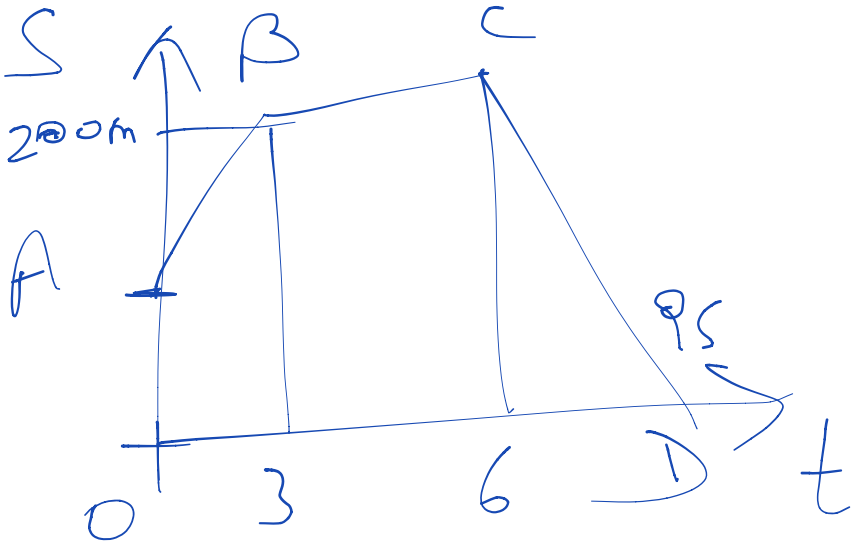
$$V = \frac{\Delta s}{\Delta t} = \frac{S_2 - S_1}{t_2 - t_1}$$



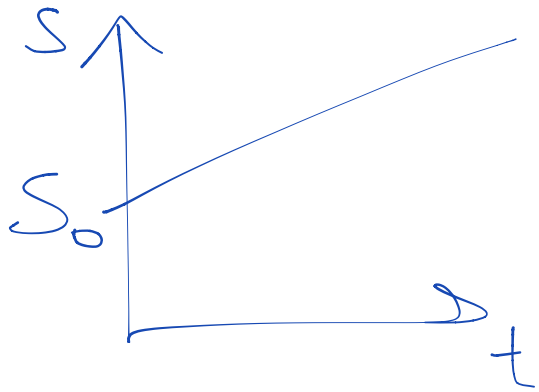
$$V_{AB} = \frac{S_B - S_A}{t_B - t_A} = \frac{200 - 100}{3 - 0} = \frac{100}{3} \, m/s$$

$$V_{BC} = 0$$

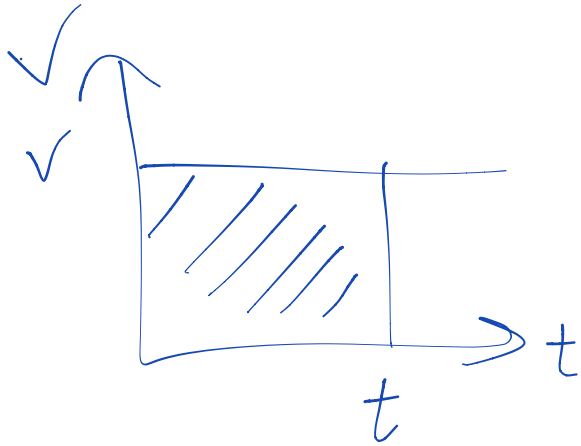
$$V_{CD} = \frac{S_D - S_C}{t_D - t_C} = \frac{0 - 200}{9 - 6} = \frac{-200}{3} \, m/s$$

