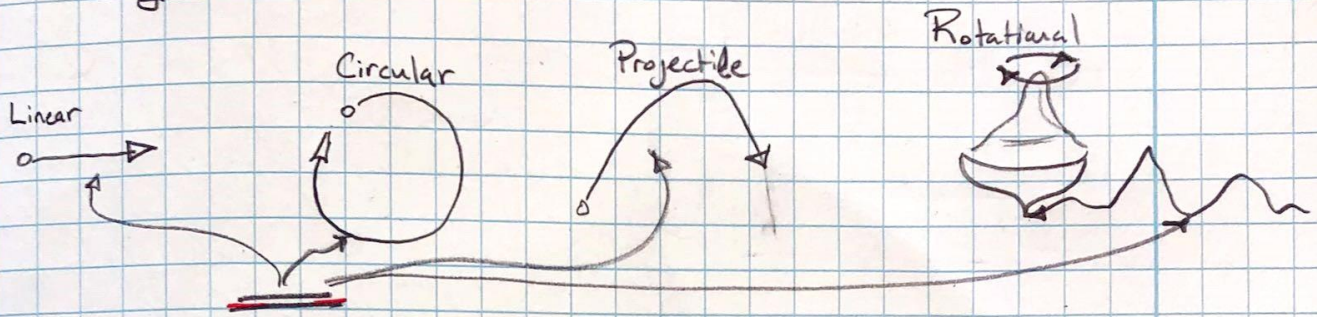
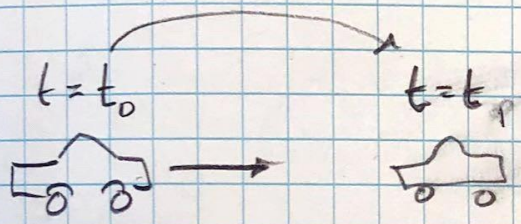
# Ch 1 Representing Motion

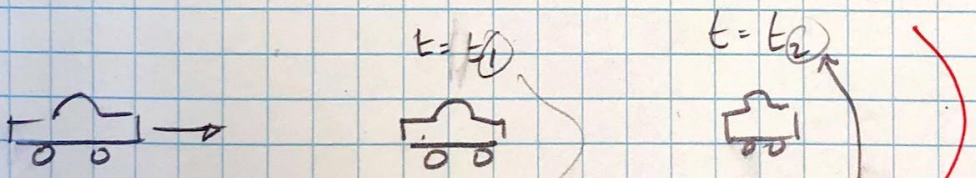
Types:




Objects trajectory = path it takes




Position @ $t_0$, then @ $t_1$



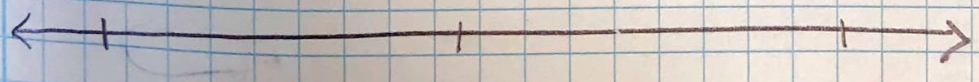

Motion Diagram

$t = 0$ or $t_i$ = initial

$t = \Delta t = t_i + \Delta t$

$t = 2\Delta t$

$\Delta$ (Delta) = Change




$x_0 = 0$
$x_i$ = initial

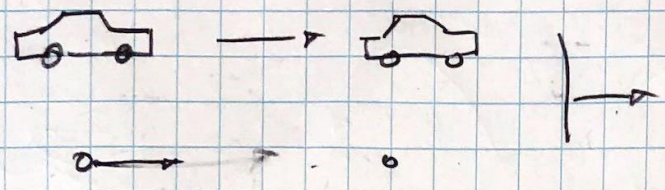
$x_1$
$x_F$ = Final

$x_2$

displacement $\Delta x = x_1 - x_0$

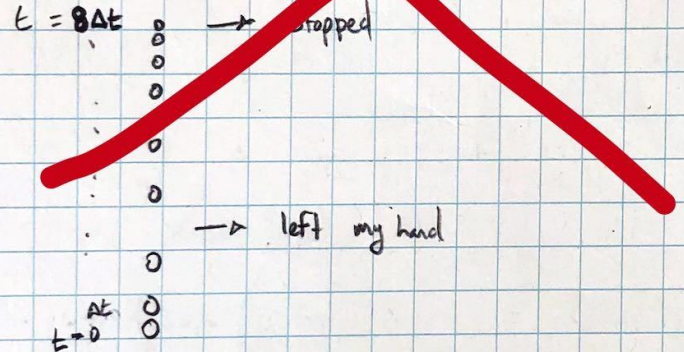
Use single dot to represent complex object.

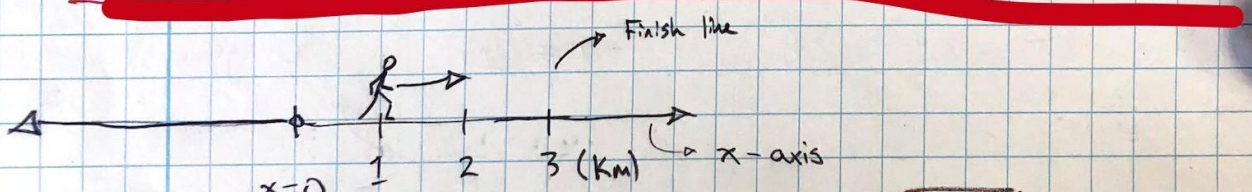
" Particle Model " → highly simplified



X Draw a Motion Diagram For Ball thrown vertically upward.

Start From rest, stop @ highest point (also @ rest)




x=0 (Origin)

x is our coordinate → Position

@ $t = t_i$

$x_i$ = (initial Position) = 0

$x_f$ = (final Position @ $t = t_f$) = 3 Km

$\Delta x$ (change in runner's Position) = $x_f - x_i = 3\,Km$

Displacement

Interval = $\Delta t$ (change in time) = $t_f - t_i = 440\,s \approx 7.3\,min$

# Speed of runner

Uniform motion = constant speed during race

$$\frac{\Delta x}{\Delta t} = \frac{3\,\text{km}}{440\,\text{s}} = \frac{3{,}000\,\text{m}}{440\,\text{s}} = 6.8\ \text{m/s} \approx 7\ \text{m/s}$$

multiply by $1 = \left(\frac{1{,}000\,\text{m}}{1\,\text{km}}\right)$

Approximately equal

Velocity is both speed + direction

runner's | speed ≈ 7 m/s | + (direction = positive)

Mgnitude = $\left|\frac{\Delta x}{\Delta t}\right|$

Stop

Radius of the Earth

6,370,000 m

# of significant digits is ambiguous...

be conservative

≥ 3 digits of significance, but < 7 (else 6,370,000.0 = 8 sig fig)

In Scientific notation

$6.37 \times 10^6$ m ⇒ now clear that only 3 sig. figs.