Motion

$$\sum \vec{F}_R = m\vec{a}$$

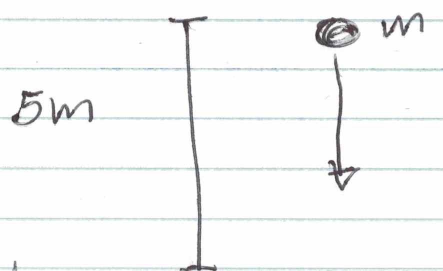
$$x(t) = x_0 + v_0 t + \frac{1}{2} a t^2$$

In physic can only sum same type of variables, lets consider in this case meter.

$$\begin{array}{lll} x & - m & \\ v_0 t & - m & \rightarrow \frac{m}{\cancel{s}} \times \cancel{s} \\ \frac{1}{2} a t^2 & - m & \rightarrow \frac{m}{\cancel{s^2}} \times \cancel{s^2} \end{array}$$

note when in unijorme motion desplacement is considered ~~lineear~~ $v_0 t$, or velocity which is $[\frac{m}{s}]$, or every second that goes by there is an incements of m meters.

note when in acceleration motion displacement has a parabolic behavior.



let $g = 10$

free falll $\quad v_0 = 0$

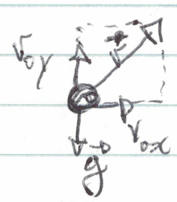
$$x = \frac{1}{2} a t^2$$

$$a = ? \quad a = g$$

$$5 = \frac{1}{2} \times 10\, t^2$$

$$5 = 5\, t^2$$

$$t = \sqrt{1} = 1 \text{ sec}$$



$$\begin{cases} y = y_0 - \frac{1}{2} a t^2 + v_{0y} t \\ x = x_0 + v_{0x} t \end{cases}$$

superposition of two motions.

$$\frac{1}{2} a t^2 = v_{0y}\, t \rightarrow \text{time} \quad t = 0 \ \& \ t = ?$$