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Grade Level 8, 9, 10
Geometry

Activity Overview

Using the on-screen directions and the more detailed directions here, students will investigate the number of degrees in each polygon with three through ten sides, then develop a formula for the relationship between the number of sides and the sum of the measures of the degrees of the polygons. Some prior familiarity with measuring angles and basic functions of the TI-nspire is needed. Students should be able to navigate between pages. Students should be able to use the menu functions on each screen.

Concepts

Geometry: polygons, angle measurements

Statistics: Linear regression

Teacher Preparation

Load .tns file “polygons-angles” onto handhelds. Print copies of instructions (remainder of this document) for students. Print polygon chart (REGULAR-POLYGONS-chart) for students.

This activity will cover the first three columns of the chart. The chart can be printed as is or by selecting only the first three columns to print.

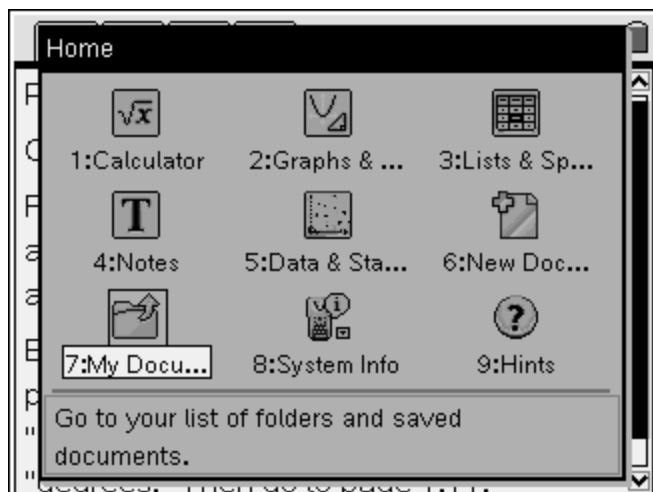
TI-nspire Applications

TI-nspire graphs and geometry, lists and spreadsheets, statistics calculations.

Evaluation

1. Complete the activity and the accompanying chart.
2. Write about the patterns involved in the chart.
3. Suggest an alternate way to discover this information.

Turn on the calculator.
 Go to the home screen.
 Select "My Documents."
 Select "polygons-angles."
 Hit enter.



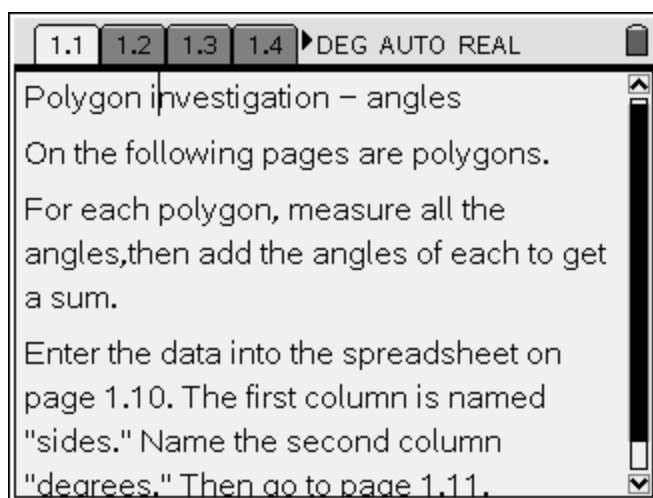
Read through the instructions on the first page (1.1).

To read the bottom of the screen, you will need to scroll down.

Alternatively, when you want to move down the page, hold **ctrl** and **3**.

To navigate one page at a time, press **ctrl** and the right arrow on the navpad.

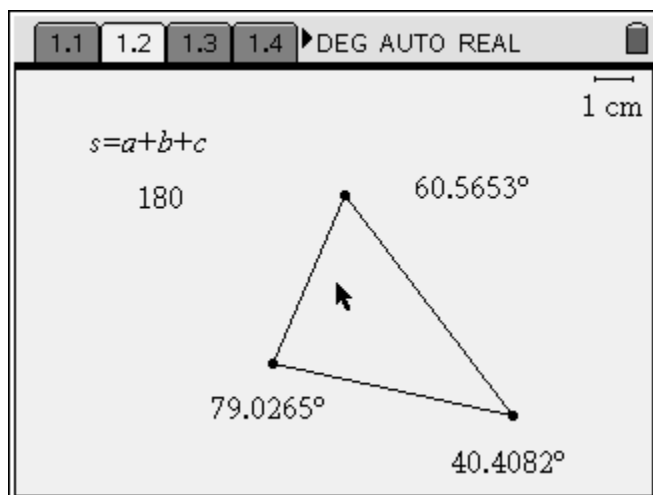
The quickest way to get to page 1.10 is to use **ctrl** and the up arrow on the navpad to get to a page of thumbnails. Select the one you want using the navpad, then hit enter.



