01-05 Constant Acceleration Lab

Name: _____

Adapted from Take-Home Physics by Michael Horton

Objectives

- Create a distance vs. time graph when there is acceleration.

Materials

- Marble
- Pie pan
- Stopwatch
- Meter stick
- Device capable of doing regressions (Vernier Graphical App or graphing calculator)

Procedure

1. Time how long it takes a marble to drop 0.50 m. It is easiest time it by having one person hold the meter stick while the other person drops the marble into the pie pan while timing it. The pie pan makes it easy hear when to stop the timer. Repeat three times and fill out the table.

Distance	Time 1	Time 2	Time 3	Average Time
0.50 m				
1.00 m				
1.50 m				
2.00 m				

2. Drop the marble from the other heights and record the times.
3. Draw a graph with the average time on the *x*-axis and the distance on the *y*-axis. The points should form a curve. Draw a smooth curve through the points. It should look similar to
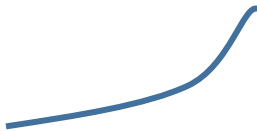
4. Is the slope of the graph increasing or decreasing? _____
5. What does that tell you about the velocity? _____
6. What would be the shape if the marble was slowing down? _____
7. When the marble fell the 2.00 m, did it take longer to fall the first half or the second half of the distance? Explain how you figured this out.
   _____
   _____
8. Use a regression device to find the quadratic regression.

   $x =$ _____ $t^2 +$ _____ $t +$ _____