Name: _____

AP Physics: Dynamics
Forces of Inclines & Atwood Machine HW

1. Baby Landon drives his little red wagon over to his buddy Mason's house to play. Mason's driveway is inclined by 12°. Landon's friend Evelyn's house has a driveway inclined by 9.00° and his friend Ben's house has a 6.00° incline for his driveway. If the coefficient of static friction is 0.15 and the coefficient of kinetic is 0.11 for the wheels of his wagon, what is the maximum angle that Landon's wagon can be inclined before sliding? Which friend or friends can he visit? Answer the following questions below to determine your answer.

   Equilibrium or Non-equilibrium ΣF_x: _____
   Equilibrium or Non-equilibrium ΣF_y: _____

   A. Draw the FBD for the scenario described above using θ as your angle.
   B. If his wagon is not yet moving or sliding, write a statement for the ΣF_x and ΣF_y
   C. What is the maximum angle of incline the wagon can withstand before sliding?
   D. Which friends can Landon visit if he needs to park in the driveway?

2. Mrs. Whittaker decides to hide birthday presents for Landon above his head in an Atwood Machine. Why not?! To begin, both boxes (masses shown below) are 1.80 m above the ground and the massless, frictionless pulley is 4.80 m above the ground. On the count of three, the two boxes are released, accelerating both.

   To what maximum height above the ground does the lighter object reach after the boxes are released?

   [Hint: First determine the acceleration of the system. Then use this acceleration to determine the velocity of the lighter mass the moment the heavier mass hits the ground. This will be the 'launch' velocity of the lighter mass. Assume the mass does not hit the pulley].