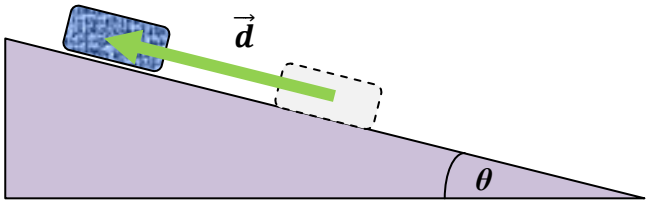
EXERCISE 01

A block of mass m=0.2 kg is pushed up a rough inclined plane with an angle $\theta = \frac{\pi}{12}\ rad$ *using a constant force* $\|\vec{F}\| = 10\,N$*, which is parallel to the slope, as shown in the figure below. The mass reaches the top of the incline after traveling a distance* ***d*** *of 3 meters.*



a) Represent the forces acting on the mass and write the analytical expressions for each of them.

b) Calculate the work done by each force, where g=9.8m/s^2 μ_k =0.2

c) Determine the initial velocity at which the mass was pushed.

EXERCISE 02

A child weighing 25 kg slides on a curved track without friction and without initial velocity as shown in the figure.

1- Represent the forces acting on the child while he is sliding.

A- Calculate the final velocity at which he reaches the ground..

EXERCISE 03

A particle moves under the effect of the force $\vec{F} = (x^2+y^2)\vec{\imath} + (xy)\vec{\jmath}$ *+ starting from the the point A to point C. Calculate the work done by this force for the following two paths:*

Path A→B→C

- *A(0,0) B (1, 0) C(1,1)*

- *A(0,0) B (1/2, 1/2) C(1,1)*

EXERCISE 04

A body of mass m, subjected to a force $\overrightarrow{F_n}$, moves along a closed path OABCO consisting of a parabolic arc and a straight line segment, following the direction indicated by the arrow. Compute the work done by $\overrightarrow{F_n}$, in the following cases:

a) $\vec{F}_1 = -y\vec{\imath} + x\vec{\jmath}$ b) $\vec{F}_2 = x\vec{\imath} + y\vec{\jmath}$

1. *What conclusions can be drawn in each case?*