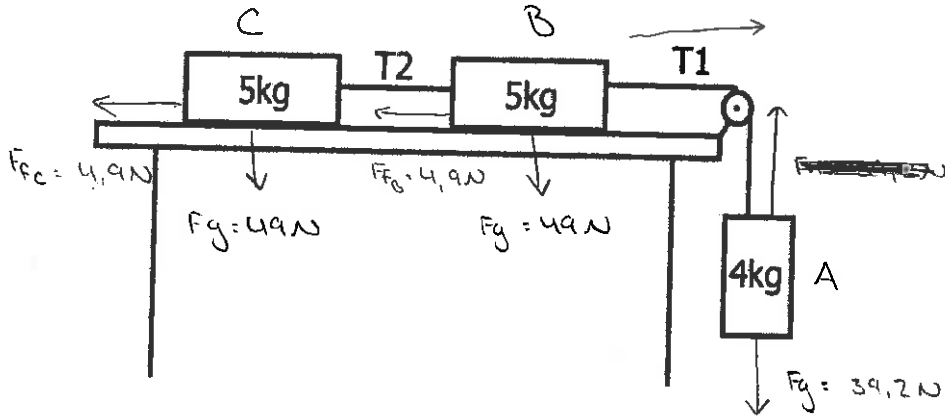


Les plans inclinés, les cordes et poulies

1. Résous le système. $\mu=0,1$



$$F_{R\text{sys}} = (39,2\text{N}) + (-4,9\text{N}) + (-4,9\text{N})$$

$$F_{R\text{sys}} = 29,4\text{N}$$

$$\vec{a}_{\text{sys}} = \frac{29,4\text{N}}{14\text{kg}}$$

$$\vec{a}_{\text{sys}} = 2,1\text{N/kg}$$

$$F_{R\text{C}} = T_2 + F_{f\text{C}}$$

$$10,5 = T_2 + (-4,9)$$

$$15,4\text{N} = T_2$$

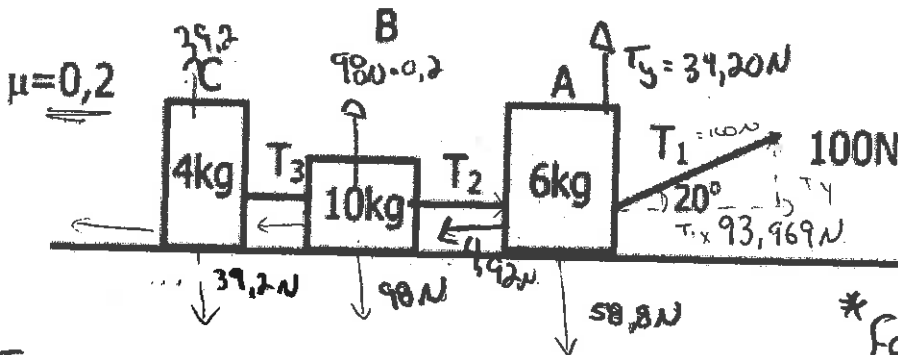
$$F_{R\text{B}} = T_1 + F_{f\text{B}} + F_{f\text{C}}$$

$$21\text{N} = T_1 + (-4,9\text{N}) + (-4,9\text{N})$$

$$T_1 = 30,8\text{N}$$

$$T_2 = 15,4\text{N}$$

2. Résous le système



$$T_{1y} = \sin 20^\circ \cdot 100 = 34,20\text{N}$$

$$T_{1x} = \cos 20^\circ \cdot 100 = 93,97\text{N}$$

$$F_{f\text{A}} = 58,8 - 34,2 = 24,6\text{N}$$

$$F_{f\text{A}} = 24,6\text{N} \cdot 0,2 = 4,92\text{N}$$

$$F_{R\text{sys}} = T_{1x} + F_{f\text{A}} + F_{f\text{B}} + F_{f\text{C}}$$

$$= 93,969\text{N} + (-4,92\text{N}) + (-19,6\text{N}) + (-7,84\text{N})$$

$$= 61,609\text{N}$$

$$a_{\text{sys}} = \frac{F_{R\text{sys}}}{m} \quad a_{\text{sys}} = 3,08\text{N/kg}$$

