Name: _____

PHY 105 Lab Test 1 October 11, 2005 50 minutes

La Salle University
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Do all work in the blue book!

1. [10 pts] In lab 2 you measured the acceleration of a cart moving horizontally when pulled by a mass M. The theoretical acceleration of the cart is given by:

$$a = \frac{M}{M_{cart} + M} g$$

   a) If you measure the mass of the cart to be 499.1 g and the mass *M* is listed as 150 g, calculate the theoretical acceleration. If your measured acceleration deviates from the theoretical value by -2.9%, what is your measured acceleration?

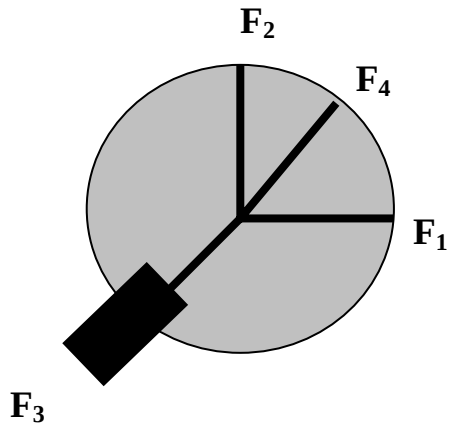
   b) Assuming that the value of 150 g is correct, what % error in your cart-mass measurement would account for the -2.9% error of part (a)?

2. [20 pts] In lecture we have described the theoretical acceleration of an Atwood's machine, which was found to be $a = \frac{m_1 - m_2}{m_1 + m_2} g$

   Write a lab description of how to measure this acceleration. Your description should include any setup required, how you would do the measurements themselves, a table for filling in data, what steps you would take to get good data, etc. You must also describe any appropriate physics theory that needed for the lab plus how to analyze the results.

3. [10 pts] In the accompanying force table view,

   - A 50-g hanger with an additional 250 g hangs from String 1, which is at 0°
   - A weight (no hanger) of unknown mass hangs from String 2, which is at 90°,
   - A 50-g hanger with an additional 100 g is attached to String 4, which is at 55°,
   - String 3 is attached to the Force Sensor, which is at 233°, with a mean reading of –5.280 N.



   a) Determine the mass that is hanging from String 2.

   b) Assume you are going to replace Strings 1 and 4 with one string. At what angle should you hang it? And how much mass should be put on the hanger?