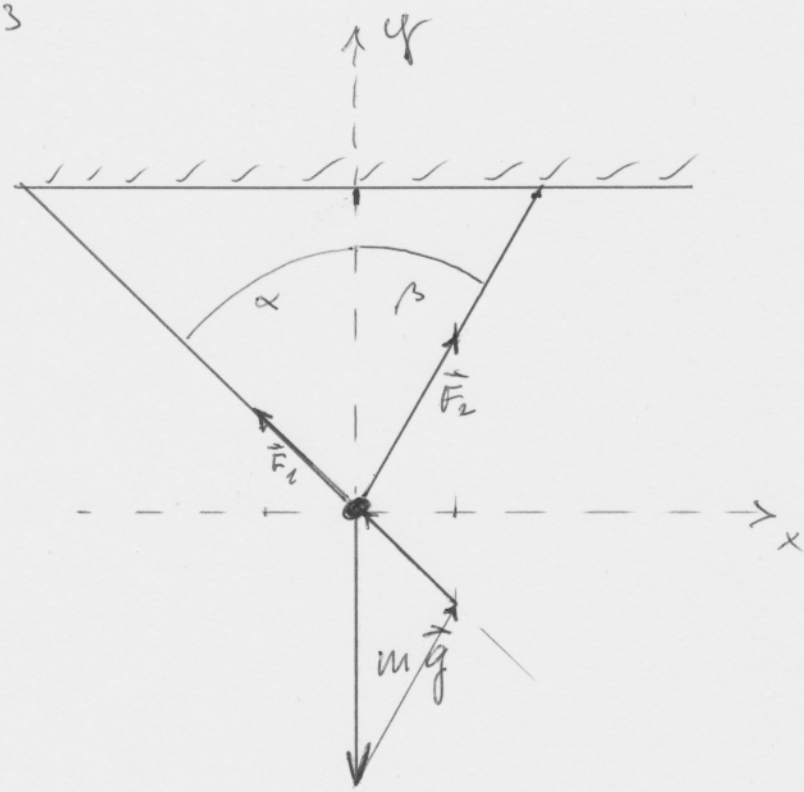
sem. 3



$\alpha = 45°$

$\beta = 30°$

$|\vec{F}_1| = ?$

$|\vec{F}_2| = ?$

$m = 5\,kg$

$m\vec{g} + \vec{F}_1 + \vec{F}_2 = 0$

valable pour $\forall$ composante $\Rightarrow$

selon x:

$-F_1 \sin\alpha + F_2 \sin\beta = 0$

selon y:

$F_1 \cos\alpha + F_2 \cos\beta - mg = 0$

solution: $F_1 = F_2 \dfrac{\sin\beta}{\sin\alpha}$

$F_2\left(\dfrac{\sin\beta\cos\alpha}{\sin\alpha} + \cos\beta\right) = mg$

$F_2 = \dfrac{mg}{\dfrac{\sin\beta\cos\alpha}{\sin\alpha} + \cos\beta} = \dfrac{5 \cdot 9.81}{0.5 \cdot 1 + \sqrt{3}/2} = 36N$

$\sin 30° = 0.5$

$\sin 45° = \cos 45° = \dfrac{\sqrt{2}}{2}$

$\cos 30 = \dfrac{\sqrt{3}}{2}$

$F_1 = 36 \cdot \dfrac{0.5}{\sqrt{2}/2} = 25.5N$

Sens: dans le direction des cordes respectives.

rem. 3

$|\vec{F}| = 20\,N$

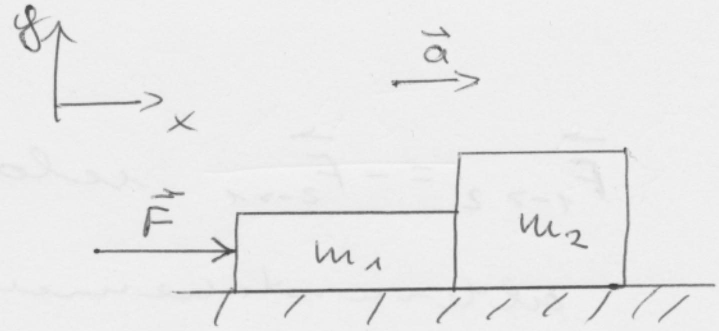
$m_1 = 2\,kg$

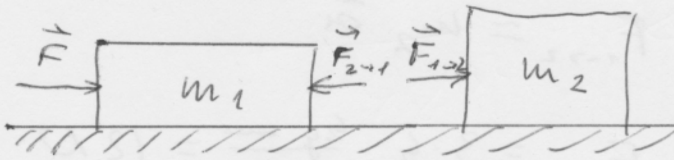
$m_2 = 3\,kg$

$\vec{F}_{21} = ?$

$\vec{F}_{1\to2} = ?$

$\vec{a} = ?$





① $\vec{a}_1 = \vec{a}_2 = \vec{a}$ (mouvement des 2 masses ensemble)

$\vec{F} = (m_1 + m_2)\,\vec{a}$

1D, écrivons seulement le composant selon x

$F = (m_1 + m_2)\,a$

$a = \frac{F}{m_1 + m_2} \Rightarrow a = \frac{20}{2+3} \frac{kg\,m}{s^2\,kg} = 4 \frac{m}{s^2}$

Donc, $\vec{a} \parallel \vec{F}$, $|\vec{a}| = 4\ m/s^2$

parallèle   sens   module

② $F + F_{2\to1} = m_1 a_1$

$F_{2\to1} = m_1 a_1 - F$

$F_{2\to1} = 2 \cdot 4 - 20 \frac{kg\,m}{s^2} = -12\,N$

$\vec{F}_{2\to1}$ est opposée à $\vec{F}$, d'où le signe "–".

$\vec{F}_{1\to 2} = -\vec{F}_{2\to 1}$ selon la III. loi de N.

alternativement,

$F_{1\to 2} = m_2\, \bar{a}$

$\underline{\underline{F_{1\to 2}}} = 3 \cdot 4 \ \frac{kg\, m}{s^2} = \underline{\underline{12\, N}}$