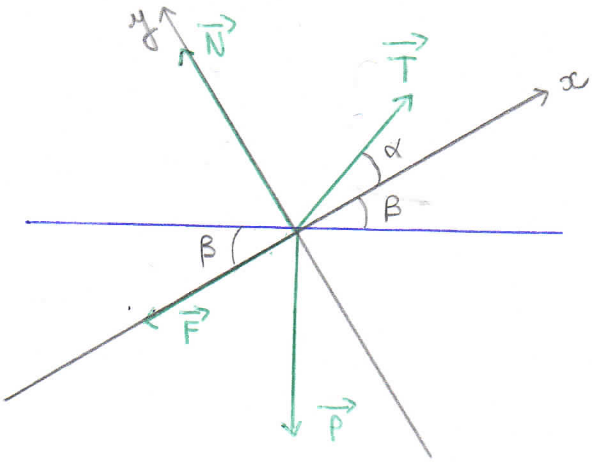
2)



$\vec{N}\begin{pmatrix}0\\N\end{pmatrix}$ $\vec{F}\begin{pmatrix}-\mu N\\0\end{pmatrix}$ $\vec{T}\begin{pmatrix}T\cos\alpha\\T\sin\alpha\end{pmatrix}$ $\vec{P}\begin{pmatrix}-mg\sin\beta\\-mg\cos\beta\end{pmatrix}$

Système en mouvement rectiligne uniforme dans un référentiel supposé galiléen

1 loi de Newton : $\vec{P}+\vec{N}+\vec{F}+\vec{T}=0$

$$\begin{cases}0-\mu N+T\cos\alpha-mg\sin\beta=0\\N+0+T\sin\alpha-mg\cos\beta=0\end{cases} \Leftrightarrow \begin{cases}T=\dfrac{mg\sin\beta+\mu N}{\cos\alpha}\\N=-T\sin\alpha+mg\cos\beta.\end{cases}$$

$$N=-\left(\frac{mg\sin\beta+\mu N}{\cos\alpha}\right)\sin\alpha+mg\cos\beta=-(mg\sin\beta\tan\alpha-\mu N\tan\alpha+mg\cos\beta$$

$$N=mg(-\sin\beta\tan\alpha+\cos\beta)-\mu N\tan\alpha=$$

$$N+\mu N\tan\alpha=mg(-\sin\beta\tan\alpha+\cos\beta)$$

$$N(1+\mu\tan\alpha)=mg(-\sin\beta\tan\alpha+\cos\beta)\Leftrightarrow\boxed{N=\frac{mg(-\sin\beta\tan\alpha+\cos\beta)}{1+\mu\tan\alpha}}$$

$$T=\frac{mg\sin\beta+\mu\left(\dfrac{mg(\cos\beta-\sin\beta\tan\alpha)}{1+\mu\tan\alpha}\right)}{\cos\alpha}$$

$$T=\frac{mg\sin\beta}{\cos\alpha}+\frac{mg\mu(\cos\beta-\sin\beta\tan\alpha)}{(1+\mu\tan\alpha)\cos\alpha}$$

$$T=\frac{mg\sin\beta}{\cos\alpha}+\frac{mg\mu(\cos\beta-\sin\beta\tan\alpha)}{\cos\alpha+\mu\sin\alpha}$$

$$\boxed{T=mg\left(\frac{\sin\beta}{\cos\alpha}+\frac{\mu(\cos\beta-\sin\beta\tan\alpha)}{\cos\alpha+\mu\sin\alpha}\right)}$$