$$F_{R\text{B}} = 14\text{kg} \cdot 3,08\text{N/kg}$$

$$= 43,12\text{N}$$

$$F_{R\text{B}} = T_2 + F_{f\text{B}} + F_{f\text{C}}$$

$$T_2 = 70,57\text{N}$$

$$F_{R\text{C}} = 4\text{kg} \cdot 3,08\text{N/kg}$$

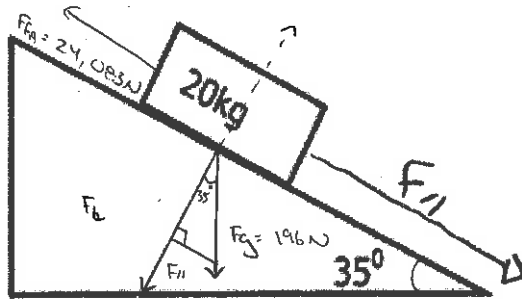
$$= 12,32\text{N}$$

$$F_{R\text{C}} = T_3 + F_{f\text{C}}$$

$$12,32\text{N} = T_3 + (-7,84\text{N})$$

$$T_3 = 20,16\text{N}$$

3. Résous le système $\mu=0,15$



$$F_{f1} = (\sin 35)(196N) = 112,421N$$

$$F_b = (\cos 35)(196N) = 160,554N$$

$$F_{FA} = 24,083N$$

$$F_{Rsys} = F_{f1} + F_b$$

$$F_{Rsys} = \frac{88,338N}{20kg}$$

$$\vec{a}_{sys} = 4,4169N/kg$$

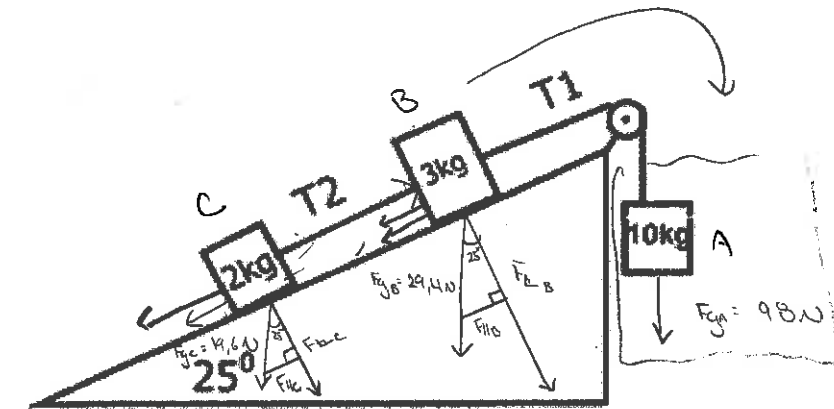
4. Résous le système $\mu=0,1$

$$F_{f1B} = 12,425N$$

$$F_{fB} = 2,665N$$

$$F_{f1C} = 8,283N$$

$$F_{fC} = 1,776N$$



$$F_{Rsys} = F_{gA} + F_{f1B} + F_{fB} + F_{f1C} + F_{fC}$$

$$= 98N + (12,425N) + (-2,665N) + (-8,283N) + (-1,776N)$$

$$= \frac{72,851N}{15kg}$$

$$\vec{a}_{sys} = 4,857N/kg$$

$$T_1 = F_{RA} = T_1 + F_{gA}$$

$$48,567N = T_1 + 98N$$

$$T_1 = -49,433N$$

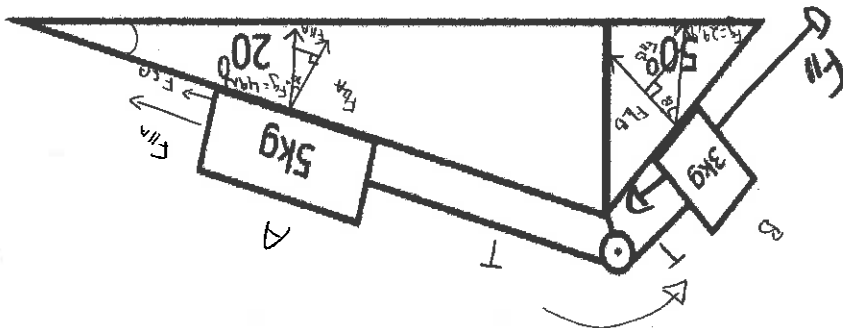
$$F_{RC} = T_2 + F_{fC} + F_{f1C}$$

$$9,714 = T_2 + (-1,776N) + (-8,283N)$$

