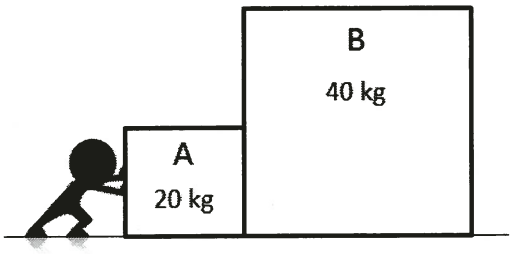
KEY

First Name:_____ Last Name:_____

L10 – FQ – Blocks Pushing Blocks

Use the following information to answer Q1 and Q2:

In a frictionless system, a force is applied to the masses below, and the entire system accelerates at 2.40 m/s^2.



Q1: What is the force of object B acting on object A ($\vec{F}_{B\ on\ A}$)?

System

$\vec{a} = \frac{\vec{F}_{net}}{m}$ or $\vec{F}_{net} = m\vec{a}$

$= (60kg)(2.40 m/s^2)$

$= 144\ N$

Whoops! I don't need this!

Use it down there!

Item B

$\vec{F}_{net} = m\vec{a}$

$= (40kg)(2.40 m/s^2)$

$= 96\ N$

$\vec{F}_{net} = \vec{F}_{A\ on\ B}$

$\vec{F}_{A\ on\ B} = 96\ N\ [R]$

$\vec{F}_{B\ on\ A} = 96\ N\ [L]$

Q2: If the mass of B is doubled, then what is the new acceleration of the system?

*(Record your **three digit** answer in the Numerical Response boxes below)*

1	.	4	4

Method #1

$F_{net_{sys}} = 144N$ (from above)

$a = \frac{F_{net}}{m} = \frac{144N}{(20+80)} = \frac{144N}{100\ kg}$

$a = 1.44\ m/s^2$

Method #2

$a = \frac{F_{net}}{m}$

$F_{net} = m_i a_i$ and $F_{net} = m_f a_f$

$m_i a_i = m_f a_f$

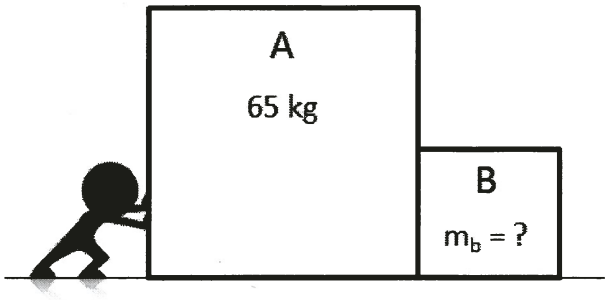
$(60kg)(2.40 m/s^2) = (100kg)a_f$

$a_f =$

KEY

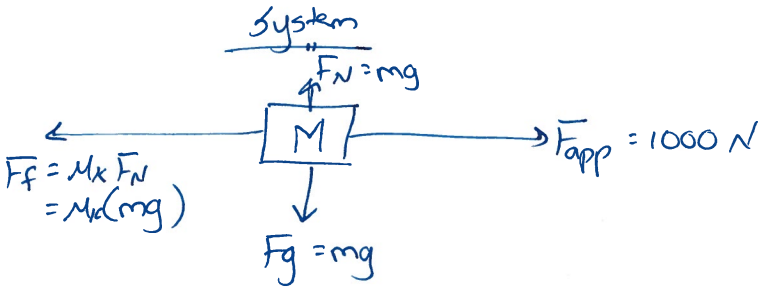
Use the following information to answer Q3:

A force of 1000N is applied to a system of blocks, as depicted below. The coefficient of kinetic friction between the blocks and the ground is 0.85.



Q3: If the entire system accelerates at 2.00 m/s^2, what is the mass of B?

a. 16.25 kg
b. 31.73 kg
c. 96.73kg
d. 229.00 kg



So $\vec{F}_{net} = \vec{F}_{app} + \vec{F}_f$

$ma = 1000 - \mu_k mg$

$m(2) = 1000 - (0.85)m(9.81)$

$2m = 1000 - 8.3385m$

$10.3385m = 1000$

$m_{sys} = 96.73$

So $m_B = 31.73$ kg

MARKING:

Beginning	0 – 0.5
Progressing	1 – 1.5
Competent	2 – 2.5
Exemplary	3