\cos \theta = \frac{b}{c}</math>  <math>\tan \theta = \frac{a}{b}</math></p> </div> </div> <div style="text-align: right; margin-top: 20px;">  </div>