$$T_2 = 19,773N$$

5. Résous le système

$\mu = 0,05$



$F_{Rsys} : F_{IA} + F_{fA} + F_{fB} + F_{IB}$

$F_{Rsys} = (-16,759N) + (-2,302N) + (22,522N) + (-0,945N)$

$F_{Rsys} = 2,516N$

$a_{sys} = 0,3145N/kg$

$F_{fB} = 0,945N$

$F_{fA} = 2,302N$

$F_{IB} = 27,522N$

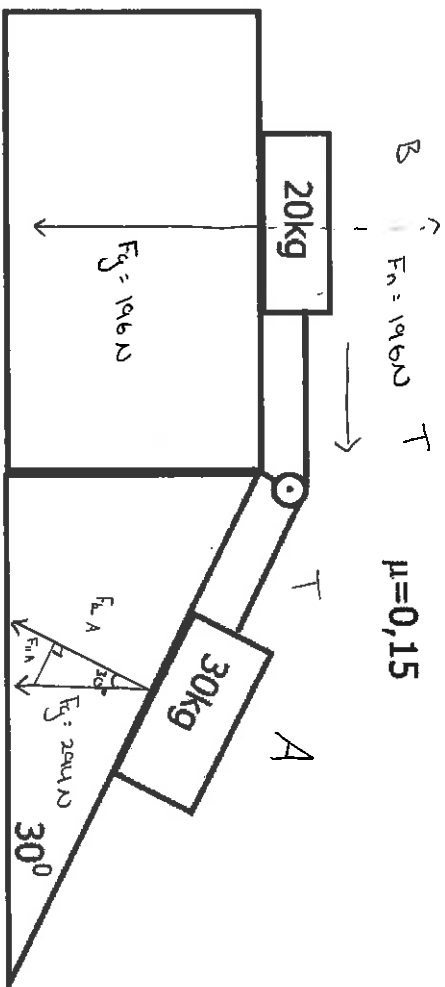
$F_{IA} = 16,759N$

$F_{RA} = T + F_{fA} + F_{IA}$

$1,5725 = T + (-2,302N) + (16,759N)$

$T = 20,6335N$

6. Résous le système.



$$F_{1A} = 147 \text{ N}$$

$$F_{1A} = 38,192 \text{ N}$$

$$F_{1B} = 29,4 \text{ N}$$

$$F_{R_{\text{sys}}} = F_{1A} + F_{1A} + F_{1B}$$

$$F_{R_{\text{sys}}} = (147 \text{ N}) + (2 \cdot 38,192 \text{ N}) + (29,4 \text{ N})$$

$$F_{R_{\text{sys}}} = \frac{29,408}{50 \text{ kg}} \checkmark$$

$$\vec{a}_{\text{sys}} = 1,588201 \text{ kg} \checkmark$$

$$F_{R_B} = T + F_{1B}$$

$$31,7632 = T + (29,4 \text{ N})$$

$$\boxed{61,16 \text{ N} = T}$$

Révision des plans inclinés corps en équilibre
Devoir formel

Nom : Chantal D.

Pour tous les systèmes déterminez la **force résultante**,
l'accélération, et les tensions. Démontrez votre travail.

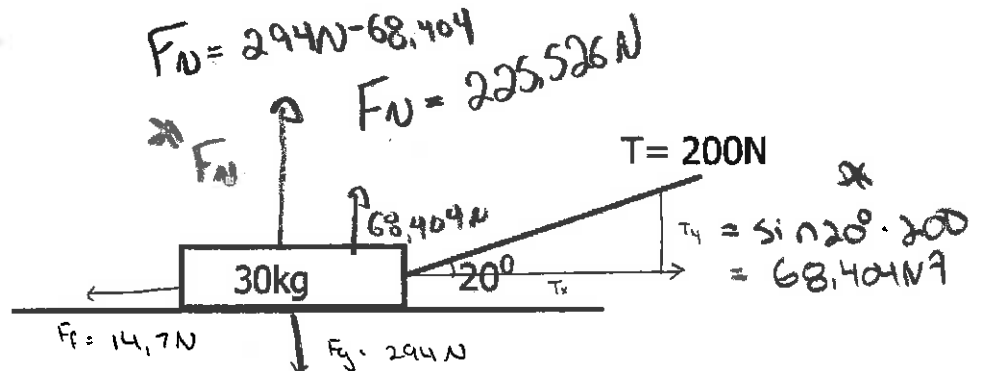
1. $\mu = 0,05$ (4)

