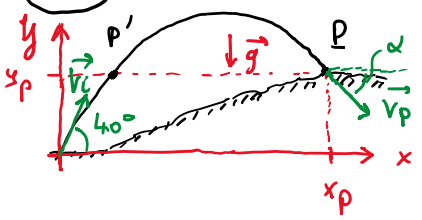
3.24



(a). $\Delta y = y_p = 6{,}0 = -\frac{1}{2}\,9{,}81(\Delta t)^2 + 43\sin 40\,\Delta t$

$-4{,}9(\Delta t)^2 + 43\sin 40(\Delta t) - 6{,}0 = 0$

$\Rightarrow \Delta t = \dfrac{-43\sin 40 \pm \left((43\sin 40)^2 - 4\cdot 4{,}9\cdot 6{,}0\right)^{1/2}}{-9{,}81} =$ ↗ $5{,}4\,s$; ↘ solution pour P' (à la montée)

(b). $v_p = \sqrt{v_{px}^2 + v_{py}^2}$

- $-g = \dfrac{v_{py} - v_{iy}}{\Delta t} \Rightarrow v_{py} = -g\cdot\Delta t + v_{iy}$

$= -9{,}81\cdot\Delta t + 43\sin 40°$

$\simeq -25{,}5\ m/s$

- $v_{px} = v_i\cos 40° = 43\cos 40 \simeq 32{,}9\ m/s$

d'où $v_p \simeq \sqrt{32{,}9^2 + 25{,}5^2} \simeq \underline{42\ m/s}$

(c). Calcul de α.

$\alpha = \arctan\left(\dfrac{v_{py}}{v_{px}}\right) \simeq \underline{-38°}$