

Physics 223

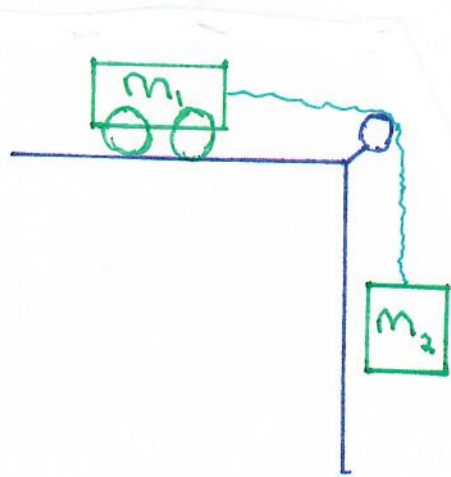
General Physics Lab

Experiment 7: Newton's Second Law Prelab

== COPY OR TAKE A PICTURE OF THIS PRELAB BEFORE TURNING IT IN. YOU WILL NEED THIS INFORMATION TO WRITE YOUR REPORT. ==

- 1) What is the objective of this experiment?

- 2) Consider an Atwood's Machine consisting of a cart (m_1) on a horizontal tabletop, connected by a thin cord that passes over a pulley to a mass (m_2), which hangs vertically off the edge of the table. See figure below:



- a) Draw free body diagrams for the mass of the cart (m_1) and the hanging mass (m_2). Label the forces on each diagram and which diagram is for each mass.

b) Starting from Newton's Second Law, derive an expression for the acceleration of the cart after the system is released from rest in terms of tension (T), the force of friction (F_{fr}), and the mass of the cart (m_1). Show all work and box your answer!

c) Starting from Newton's Second law, derive an expression for the tension in the cord after the system is released from rest in terms of the masses (m_1 and m_2), the magnitude of gravitational acceleration (g), and the friction force (F_{fr}). Show all work and box your answer!