$$\cos 20^\circ = \frac{T_x}{200N}$$

$$T_x = 187,939N$$

$$F_f = 225,526N \cdot 0,05$$

$$= 11,28N$$



$$F_R = T_x + F_f$$

$$F_R = 187,939N + -11,28N$$

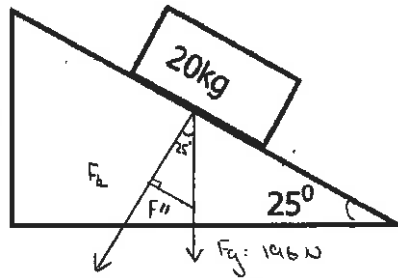
$$= 176,66N$$

$$a_{sys} = 5,889N/kg$$

2. $\mu = 0,15$ (3)

$$F_{||} = 82,833N$$

$$F_f = 26,645N$$



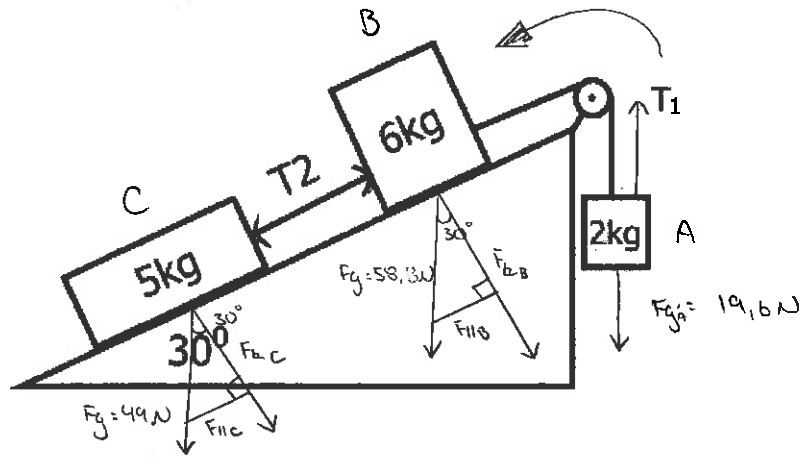
$$F_R = F_{||} + F_f$$

$$F_R = 56,188N$$

20kg

$$\vec{a}_{sys} = 2,809N/kg$$

3. $\mu = 0,2$ (6)



$$F_{g\parallel B} = 29,4 \text{ N}$$

$$F_{fB} = 10,184 \text{ N}$$

$$F_{g\parallel C} = 24,5 \text{ N}$$

$$F_{fC} = 8,487 \text{ N}$$

$$F_{R\text{SYS}} = F_{g\parallel B} + F_{fB} + F_{g\parallel C} + F_{fC} + F_{gA}$$

$$F_{R\text{SYS}} = (29,4 \text{ N}) + (-10,184 \text{ N}) + (24,5 \text{ N}) + (-8,487 \text{ N}) + (-19,6 \text{ N})$$