$$v = \frac{s - s_0}{t - \cancel{t_0}}$$

$$v = \frac{s - s_0}{t} \Rightarrow s = s_0 + vt$$

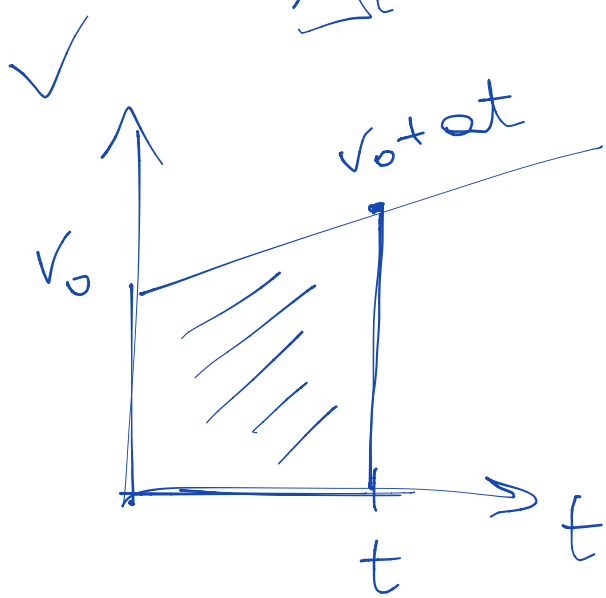


$v = \text{const.}$



$$\Delta s = A = vt$$

$$a = \frac{\Delta v}{\Delta t} = \frac{v_2 - v_1}{t_2 - t_1}$$



$$a = \frac{v - v_0}{t - \cancel{t_0}}$$

$$v = v_0 + at$$

$$y = 2 + 3x$$

$$x = 5$$

$$\Delta s = \frac{(v_0 + v_0 + at)t}{2} = \frac{2v_0 t + at^2}{2}$$

$$\Delta s = v_0 t + \frac{1}{2} at^2$$

$$s - s_0 = v_0 t + \frac{1}{2} at^2$$

$$s = s_0 + v_0 t + \frac{1}{2} at^2$$

$$\begin{cases} S = S_0 + V_0 t + \frac{1}{2} a t^2 \\ V = V_0 + a t \end{cases}$$

① $\Delta S = \dfrac{V^2 - V_0^2}{2a}$

② $\Delta S = \left(\dfrac{V + V_0}{2}\right) t$

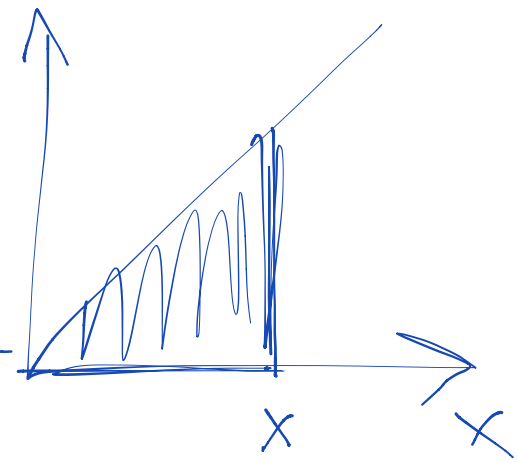
③ $\Delta S = V t - \frac{1}{2} a t^2$

<u>Pr</u>: $V_0 = 30\,m/s$ $\quad V_f = 0\,m/s$

$\Delta S = 10\,m$ $\quad a = ?$

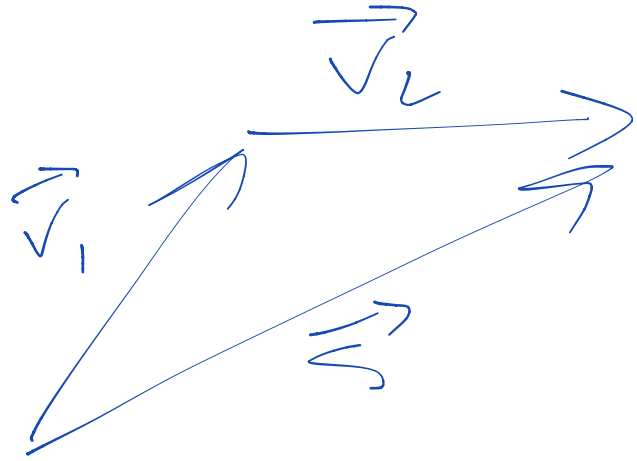
$$a = \frac{V^2 - V_0^2}{2\Delta S} = \frac{0 - 900}{2 \cdot 10} = -45\,m/s^2$$

