Name:

Date: _____

Lab #1 – Graphing (40 minutes) AP Physics 1/2

Purpose: To review graphing methods and techniques for using graphs to produce meaningful results.

Equipment: round objects (glasses, bowls, tubes, pots, pans, etc.); string; metric ruler; graph paper or a computer graphing program

Procedure: Wrap a piece of string around the circumference of a round object. Mark the length of the string and unwrap it. Measure the string's length in millimeters and record the number in the data table below. Use the ruler to measure the diameter of the object as accurately as possible in millimeters. Record this measurement in your data table. Repeat this procedure for as many different objects as you can (up to 8).

Object	Circumference (mm)	Diameter (mm)
1		
2		
3		
4		
5		
6		
7		
8		

<u>Graph</u>: using graph paper (or a graphing program if you know how) produce a graph of circumference vs. diameter. Be sure to make your graph with circumference on the y-axis and diameter on the x-axis. Use an appropriate scale that will fill up nearly an entire sheet of graph paper; include a title on your graph as well as labels on your axes with units. Carefully plot your data points and draw a best-fit line for the data (use a ruler to draw your line!) The best-fit line for this experiment should be very close to straight. Attach your graph to this sheet when you submit your lab.

<u>Results</u>: select and circle two points on the best-fit line that you produced. Note that these do not have to be data points from your table, but must be <u>on the line</u>.

Use the formula $\frac{y_2 - y_1}{x_2 - x_1}$ to determine the slope of the graph (include the equation and units in your calculation.)

<u>Analysis</u>: The slope that you calculated is considered your "measured value" for this experiment. The "expected value" for this experiment is 3.14.

Use the percent error formula: $\% error = \frac{|measured - \exp ected|}{\exp ected} x100$ to compare these two values.

<u>Summary</u>: in the space below, write a summary of important details for this activity. In writing your summary you should at a minimum consider... "What type of relationship exists between circumference and diameter?" "What does the slope of a graph of these two values represent?" "What equation can you write that relates circumference to diameter?" "What was the quality of your result and how do you know?" "What were the main factors that limited the precision of your results?"

