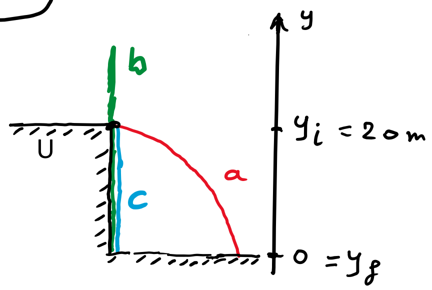
**6.45**

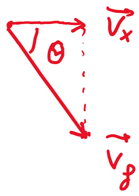



Dans tous les cas, $\Delta E_{méc} = 0$

(a). $E_{méc\,i} = E_{méc\,f}$

$$\frac{1}{2}\cancel{m}v_i^2 + \cancel{m}g y_i = \frac{1}{2}\cancel{m}v_f^2$$

$$\Rightarrow v_f^2 = v_i^2 + 2 g y_i \Rightarrow v_f = \sqrt{v_i^2 + 2 g y_i} = \underline{\underline{22\ m/s}}$$




$v_x = v_i$ (lancer horizontal)

$$\cos\theta = \frac{v_x}{v_f} \Rightarrow \theta = \arccos\left(\frac{v_x}{v_f}\right) = \underline{\underline{63°}}$$

(b) et (c) : $v_f = 22\ m/s$ et

direction verticale vers le bas

**6.46**

$E_{cin}(A) = \frac{1}{2} m_A v^2$

$E_{cin}(B) = \frac{1}{2} m_B v^2$

$$\Rightarrow \underbrace{\Delta W}_{=\text{ travail des forces motrices}} = W_B - W_A = E_{cin}(B) - E_{cin}(A) = \frac{1}{2} v^2 (m_B - m_A)$$

$$= \frac{1}{2} \cdot 40^2 (2000 - 1200)$$

$$= \underline{\underline{6,40 \cdot 10^5}}\ J$$

**6.47**

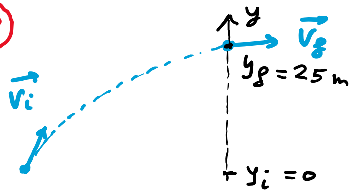
$$W = \vec{F} \cdot \Delta\vec{r} = -F \cdot \Delta r = -3000 \cdot 850 = -\underline{\underline{2,55}} \cdot 10^6\ J$$

car $\vec{F}$ et $\Delta\vec{r}$

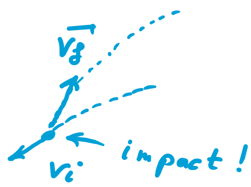
même direction,

sens opposé

**6.48**




– après impact –




– lors de l'impact –

• <u>Lors de l'impact :</u> $W_{batte \to balle} = 140\,J = \underbrace{E_{cin\,f} - E_{cin\,i}}_{\text{balle !}} = \frac{1}{2} m v_f^2 - \frac{1}{2} m v_i^2$

$$\Rightarrow \frac{1}{2} m v_f^2 = 140 + \frac{1}{2} m v_i^2 \Rightarrow v_f = \left(\frac{2 \cdot 140 + m v_i^2}{m}\right)^{1/2} = 60\ m/s$$

• <u>Après impact :</u> $v_f \mapsto v_i$ ! $v_i = 60\ m/s$

$\Delta E_{méc} = 0 \Rightarrow E_{méc}(i) = E_{méc}(f)$

$$\frac{1}{2}\cancel{m}v_i^2 = \frac{1}{2}\cancel{m}v_f^2 + \cancel{m}g y_f \Rightarrow v_f^2 = v_i^2 - 2 g y_f$$

$$\Rightarrow v_f = \sqrt{v_i^2 - 2 g y_f} = \underline{\underline{56}}\ m/s$$