AP Physics – Assignment #9
Newton's Second Law (Two bodies –Level 2)

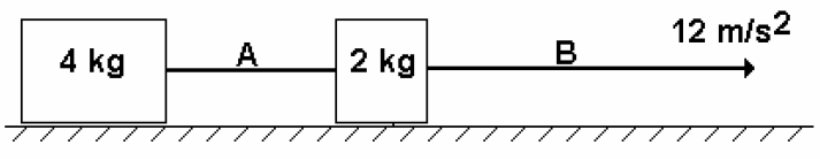
Instructions: Complete these problems on separate paper. On ALL questions (yes, even multiple choice), you must:

1. *Draw a picture or diagram* to visualize the problem
2. *Show each step of your calculations clearly*
3. *Write a few sentences* explaining important steps and discussing the reasonableness of your result.

It is ok to collaborate with your peers, but the work must be your own.

You must take assignments seriously to learn physics

1. (1a, 1b, & 1c)



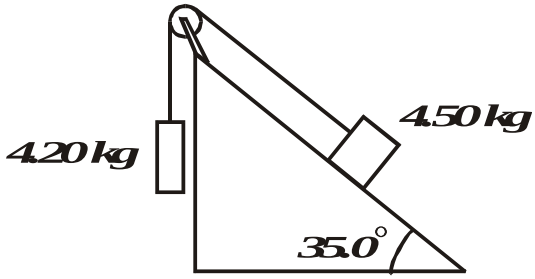
What is the magnitude of the force of string B on the 2 kg mass?
A) 72 N B) 48 N C) 24 N D) 6 N E) 3 N

What is the magnitude of the force of string A on the 4 kg mass?
A) 72 N B) 48 N C) 24 N D) 6 N E) 3 N

What is the magnitude of the net force on the 2 kg mass?
A) 72 N B) 48 N C) 24 N D) 6 N E) 3 N

2. The apparatus shown in the picture to the right is called an *Atwood's Machine* and is used to measure the acceleration due to gravity *g* by measuring the acceleration of the two blocks connected by a string over a pulley. Find the tension in the cord and the acceleration (magnitude and direction) of each block for the following situations:
   i. m_1 = 30 kg; m_2 = 12 kg
   ii. m_1 = 6 kg; m_2 = 12 kg
   iii. m_1 = 12 kg; m_2 = 12 kg
   iv. m_1 = 0 kg; m_2 = 12 kg

3. A 4.50 kg block rests on a smooth ramp as shown. It is attached to a 4.20 kg block by a very low mass string that is run over a low friction pulley.
   i. In what direction will the blocks travel?
   ii. What will be the acceleration of the blocks when the system is released?
   iii. What will be the tension in the string when the system is released?



"You don't have to be a fantastic hero to do certain things. You can be just an ordinary chap, sufficiently motivated to reach challenging goals."
- Sir Edmund Hillary