$$\vec{F}_{el} = -k\vec{x}$$

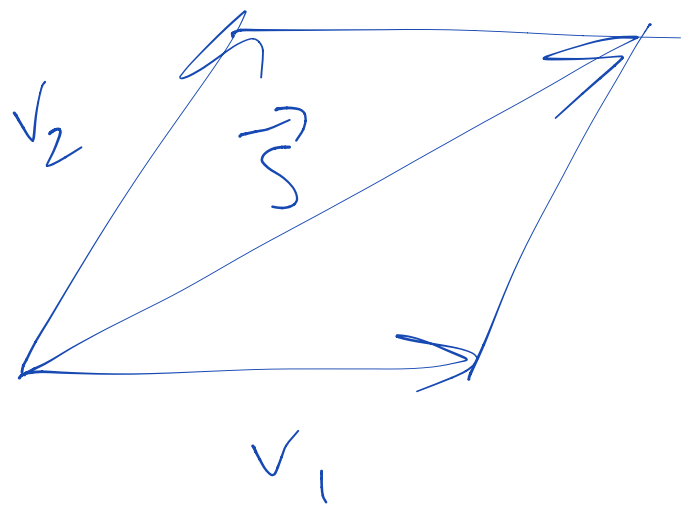


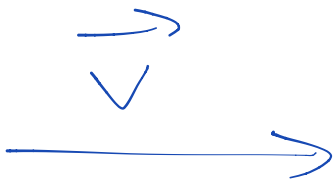
$$\mathcal{L} = \frac{x \cdot kx}{2} = \frac{1}{2}kx^2$$

