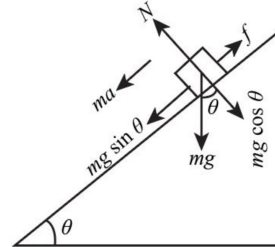


1) Force and acceleration on an *inclined plane*

For example what is the acceleration if  
 $m = 2\text{kg}$   
 $\theta = 46^\circ$   
 $f = 3\text{N}$



2) Definition of *Momentum of a body*

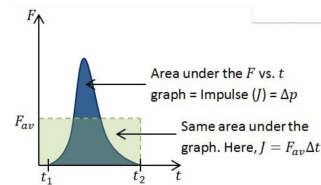
Definition of *Total Momentum of a system*  
 Concept of (pseudo-) isolated body or system  
*Conservation* of the total momentum  
 Applications (collisions, explosions..)

$$\vec{P}_{initial} = \vec{P}_{final}$$

$$m_A \vec{v}_A + m_B \vec{v}_B = m_A \vec{v}'_A + m_B \vec{v}'_B$$

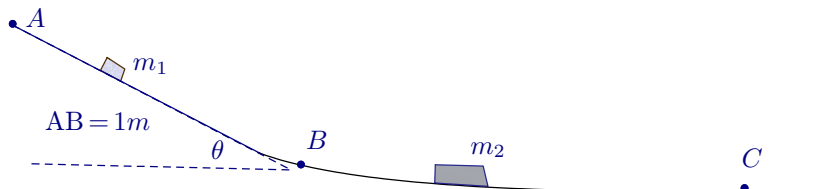
3) Relation between impulse and momentum

Relation between impulse and average force  
 Using graphics of F vs time



Question :

A body of mass  $m_1$  (100g) is moving downward along an inclined plane of angle  $\theta = 40^\circ$ .



There is a constant friction force of 0.5N between A and B.

and no more friction from B to C (BC can be considered as horizontal).

- 1) Show that the acceleration of  $m_1$  between A and B has magnitude  $a = 1.43\text{ms}^{-2}$ .
- 2) If  $m_1$  started at the rest from position A, what is its speed at B ?
- 3) An other object of mass  $m_2$  (200g) is placed somewhere between B and C.

After  $m_1$  collides with  $m_2$ , both will continue together with a common final speed  $v_f$ .

Show that  $v_f = 0.476\text{ms}^{-1}$ .