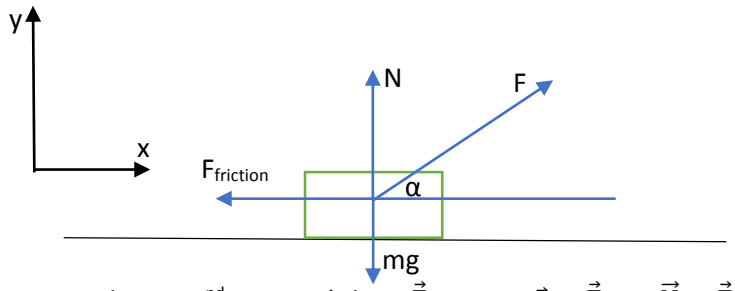
Answer on Question #65767 - Physics Mechanics Relativity

A block being pulled to the right by a 10N force acting 30° above the horizontal undergoes uniform motion on a level surface. The coefficient of sliding friction between the block and the surface is 0.4 what is the acceleration of the block

Data:
$F = 10N$
$\alpha = 30°$
$\mu = 0.4$
Solution:



According to 2nd Newton's law: $\vec{F}_{sum} = m\vec{g} + \vec{F}_{fr} + \vec{N} + \vec{F} = m\vec{a}$
on OX: $-F_{fr} + F * cos\alpha = ma$
on OY: $mg = N + F * sin\alpha$

As $F_{fr} = \mu N$: $ma = F(cos\alpha + \mu sin\alpha) - \mu mg$; $\boldsymbol{a = \frac{F(cos\alpha + \mu sin\alpha) - \mu mg}{m}}$

Acceleration of the block depends on its mass(no info about its mass)