$$\vec{F}_a = \mu_s \vec{F}_N \qquad \vec{F}_d = \mu_d \vec{F}_N$$



$$\vec{s} = \vec{v}_1 + \vec{v}_2$$

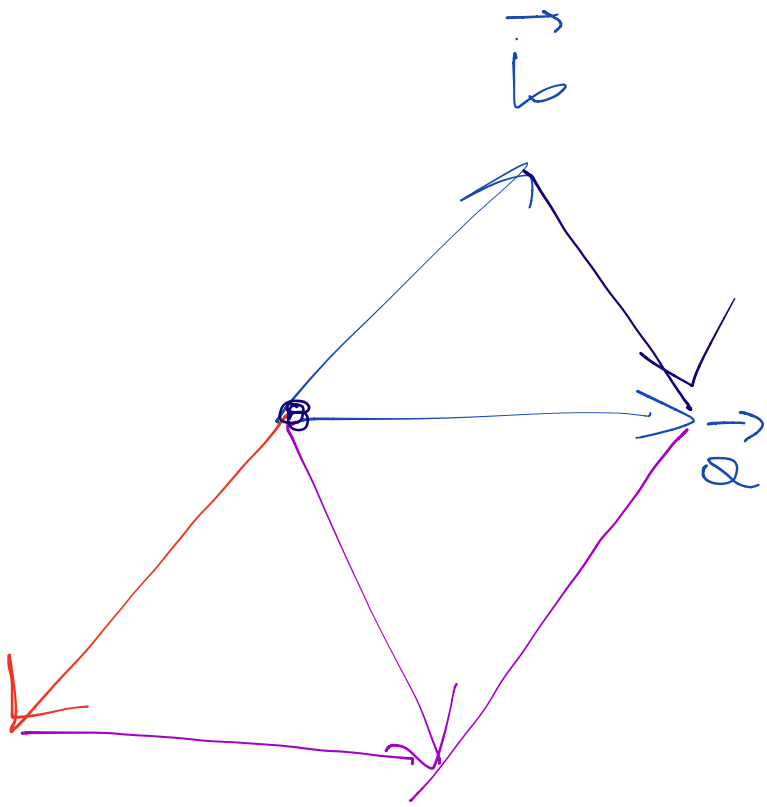


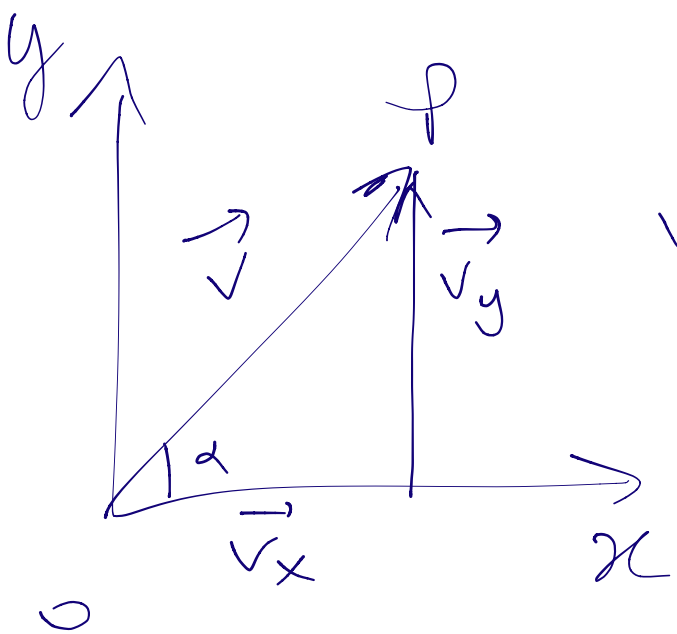


$k|\vec{v}|$

kv

$$\vec{a} - \vec{b} = \vec{a} + (-\vec{b})$$

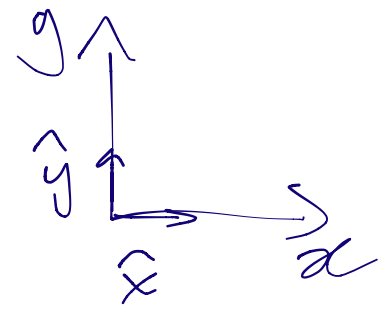




$$V_x = V\cos\alpha$$

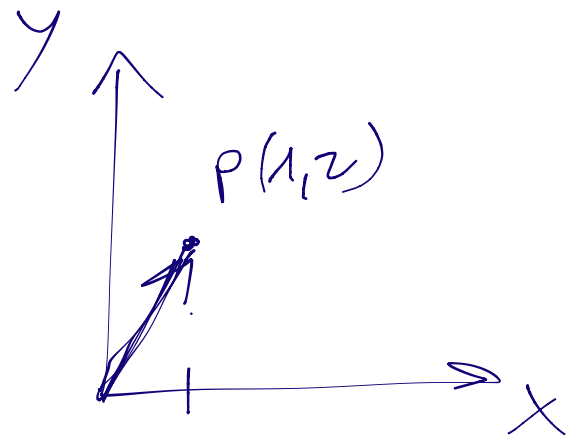
$$V_y = V\sin\alpha$$

$$\vec{V} = V_x \hat{x} + V_y \hat{y}$$

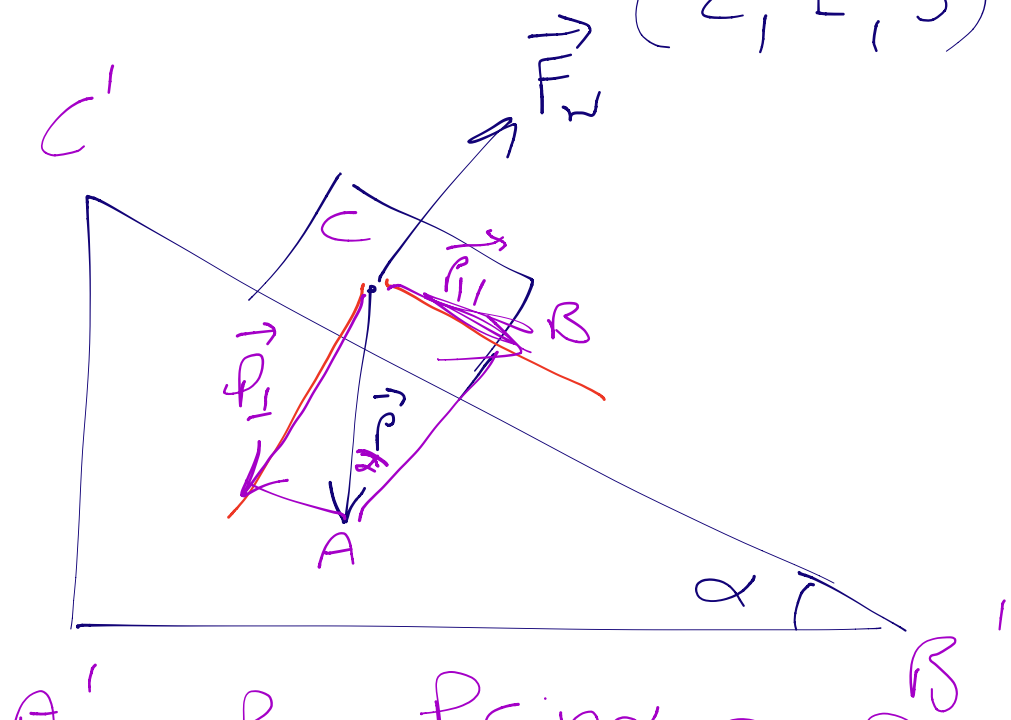


$$\vec{V} = (V_x, V_y)$$

$$\vec{V} = (1, 2)$$



$(2, 1, 3)$



$P_{\parallel} = P \sin\alpha \qquad P_{\perp} = P \cos\alpha$