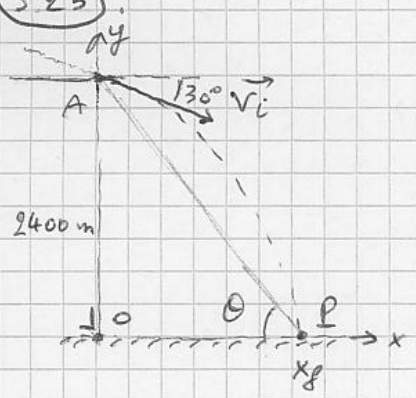
3.25



Il faut calculer x_f.

- $\Delta x = x_f = v_{ix} \cdot \Delta t$

$v_{ix} = v_i \cos 30° = 240 \cdot \frac{\sqrt{3}}{2} = 120\sqrt{3}$

$\Rightarrow x_f = 120\sqrt{3}\,\Delta t$

- MRUA, chute verticale

$\Delta y = 0 - 2400 = -\frac{1}{2} g \Delta t^2 + v_{iy} \Delta t = -4,9\Delta t^2 - v_i \sin 30 \Delta t$

$-2400 = -4,9\Delta t^2 - 120\Delta t$

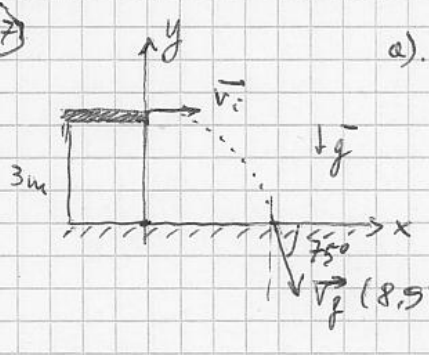
$\Rightarrow 4,9\Delta t^2 + 120\Delta t - 2400 = 0$

$\Delta t = \frac{-60 \pm \sqrt{60^2 + 4,9 \cdot 2400}}{4,9} \approx 13,048\,s$ (Seule réponse positive)

d'où $x_f = 120\sqrt{3} \cdot 13,048 \approx 2711,987\,m$

Calcul de θ : $\tan\theta = \frac{2400}{x_f} \Rightarrow \theta = \text{Arctg}\left(\frac{2400}{x_f}\right) \approx 41,5°$

3.27



a). On ne sait rien concernant $\vec{v_i}$!

- Composantes de $\vec{v_f}$: $v_{fx} = v_f \cos 75° = v_{ix}$

$v_{fy} = v_f \sin 75°$

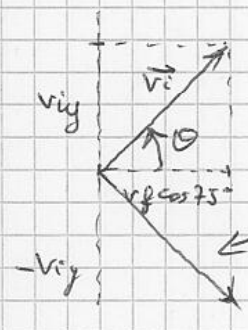
- Composantes de $\vec{v_i}$: $v_{ix} = v_{fx}$ (MRU selon $\vec{ox}$)

$v_{fy}^2 - v_{iy}^2 = 2 a_y \Delta y$; $v_f^2 \sin^2 75° - v_{iy}^2 = -2 \cdot 9,8 \cdot (0 - 3)$

$\Rightarrow v_{iy}^2 = v_f^2 \sin^2 75° - 6 \cdot 9,8 \Rightarrow v_{iy} = \pm\sqrt{v_f^2 \sin^2 75° - 6 \cdot 9,8} \approx \pm 3,886\ldots\ m/s$

Intensité de la vitesse, $v_i = \sqrt{v_{iy}^2 + v_{ix}^2} \approx 4,5\ \frac{m}{s}$

b). direction



$\theta = \text{Arctan}\left(\frac{v_{iy}}{v_{ix}}\right) = \text{Arctan}\left(\frac{3,886}{v_f \cos 75°}\right) \approx 59,3°$