Physics Equations Cheat Sheet

by lurkGH

September 19, 2024

Position, Velocity, and Acceleration

Displacement

$$\Delta r = \vec{r}_f - \vec{r}_i$$

Average Velocity

$$\vec{v}_{avg} = \frac{\Delta \vec{r}}{\Delta t}$$

Average Velocity (Constant Acceleration)

$$\vec{v}_{avg} = \frac{1}{2}(v_{fx} + v_{ix})$$

Instantaneous Velocity

$$\vec{v} = \lim_{\Delta t \to 0} \frac{\Delta \vec{r}}{\Delta t}$$

Average Acceleration

$$\vec{a}_{avg} = \frac{\Delta \vec{v}}{\Delta t}$$

Instantaneous Acceleration

$$\vec{a} = \lim_{\Delta t \to 0} \frac{\Delta \vec{v}}{\Delta t}$$

Projectile Motion Equations (1 Dimension)

Find velocity with acceleration and time

$$\Delta v_x = a_x \Delta t$$

Find velocity with acceleration and displacement

$$v_{fx}^2 - v_{ix}^2 = 2a\Delta x$$

Find displacement with velocity and time

$$\Delta x = \frac{1}{2}(v_{fx} + v_{ix})\Delta t$$

Find displacement with acceleration and velocity

$$\Delta x = \frac{1}{2}a_x(\Delta t)^2 + v_{ix}\Delta t$$

Circular Projectile Motion Equations

$$\Delta\omega = \omega_f - \omega_i = \alpha\Delta t$$

$$\omega_f^2 - \omega_i^2 = 2\alpha\Delta\theta$$

$$\Delta\theta = \frac{1}{2}(\omega_f + \omega_i)\Delta t$$

$$\Delta\theta = \frac{1}{2}\alpha(\Delta t)^2 + \omega_i\Delta t$$