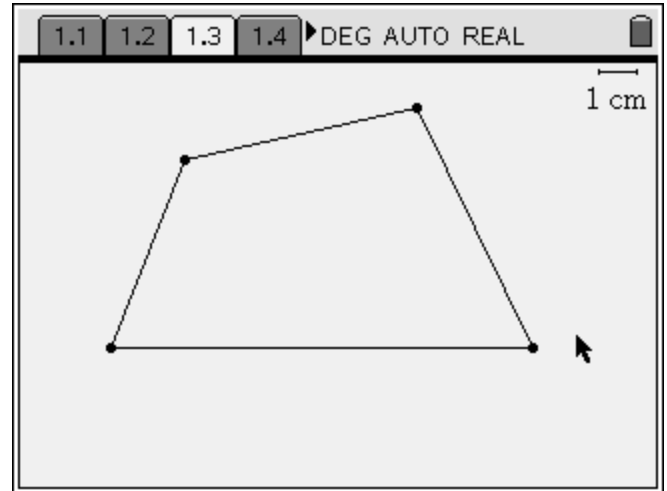
The triangle is already completed. Each angle was measured by using **menu** **7** **4**. The three vertices of the angle must be selected with the vertex as the middle point. Make sure the point is blinking before hitting enter to select it.

Record the sum of the values on the polygon chart.

Later, it will be transferred to page 1.10.

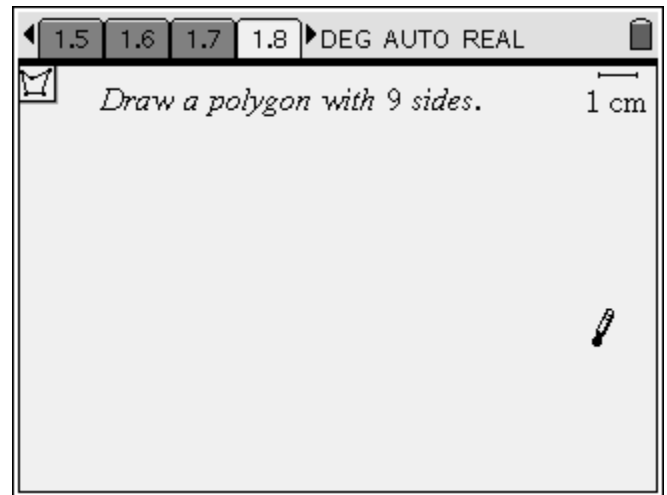


Repeat the process of measuring and recording the angle measures and their sums on pages 1.3 through 1.9.



On page 1.8, you'll draw your own nonagon (9 sided polygon.)

To do this select **menu** **8** **4**. You will need to mark nine different points, then return to the first point you created as a tenth entry to finish the polygon.



The screen shot at right shows the polygon tool in the upper left corner. This will show up after you select **menu** **8** **4**. The pointer will also change to a pencil.

Then draw a decagon on page 1.9 and repeat the process.

Go to page 1.10.

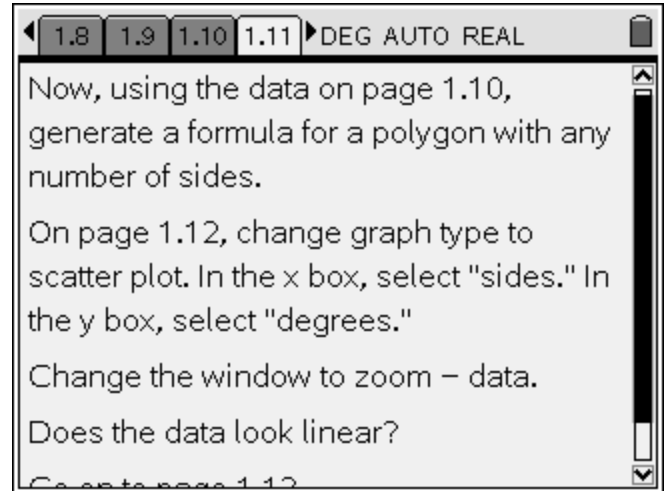
In the box next to the letter B (which is highlighted at right) type "degrees."




Enter the results you've found in your investigation for each polygon.

