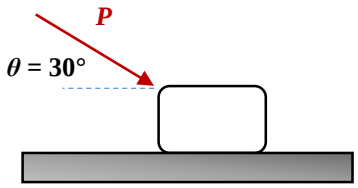
System diagram drawing exercise

For each of the problems given below,

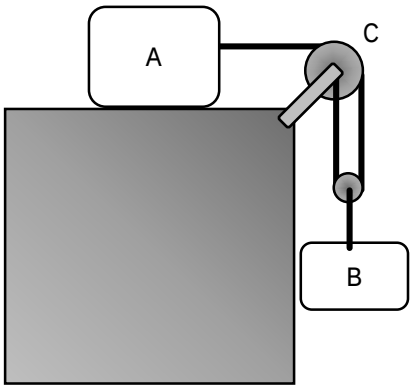
- draw the requested **system diagram**, which could be used to write the right hand side of the conservation of linear momentum, and
- an additional diagram showing the state of motion, which could be used to find an expression for the system momentum, $\vec{P}_{sys}$.

1. A block with mass m = 200 lbm is initially at rest on a horizontal surface. Find the magnitude of the force **P** required to accelerate the block to the right with an acceleration of a = 10 m/s^2. The kinetic coefficient of friction between the block and the surface is μ_k = 0.25.



Draw a system diagram for the block.

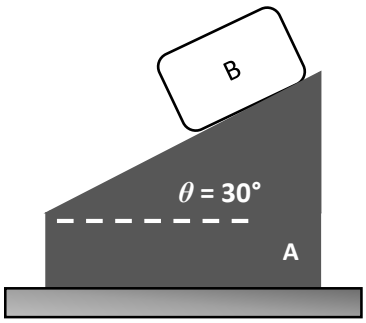
2. The two blocks shown are initially at rest. They are connected with a massless, inextensible rope and frictionless, massless pulleys. If all surfaces are frictionless, find the acceleration of each block and the tension in the rope.



Draw system diagrams for

- *Block A,*
- *Block B, and*
- *Pulley C.*

3. A block with mass m_B = 12 lbm starts from rest and slides down a wedge with mass m_A = 30 lbm, which is also initially at rest. Neglecting friction both between the block and the wedge and between the wedge and the horizontal surface, determine (a) the acceleration of the wedge, and (b) the acceleration of the block *relative to the wedge*.



Draw system diagrams for

- *Wedge A,*
- *Block B, and*
- *both A and B together.*