Physics Formulas for Units 2-6

Unit 2 Simple Kinematic Formulas

Constant motion: only used with average velocity or with constant velocity!!

$\Delta x = v_{average} \times t$ A constant velocity IS an average velocity and IS the instantaneous velocity every second that the object is in constant motion

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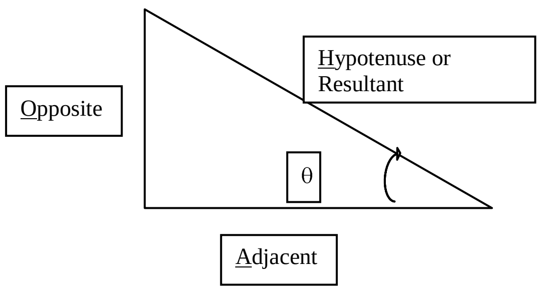
Units 3-4: Acceleration and projectile motion

General Kinematic Formulas: The Big Three Formulas for uniformly accelerated motion

$v_f = v_i + at$ $v_f^2 = v_i^2 + 2a\Delta x$ $\Delta x = v_i t + \frac{1}{2}at^2$ $g = 9.8\frac{m}{s^2}$ or you can use $g=10\ m/s^2$



Sin θ = O/H Cos θ = A/H Tan θ = O/A

To get the side opposite in a right triangle: side opposite = Hypotenuse (Sin θ)

To get the side adjacent: side adjacent = Hypotenuse (Cos θ)

If W = mg is the hypotenuse, then the adjacent would be = mg (Cos θ) and opposite side would be = mg (Sin θ)

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Unit 5: Newton's laws and forces

$F_{net} = ma$ $W = mg$ $F_g = G\frac{m_1 m_2}{r^2}$ when G = 6.67 x 10^{-11} $\frac{N \bullet m^2}{kg^2}$

$F_f = \mu_k F_N$ **For kinetic friction** ***μ is the coefficient of friction and can be μ_k or μ_s***

N or F_N are symbols for the Normal Force in a formula

$F_f \leq \mu_s N$ **For static friction**

Force of static friction will be at maximum and equal to $\mu_s N$ right before the object begins to slide.

Objects in equilibrium: $\sum F_x = Zero$ **and** $\sum F_y = Zero$

Objects accelerating: $\sum F = ma$

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Unit 6: Circular motion

Tangential velocity formulas

$v = \frac{2\pi r}{T}$ T = period $v = 2\pi rf$ $f = frequency$ $T = \frac{1}{f}$ and $f = \frac{1}{T}$

$a_c = \frac{v^2}{r}$ a_c = centripetal acceleration $F_c = ma_c$

$F_G = G\frac{m_1 M_2}{r^2}$ $v = \sqrt{\frac{GM}{r}}$ $\mathbf{G}$ = Gravitational constant = $G = 6.67 \times 10^{-11} \frac{N \bullet m^2}{kg^2}$

τ (Tau) is torque $\tau = rF$ r is lever arm distance

ω (Omega) is rotational speed or angular velocity ω = #of rotations per unit of time

I is moment of inertia (inertia of rotating mass) I=(a coefficient)mr^2

Angular momentum = Iω Conservation of Angular Momentum: $I_1\omega_1 = I_2\omega_2$