## Answer on Question \#40806-Physics - Mechanics

A 20 kg block on an inclined plane is pulled up the plane with a rope tied to the block. The rope is at angle of 37 degrees above the surface of the plane. The tension in the rope is 250 N and the frictional force on the block is 8.0 N.What is the acceleration of the block?

## Solution



We have, according the second Newton's law that the
$m=20 \mathrm{~kg}$
$\alpha=37$
$F=250 N$
$F_{f}=8.0 \mathrm{~N}$
$m \vec{a}=\vec{F}_{f}+\vec{P}+m \vec{g}+\vec{F}$
Where $\vec{F}_{f}$ is frictional force, $\vec{P}$ is reaction force of floor, $m \vec{g}$ is gravitational force, $\vec{F}$ is force applied at an angle of 37 degrees above the horizontal pulls

In terms of projections on directions, which are parallel and perpendicular to plane, have

$$
\begin{aligned}
& \left\{\begin{array}{l}
m a=F-F_{f}-m g \sin \alpha \\
m g \cos \alpha-P=0
\end{array} \Rightarrow\right. \\
& a=\frac{F-F_{f}-m g \sin \alpha}{m}=6.2 \frac{\mathrm{~m}}{\mathrm{~s}^{2}}
\end{aligned}
$$

Answer: $a=6.2 \frac{\mathrm{~m}}{\mathrm{~s}^{2}}$