$$F_{R\text{SYS}} = \frac{15,629 \text{ N}}{13 \text{ kg}} \checkmark$$

$$\checkmark \vec{a_{\text{SYS}}} = 1,202 \text{ N/kg}$$

$$F_{RA} = T_1 + F_{gA}$$

$$\checkmark 2,404 \text{ N} = T_1 + (-19,6 \text{ N})$$

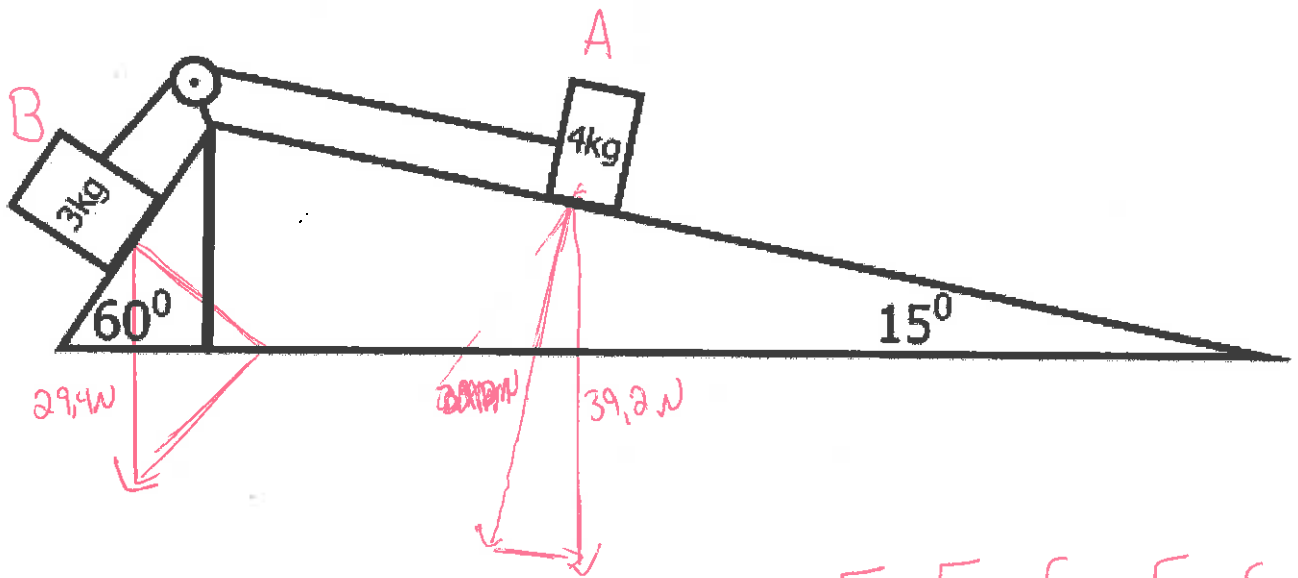
$$T_1 = 22,004 \text{ N}$$

$$F_{RC} = T_2 + F_{fC} + F_{g\parallel C}$$

$$6,01 \text{ N} = T_2 + (-8,487 \text{ N}) + (24,5 \text{ N})$$

$$\checkmark T_2 = -10,003 \text{ N}$$

4. $\mu = 0,1$ (5)



$$A \quad F_{\parallel} = \sin 15^{\circ} \cdot 4 \cdot 9,8 = -10,146 \text{ N}$$

$$F_f = (\cos 15^{\circ} \cdot 4 \cdot 9,8) \cdot 0,1 = -3,786 \text{ N}$$

$$B \quad F_{\parallel} = \sin 60^{\circ} \cdot 3 \cdot 9,8 = +25,46 \text{ N}$$

$$F_f = (\cos 60^{\circ} \cdot 3 \cdot 9,8) \cdot 0,1 = -1,47 \text{ N}$$

$$F_R = F_{\parallel A} + F_{fA} + F_{\parallel B} + F_{fB}$$

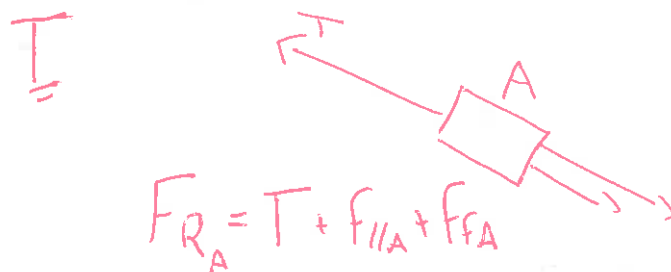
$$= -10,146 \text{ N} + -3,786 \text{ N}$$

$$+ 25,46 \text{ N} + -1,47 \text{ N}$$

$$= \underline{10,058 \text{ N}}$$

$$a_{\text{sys}} = 10,058 \text{ N} / 7 \text{ kg}$$

$$= \underline{1,437 \text{ N/kg}}$$



$$F_{R_A} = T + F_{\parallel A} + F_{fA}$$

$$(4 \cdot 1,437) = T + -10,146 \text{ N} + -3,786 \text{ N}$$

$$+ 10,146 \text{ N} + 3,786 \text{ N} + 5,747 = T$$

$$\underline{T = 19,68 \text{ N}}$$