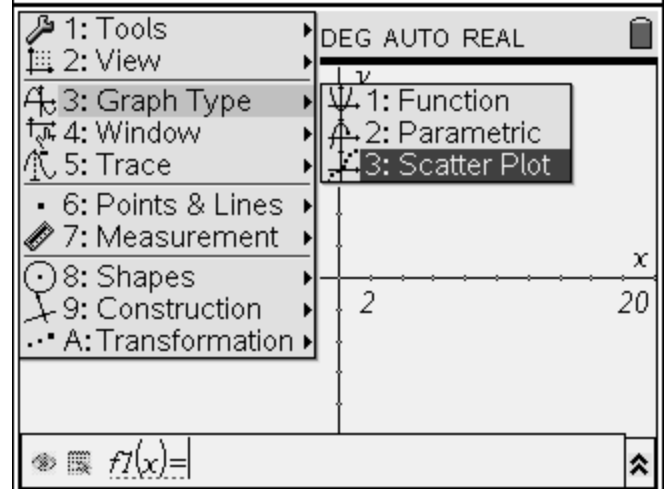
A screenshot of the TI-Nspire software interface showing a data table. The top navigation bar shows pages 1.7, 1.8, 1.9, and 1.10, with 1.10 selected. The mode is set to DEG AUTO REAL. The table has columns labeled A through G and rows numbered 1 through 5. Column B is highlighted. The data in the table is as follows:

	A (...)	B	C	D	E	F	G
1		3					
2		4					
3		5					
4		6					
5		7					

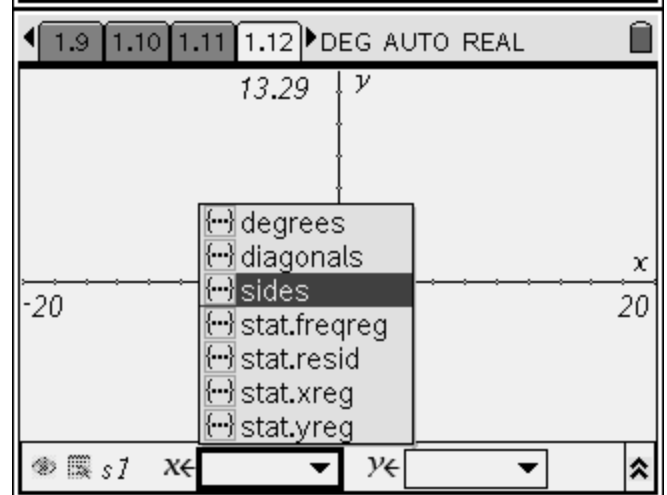
Go to page 1.11.
Read the instructions.



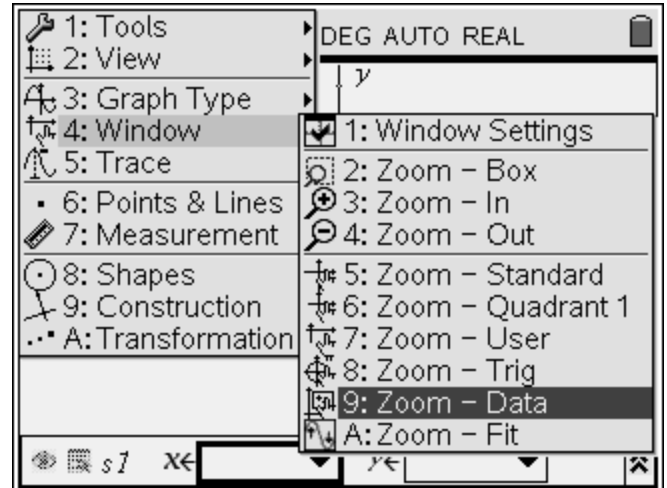
Go to page 1.12.
Select   .



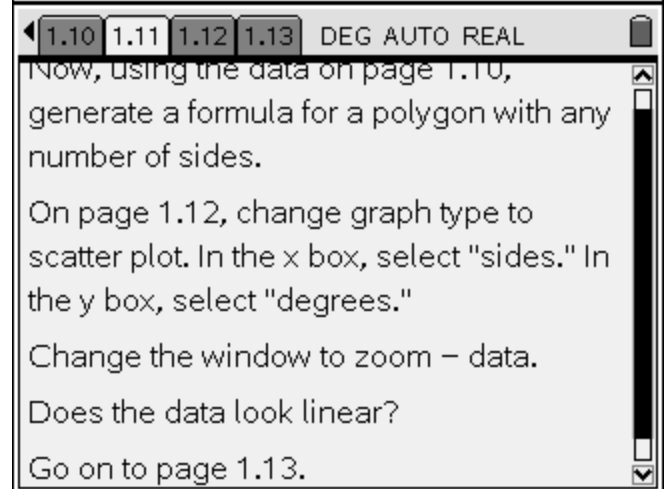
In the x box, select sides.
In the y box, select degrees.



Select   .



Answer the question: does the data look linear?



On the linear regression page, x List is sides; y List is degrees; Save in f1(x), frequency is 1; 1st result column is c[.]

The square brackets are above the left parentheses.

What is the equation that shows the relationship between the number of sides of a polygon and the sum of the measures of its angles?

This will show up on your data page. You can use menu, actions, resize if you can't read all of the information.

Can you find the sum of the measures of the angles of a polygon with 20 sides? 30 sides? 100 sides?

