Exercice 1 :

Q1

$$\overrightarrow{OM}(t) \begin{cases} x(t) = a.t^2 + x_0 \\ y(t) = -v_0.t \\ z(t) = z_0 \end{cases} \xrightarrow{\vec{v} = \frac{d\overrightarrow{OM}}{dt}} \vec{v}(t) = \begin{cases} v_x(t) = \frac{dx(t)}{dt} = 2a_0.t \\ v_y(t) = \frac{dy(t)}{dt} = -v_0 \\ v_z(t) = \frac{dz(t)}{dt} = 0 \end{cases}$$

$$\vec{a} = \frac{d\vec{v}(t)}{dt} \rightarrow \vec{a}(t) = \begin{cases} a_x(t) = \frac{dv_x(t)}{dt} = 2a_0 = 4\ m.s^{-2} \\ a_y(t) = \frac{dv_y(t)}{dt} = 0\ m.s^{-2} \\ a_z(t) = \frac{dv_z(t)}{dt} = 0\ m.s^{-2} \end{cases}$$

Q2 : $\|\vec{v}\| = v = \sqrt{v_x^2 + v_y^2 + v_z^2}$

$v(2s) = \sqrt{(4\times 2)^2 + (-3)^2 + 0^2} = \sqrt{73} = 8{,}5\ m.s^{-1}$

Q3 : $\|\vec{a}\| = a = \sqrt{a_x^2 + a_y^2 + a_z^2}$

$a(1s) = \sqrt{2^2 + 0 + 0} = 2{,}0\ m.s^{-2}$ ($\vec{a} = \overrightarrow{cste}$ donc la valeur ne dépend pas de l'instant choisi)