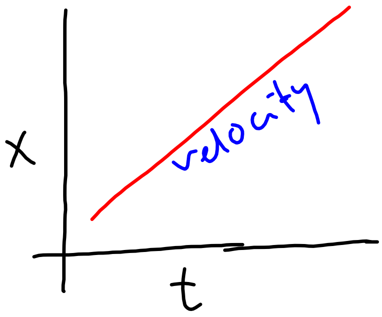
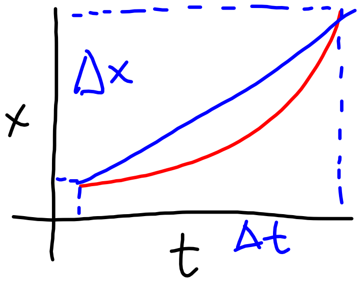
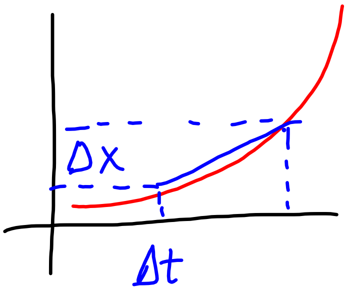
Unit 1

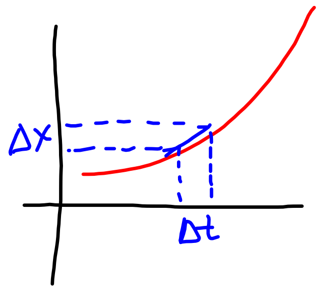


Unit 2

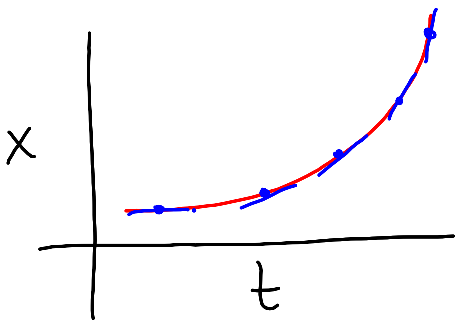


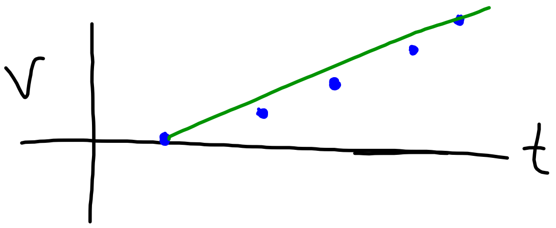
$$v = \frac{\Delta x}{\Delta t}$$

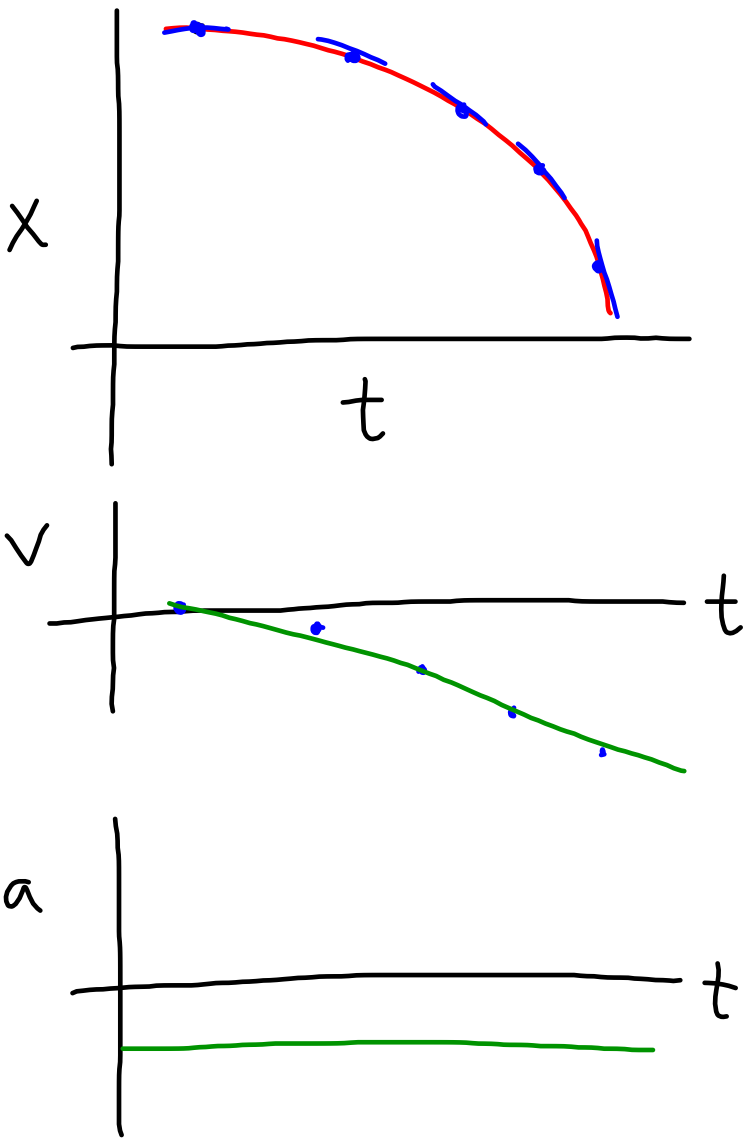




- Reduce size of Δt until it is infinitely small, velocity secant becomes a tangent.







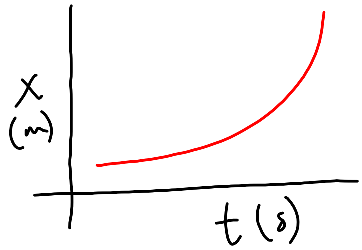
$$\bar{a} = \frac{\Delta \bar{v}}{\Delta t}$$

Units: m/s/s

$$a = \frac{\Delta v}{\Delta t}$$

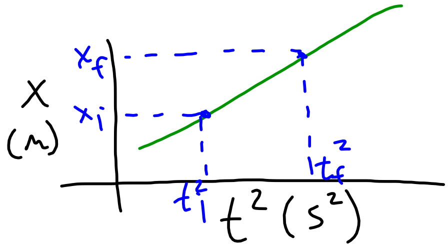
$$\Delta v = a \Delta t \qquad \Delta v = v_f - v_i$$

$$v_f = a \Delta t + v_i$$



x	t	t^2
1	1	1
4	2	4
9	3	9
16	4	16
25	5	25

$$y = ax^2 + bx + c$$



$$m = \frac{x_f - x_i}{t_f^2 - t_i^2} = \frac{\Delta x}{\Delta t^2}$$

$$\Delta x = m \Delta t^2$$

↳ units: m/s/s

