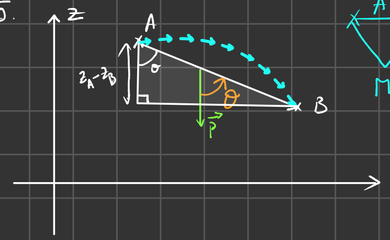
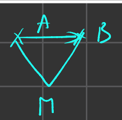
5.





1.1. $W_{\vec{AB}}(\vec{P}) = \vec{AB}\cdot\vec{P} = AB \times P \times \cos(\vec{AB};\vec{P})$

$= AB \times P \times \cos(\vec{P};\vec{AB})$

$= AB \times P \times \cos(\theta)$

$= AB \times m \times g \times \cos(\theta)$

$= \cancel{AB} \times m \times g \times \frac{(z_A - z_B)}{\cancel{AB}}$

$\boxed{W_{\vec{AB}}(\vec{P}) = mg(z_A - z_B)}$

1.3. $W_{\vec{AB}}(\vec{P}) = 2{,}0\times10^3 \times 3{,}7 \times (2\times10^3 - 20)$

$= 1\times10^7 \text{ J} > 0$

Le poids est donc moteur sur le trajet $\vec{AB}$.

1.4.1. $E_m(A) = E_c(A) + E_{pp}(A)$

$= \frac{1}{2} m v_A^2 + mg z_A$

$= m\left(\frac{1}{2} v_A^2 + g z_A\right)$

$= 2{,}0\times10^3\left(\frac{1}{2}\times 100^2 + 3{,}7\times 2\times10^3\right)$

$= \boxed{2\times10^7 \text{ J}}$

$E_m(B) = m \times \left(\frac{1}{2} v_B^2 + g z_B\right)$

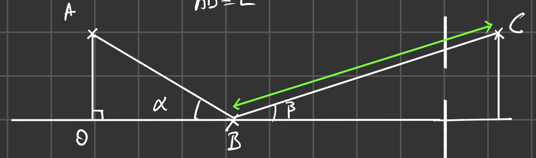
$= 2{,}0\times10^3 \times \left(0{,}5\times(75\times10^{-2})^2 + 3{,}7\times20\right)$

$= 1{,}5\times10^5 \text{ J}$

L'énergie mécanique se dissipe en raison de l'action de forces non conservatives comme les forces de frottements.

n°7.

AB = L



$\sin(\alpha) = \frac{OA}{AB} \Leftrightarrow \boxed{OA = AB\sin(\alpha)}$

$\Leftrightarrow z_A = AB\sin(\alpha)$

En l'absence frottements, $E_m(A) = E_m(C)$

$\underbrace{E_c(A)}_{=0\text{ J}} + E_{pp}(A) = \underbrace{E_c(C)}_{=0\text{ J}} + E_{pp}(C)$

$\cancel{mg}\, z_A = \cancel{mg}\, z_C$

$\boxed{z_A = z_C}$

Or $\sin(\beta) = \frac{z_C}{BC} = \frac{AB\sin(\alpha)}{BC}$

$BC = \frac{AB\sin(\alpha)}{\sin(\beta)}$

$BC = \frac{30\sin(30)}{\sin(15)}$

$BC = 58 \text{ m}$

plus de bonnes notes