Round about Circles
ID: 8554

Name _____

Class _____

In this activity, you will explore:

- *the relationship between the diameter and circumference of a circle*

Open the file *StatAct03_RoundAboutCircles_EN.tns* on your handheld and follow along with your teacher to work through the activity. Use this document as a reference and to record your answers.
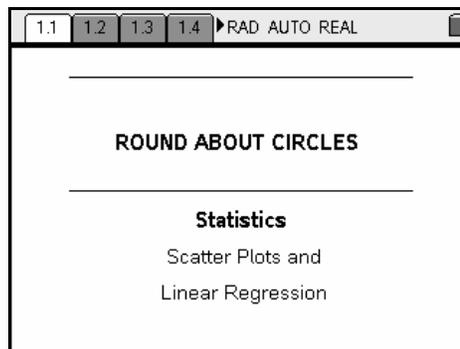
Diameter v. Circumference

Using the tape measure supplied by your teacher, measure (in centimeters) the circumference and diameters of various circular objects in the room. You may also measure the circumference and diameter of a circle drawn using a compass. Record measurements for at least 15 different-sized circles in the spreadsheet on page 1.4.
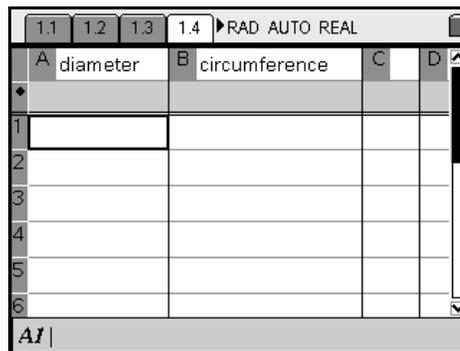
To display a scatter plot of the data on page 1.4, select both data columns (arrow all the way up to select one, then hold down the **SHIFT** ($\overset{\text{CAPS}}{\Uparrow}$) key and arrow to select the other. Select **MENU > Data > Quick Graph** and a dot plot of your data will appear in a split window.

- What type of function can be used to *best* approximate this data? _____

Press $\boxed{\text{ctrl}}$ + $\boxed{\text{tab}}$ to move to the *Data* & Statistics window, and select **MENU > Actions > Add Movable Line**. Drag and rotate the line to best fit the data.

- Sketch the scatter plot and fit line here.

- What is the equation of this fit line?

  _____

- How good a fit is this equation?
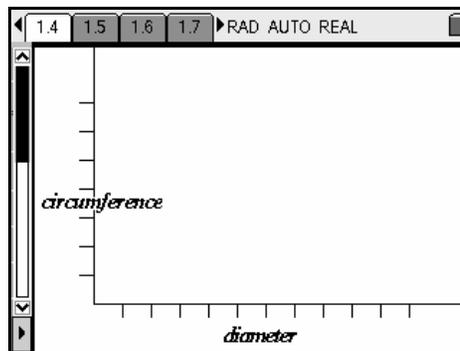
Next, you will perform a linear regression using the TI-Nspire handheld. To set up the regression, once again select the two data columns in the *Lists & Spreadsheet* window. Then choose **MENU > Statistics > Stat Calculations > Linear Regression (mx+b)**. Press (tab) to move through the fields, setting them as they appear at the right.
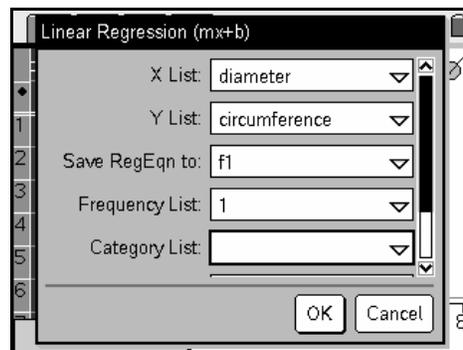
The value "*r*" that results from the regression is called the correlation coefficient and is essentially a measure of how well the regression equation models the graphed data. A value of *r* close to 1 or −1 indicates a very good fit, while values close to zero indicate a poor fit.

- What is the regression equation? _____

- Was your equation a good fit? Explain.

To further explore this relationship, advance to page 1.7. Grab and drag point *A* to stretch and shrink the circle. Observe the relationship between circumference and diameter as shown graphically by the point *P*.

To better see this relationship, select **MENU > Trace > Geometry Trace**, click on point *P*, and grab and drag point *A*.
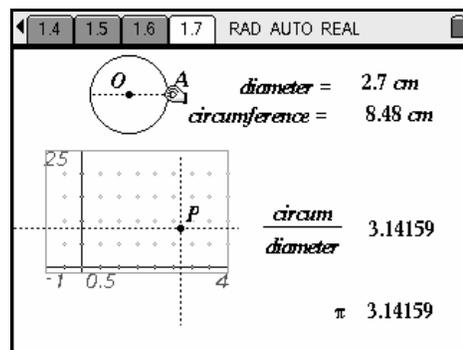
- What is the slope (rate of change) of the line traced out by point *P*?   _____

- Since $\text{slope} = \dfrac{\text{rise}}{\text{run}}$, write an equation for the slope you found above, in terms of the diameter and circumference.   _____

- Write an equation for the circumference of a circle in terms of its diameter.

      _____