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

↳ the ½ comes from looking at real data

(in derivation, c.f. area of triangle: $\frac{1}{2}bh$)

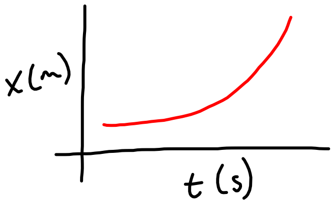
$$\bar{x}_f = \frac{1}{2} \bar{a} (\Delta t)^2 + \bar{v}_i \Delta t + \bar{x}_i$$

- Plot velocity - position
  - linearize velocity axis
  - use area of trapezoid

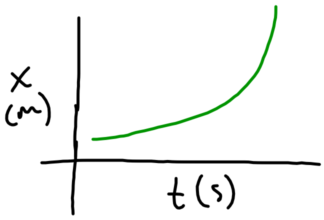
$$\bar{v}_f^2 = 2 \bar{a} \Delta \bar{x} + v_i^2$$

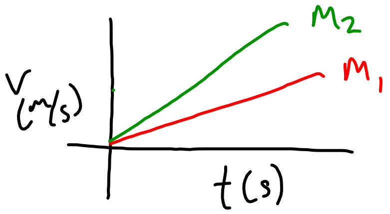
Lab Analysis Guide:

Smaller Incline



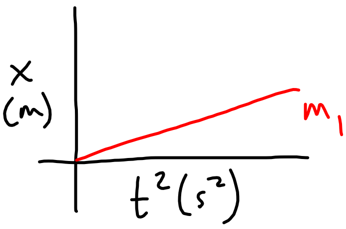
Larger Incline

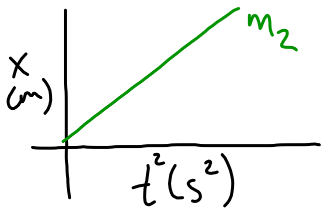




$m_1 = \frac{\Delta v}{\Delta t}$ $m_2 = \frac{\Delta v}{\Delta t}$

Slope of v-t graph is acceleration!





$m_1 = \frac{\Delta x}{\Delta t^2}$ $m_2 = \frac{\Delta x}{\Delta t^2}$

Slope of line in x-t graph is $\frac{1}{2}$ the slope of line in v-t graph.