ABRHS PHYSICS

Lab 15-4: Physical Pendulum

Names:

Purpose: 1. To determine the theoretical relationship between the point of oscillation and the period for a physical pendulum made of a meter stick.

2. To experimentally determine the relationship and compare it to your prediction.

Materials: 1 physical pendulum 1 stop watch

Diagram:



Theory:

Derive an expression for the period of small oscillations of a meter stick as a function of r, where r is the distance between the oscillation point and the center of mass of the meter stick.

Theoretical Equation:

Procedure:

1. For each of the pivot points of the physical pendulum, determine the period of oscillation and record in the data table. Measure the distance from the pivot point to the center of mass and record.

Lab 15-4: Physical Pendulum

- 2. Make a graph of Period (T) vs. Offset (r).
- 3. Exciting New Thing! In order to compare your data to your theory, you must enter your theoretical equation (or *model*) into LoggerPro as follows:
 - a. Under Analyze, choose Model....
 - b. Click on the **Define Function** button.
 - c. Enter your equation in the space marked f(r)=.
 - The variable in your equation will be *r*.
 - Multiplication is done with an asterisk (*). Square roots are done with *sqrt()*.
 - Your equation should have a constant in front of it. Instead of typing in that constant call it *A* in the equation. (Logger Pro will need something that it can vary to find the best fit to the model you will be able to force it to your constant later on.)
- 4. To use your new equation, under **Analyze**, choose **Curve Fit...** Choose your newly defined equation, make it a **Manual Fit** (in the upper right corner), and finally enter your constant and click on **Ok**.
- 5. Copy and paste the graph in the space below. Please make sure your graph is clean and legible.

Data:

Length of Pendulum: _____ m

r (m)	T (s)	



Graph:

Paste Graph Here

Conclusion:

Intelligently discuss how your data compares to your theoretical predictions. Also discuss any difficulties (and how you overcame them) in doing the lab and the major sources of error in the lab. If you use the phrase "human error" you will get a 0 on the lab.