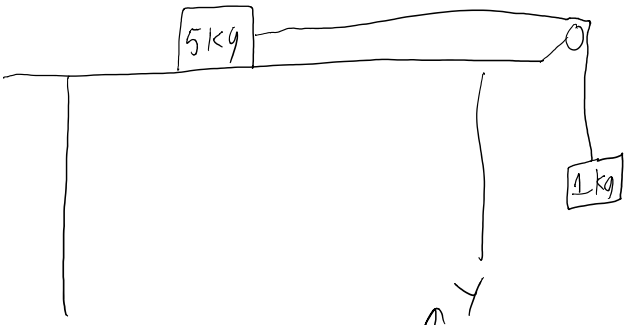
A 5 kg block is resting on a flat frictionless surface table and is connected to a 1 kg block hanging over the edge of the table. What is the acceleration of the 5 kg block?

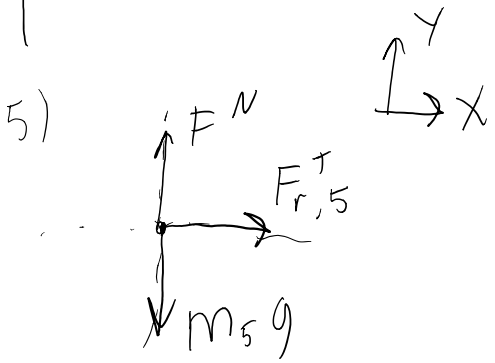
$|\Delta\vec{x}_5| = |\Delta\vec{x}_1|$

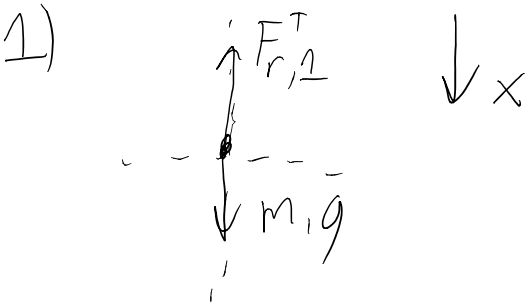
$|\vec{v}_5| = |\vec{v}_3|$

$|\vec{a}_5| = |\vec{a}_3|$

$|\vec{F}^T_{r,5}| = |\vec{F}^T_{r,1}|$







The y direction for block 5 will tell us that the normal force is equal to the force of gravity. Not very useful for this problem.

$\Sigma F_{x_5} = m_5 a_{x_5}$

$F^T_{r,5} = m_5 a_{x_5}$

$F^T_{r,1} = m_5 a_{x_1}$

$\Sigma F_{x_1} = m_1 a_{x_1}$

$-F^T_{r,1} + m_1 g = m_1 a_{x_1}$

$-(m_5 a_{x_1}) + m_1 g = m_1 a_{x_1}$

$m_1 g = m_1 a_{x_1} + m_5 a_{x_1}$

$m_1 g = (m_1 + m_5) a_{x_1}$

$\frac{m_1 g}{(m_1 + m_5)} = a_{x_1}$

$1.63 \frac{m}{s^2} = a_{x_1} = a_{x_5}$

$1.63 \frac{m}{s^2} = a_{x_1} = a_{x5}$