Tension Lab

Name:
Period:
Mr. Z.'s Physics Class
11/17/05

In this lab, your goal is to measure the forces involved in several different situations, and verify that the forces on each object sum to zero. You will need:

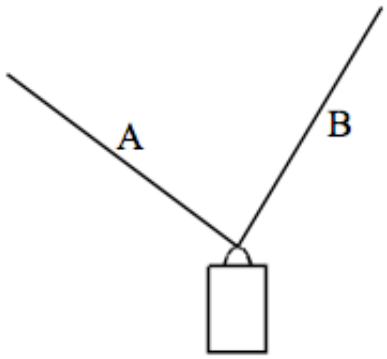
- Two weights of different sizes
- Two strings (each with three loops to connect to the object and scales)
- Three spring scales (two 5 N and one 10 N should work)

In order to get accurate results, you have to measure all the forces and angles without anything moving. It works well of those holding the strings brace their arms against the table, to make it easier to hold their end steady, and the other group members quickly make and record the measurements.

Also, be sure to zero your scales before you start.

1. What is the $\vec{F_g}$ of each weight, as a force vector?

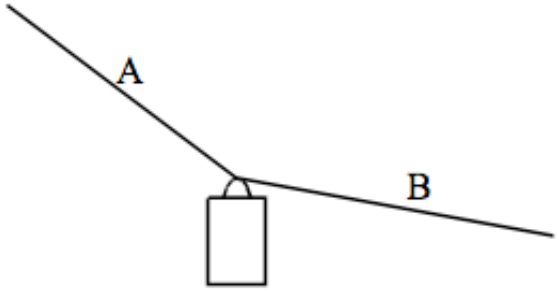
2. a) Pick either weight to set up the situation below, and draw the force diagram.



b) In which string should the force be larger?

c) Set up that situation, measure the angle of each string, and record the scale measurements. Give the vector form of each force. Then, find the net force. It should be nearly zero (within about .5 in each coordinate).

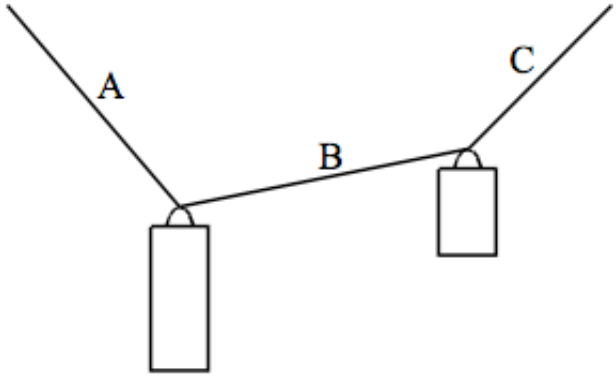
3. a) Draw the force diagram for the object in the situation below.



b) In which string should the force be larger?

c) Set up that situation, measure the angle of each string, and record the scale measurements. Give the vector form of each force. Then, find the net force. It should be nearly zero (within about .5 in each coordinate).

4. a) In this situation, there are two objects. Draw the force diagram for each object. There should be three forces acting on each.



b) Here, it is difficult to measure the force in the middle string. So, instead, we'll treat both objects as one single object. Its weight will be their combined weights, and it will have just the two outside tension forces acting on it.

Find the vector form of each force, and from that find the net force.

c) **Extra Credit:** Find the tension force the middle string exerts on each weight.