Lab Report Quiz

February 2024

Name _____

Consider a car rolling down a ramp with a very slight angle (of less than 1 degree).

Somebody formulates the hypothesis that the car is following the equation x(t) = 1/2 a t^2, that is, that it is accelerating at a constant rate with an initial speed of zero.

They collect the following position-time data.

Position (cm)	Time (s)	
0	0	
4	0.5	
17	1	
38	1.5	
67	2.0	
101	2.5	
120	3.0	

1) Determine a third column which will, if the hypothesis is true, cause the data to appear in a straight line. Calculate that third column.

2) Graph the linearized data with the position on the vertical axis and time on the horizontal axis. There should be one outlier (a point that does not follow the pattern of the others). Circle it.
Make sure to appropriately label your graph.

3) Draw a best-fine line based on all the points other than the outlier.

4) Based upon your graph, which of the following statements is most accurate:

The data are consistent with the hypothesis.

The data are NOT consistent with the hypothesis.

The data are consistent with the hypothesis over some range.

Briefly explain why

5) Determine the slope of your line. From this slope, and the hypothesis, calculate the acceleration of the car. Make sure to use appropriate units in your result.

6) Compare your result to the acceleration of an object in free-fall. Your result should be somewhere between 1% and 5% of the free-fall acceleration for earth. Check that the result is reasonable.