Mathematical Modeling Using Long-Exposure Photography – Class Handout

1. Fill out the tables below using the measurements collected in class. The columns are t for time, Δx and Δy for the changes in position over each time interval, and x and y for the positions relative to the starting point at time t.

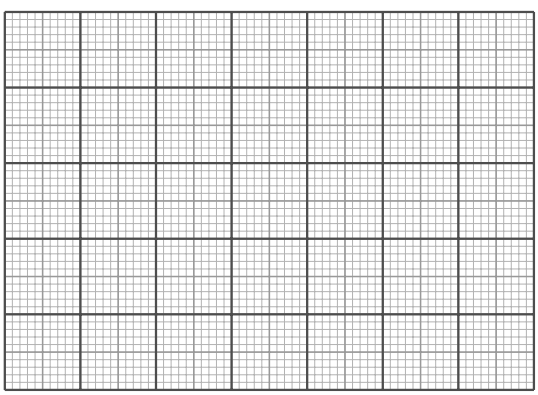
t	Δx	x

Table 1: Rolled ball.

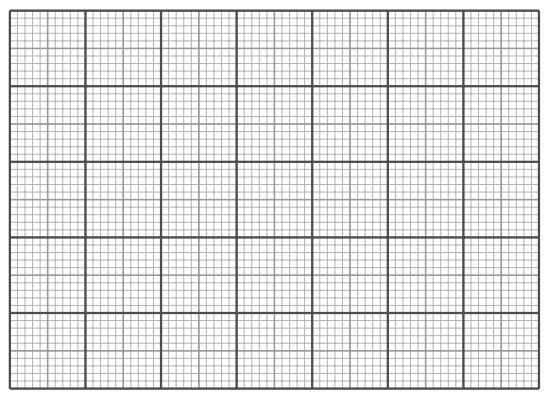
t	Δy	y

Table 2: Dropped ball.

2. Plot the position versus time (x vs. t) and (y vs. t) for each table on the space below. Be sure to label the axes appropriately.



x vs. t



y vs. t

3. Does either data set look like it can be modeled by a linear function $f(t) = mt + b$? If so, graphically estimate the value of m and b.

4. Compute the error between your model and the data. To do this, sum the absolute value of the difference between your model and the data at each recorded time. Can you change the value of m or b in your model to make the error smaller?

5. Repeat the above steps by plotting the changes in position versus time, Δx vs. t and Δy vs. t.