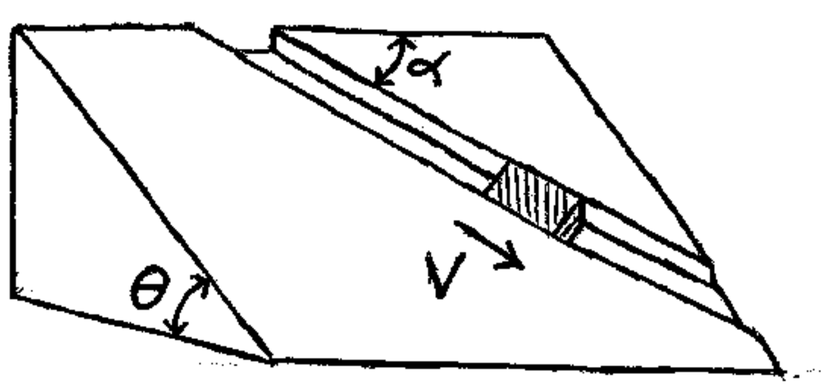
This is a force and motion problem involving Newton's laws.



A block of mass m slides at constant velocity v along a groove cut into an inclined plane, as shown. What is the magnitude and direction of the force exerted on the block by the inclined plane?

Solution:

The block moves at constant velocity in a straight line, which means that the acceleration of the block is zero. By Newton's 2nd law, the sum of the external forces acting on the block must be zero. The external forces acting on the block are due to gravity and the contact force between the block and inclined plane.

As a result, $\sum \vec{F}_{ext} = 0$

$$\sum \vec{F}_{ext} = \vec{F}_{gravity} + \vec{F}_{contact} = 0$$

Therefore, $\vec{F}_{contact} = -\vec{F}_{gravity} = -m\vec{g}$

Note: $\sum \vec{F}_{ext}$ is usually just written $\sum \vec{F}$

So, $\vec{F}_{contact}$ has magnitude equal to mg with direction pointing upward. (ans.)