LAB–Circumference and Area of Circles Name _____
Geometry Partner _____

Procedure:

1. Choose one circular object from those available. You should also get graph paper, scissors, a pencil, and a tape measure or string.

2. Take several measurements of your circle as demonstrated and record them below. Then select a new object. Measure it and record below. Continue until your chart is complete.

DIAMETER	RADIUS	CIRCUMFERENCE	AREA

3. Now make some calculations. Find out if any of the ratios below seem to stay the same for all of your objects.

Ratio of Diameter to Radius: same or change? value if same_____

Ratio of Circumference to Diameter: same or change? value if same_____

Ratio of Circumference to Radius: same or change? value if same_____

Ratio of Area to Diameter: same or change? value if same_____

Ratio of Area to $(\text{Diameter})^2$: same or change? value if same_____

Ratio of Area to Radius: same or change? value if same_____

Ratio of Area to $(\text{Radius})^2$: same or change? value if same_____

4. Select two of your ratios above that stayed the same, and calculate its value to several decimal digits.
Ratio of _____to_____Record the value _____

Ratio of _____to_____Record the value _____

5. Why do you think the ratios above stayed the same? How is this related to the formulas for area and circumference? Explain.

_____

_____

6. Choose one of your ratios from #4. Ratio of _____to_____
On a piece of graph paper, make a 1-quadrant graph on a set of coordinate axes of the data points used to make your ratio (Note: if your selected ratio used radius^2 or diameter^2, then you must square the data point before graphing.) Select an appropriate scale to use on your axes, and label them. Turn this graph in with your lab report.

Data points used:

X-axis (Indep. Var.)	Y-axis (Dep. Var .)

7. With a ruler, determine the "Best Fit Line" of your data points. Extend your line so it intersects the Y-axis, and determine its Y-intercept:_____

Circle 2 other points that are on the best fit line and use them to calculate the slope of the line.

Points: (,) and (,)

Calculations:

Equation of line in y = mx + b form:_____

8. How does your equation relate to the ratio you calculated in #4?

_____

_____

Alternative Procedure with Graphing Calculator:

6. Choose one of your ratios from #4. Ratio of _____to_____
Enter the data points used to make your ratio into the List Editor of your calculator. (Note: if your selected ratio used radius^2 or diameter^2, then you must square the data point. You can do this by entering a formula for a third list, such as L1^2.) Graph the points on a scatterplot with appropriate window dimensions. Make a labeled sketch of your graph to turn in with your lab report.

Data points used:

X-axis (Indep. Var.)	Y-axis (Dep. Var .)

7. Use a linear regression calculation to model your data from the Stat Calc menu.

Equation of line in y = mx + b form:_____

8. How does your equation relate to the ratio you calculated in #4?

_____

_____

Extension: Make a graph of one of the ratios that did not remain constant, (A to R or A to D). Explain the shape of these graphs. Calculate an appropriate regression equation to model the data. Explain how your equation relates to the ratio calculated in #4.