Activity 4 Names: _____

Answers should be filled in on this sheet except where noted.

1. Pick up an acrylic frame, 4 hooks, and 2 rubber bands from the front of the room.
2. Find an object that can be used as a mass (25 grams is about the minimum).
3. Measure the mass of the object and convert it to a force, W.

Object weight: $W =$ _____

4. Suspend the mass from opposite sides of the frame using the two rubber bands.
5. Using a ruler, measure the *x* and *y* distances from one end of the rubber band to the other.

For the first rubber band: $\delta_{x,1} =$ _____

$\delta_{y,1} =$ _____

For the second rubber band: $\delta_{x,2} =$ _____

$\delta_{y,2} =$ _____

6. Using the weight from step 3 and the measurements from step 5, calculate the force in each applied to each rubber band assuming particle equilibrium. Show your work on a separate sheet.

For the first rubber band: $\dot{F}_1 =$ _____

For the second rubber band: $\dot{F}_2 =$ _____

7. Measure the length of each rubber band and use it to calculate the force in each rubber band using the provided calibration.

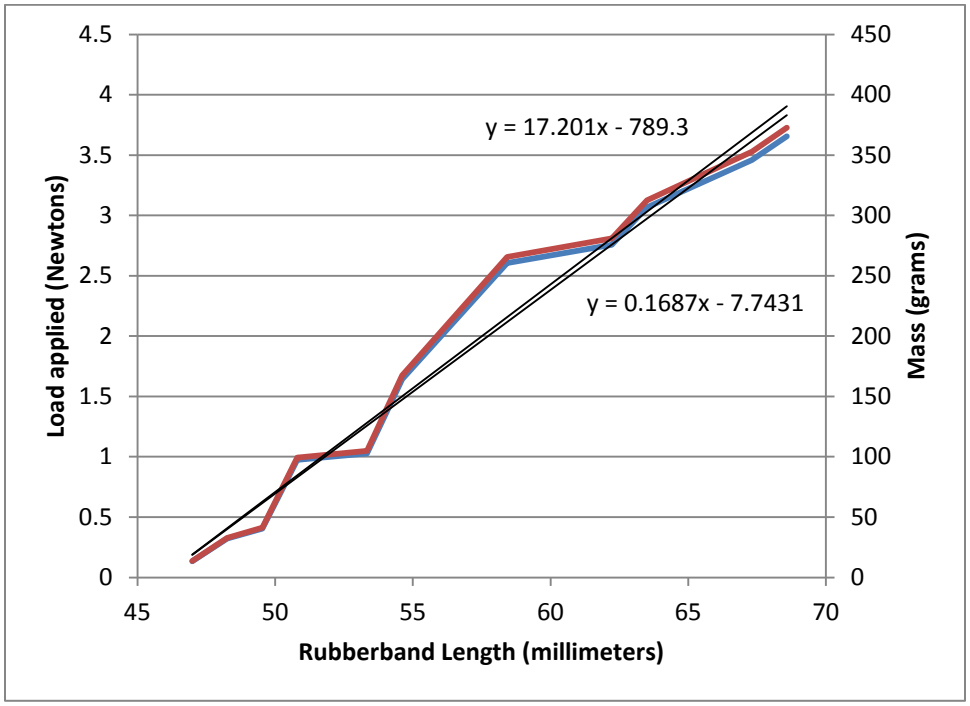
For the first rubber band: $L_1 =$ _____

$F_1 =$ _____

For the second rubber band: $L_2 =$ _____

$F_2 =$ _____

8. Calculate the performance metric, $m = \sqrt{(F_1 - \dot{F}_1)^2 + (F_2 - \dot{F}_2)^2}/W =$ _____



Load in Newtons: F = 0.1687*Length – 7.7431

Mass in grams: F = 17.201*Length – 789.3