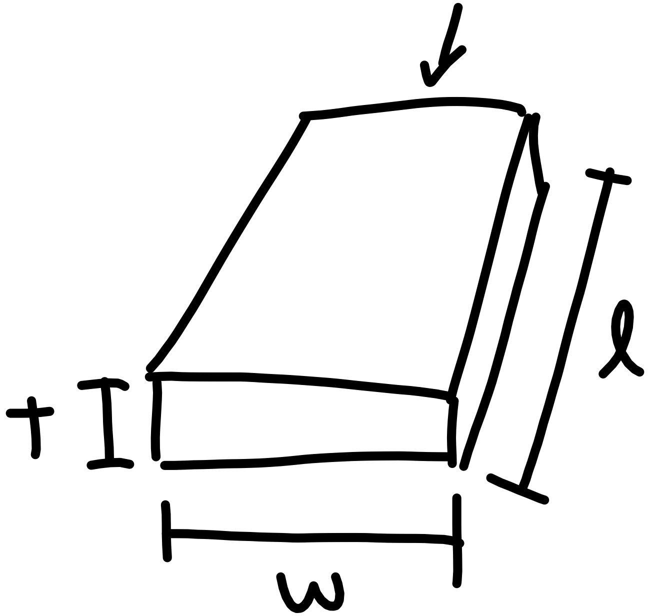
$$R = \rho \frac{l}{A}$$



$$R = \rho \frac{l}{t w}$$

1 $$R = \overbrace{\boxed{\frac{\rho}{t}}}^{R_s} \frac{l}{w}$$

$$\hookrightarrow R_s = \frac{\rho}{t}$$

$$\frac{1}{R_{eff}} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$R = R_s \frac{l}{w}$$

$$R_s = \Omega \square$$

Kinematic Equations

*** Constant acceleration ONLY ***

Displacement: $S = x_f - x_i$

Velocity: $V = \frac{S}{\Delta t} = \frac{x_f - x_i}{t_f - t_i} = \frac{dx}{dt}$

acceleration: $a = \frac{V}{\Delta t} = \frac{V_f - V_i}{t_f - t_i} = \frac{dv}{dt}$

I. Velocity-time

$$a = \frac{dv}{dt}$$

$$a\,dt = dv$$

$$\int_0^{t_F} a t^0 \, dt = \int_{v_i}^{v_F} 1 v^0 \, dv$$

$$at = v$$

$$at$$

$$a(t_f - 0) = V_f - V_i$$

$$at = V_f - V_i$$

$$V_i + at = V_f$$

$$\boxed{\begin{array}{c} V_f = V_i + at \\ V(t) = V_i + at \end{array}}$$

II. Position - time

$$V = \frac{dx}{dt}$$

$$V\,dt = dx$$

$$(V_i + at)\,dt = dx$$

$$\int_0^t V_i + at\,dt = \int_{x_i}^{x_f} 1\,dx$$

$$\int_0^t v_i t^0 + at \, dt = \int_{x_i}^{x_f} 1 x^0 \, dx$$

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

$$v_i t + \frac{1}{2}at^2 = x_f - x_i$$

$$\boxed{\begin{aligned} x_i + v_i t + \frac{1}{2}at^2 &= x_f \\ x(t) &= x_i + v_i t + \frac{1}{2}at^2 \end{aligned}}$$

III. Velocity-Position

$$\frac{dv}{dx} \rightarrow \frac{\frac{m}{s}}{m} \rightarrow \frac{\cancel{m}}{s} \cdot \frac{1}{\cancel{m}} = \frac{1}{s} = Hz$$

$$\frac{dv}{dx} = \frac{dv}{dx}$$

$$\frac{dv}{dx} = \frac{dv}{dx} \cdot 1$$

<u>But</u>: $\frac{dt}{dt} = 1 \rightarrow \frac{dv}{dx} = \frac{dv}{dx} \cdot \frac{dt}{dt}$

$$\frac{dv}{dx} = \underbrace{\frac{dv}{dt}}_{a} \cdot \left.\frac{dt}{dx}\right] \quad \frac{1}{v}$$

$$\frac{dv}{dx} = a\frac{1}{v}$$

$$\frac{dv}{dx} = \frac{a}{v}$$

$$v\,dv = a\,dx$$

$$v\,dv = a\,dx$$

$$\int_{v_i}^{v_f} v\,dv = \int_{x_i}^{x_f} a\,x^0\,dx$$

$$\frac{1}{2}v^2 = ax$$

$$\frac{1}{2}v_f^2 - \frac{1}{2}v_i^2 = ax$$

$$\frac{1}{2}\left(v_f^2 - v_i^2\right) = ax$$

$$V_f^2 - V_i^2 = 2ax$$

$$\boxed{\begin{aligned} V_f^2 &= V_i^2 + 2ax \\ V^2(x) &= V_i^2 + 2ax \end{aligned}}$$