# Finding Pi

### TEACHER GUIDE

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#### **Activity Overview**

Students discover that pi is the ratio of a circle's circumference to its diameter using manipulatives and the Nspire's data capture feature.

#### Concepts

- Circumference
- Pi

#### **Tennessee Standards**

- Geometry
  - 3108.2.1 Analyze properties and aspects of pi (e.g. classical methods of approximating pi, irrational numbers, Buffon's needle, use of dynamic geometry software).
  - 3108.2.2 Approximate pi from a table of values for the circumference and diameter of circles using various methods (e.g. line of best fit).

#### **Teacher Preparation**

- Load or have the students load the tns file: finding pi.tns
- There is no student activity sheet for this activity
- Students may use the attached circle sheet or students may use a variety of plastic lids
   Materials needed: a length of string (14 inches or 32 centimeters), ruler with centimeters
- The circle sheet does not include the diameter. Students should move the ruler around the circle to find the diameter or the teacher may draw the diameter for each circle before copying the sheet.

#### **TI Nspire Applications**

Graphs & Geometry

Lists & Spreadsheet

### Problem 1

In problem 1, students find the circumference and diameter of a variety of different size circles using circles copied on a piece of paper or from a variety of plastic lids. Students should centimeters.

Students begin on page 1.2. Follow the	Using a piece of string and ruler, find the
instructions given on page 1.2.	circumference of a variety of different size
	circles. Enter your measurement (in cm) in
	the column labeled "circumference" on the
	next page.
	Next, using a ruler, find the diameter (in cm)
	of each circle and place your measurement
	in the column labeled "diameter" next to its
	respective circumference

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On page 1.3, students should enter the measurements they found for the circumference in Column A. The measurements that are found for the diameter are placed in Column B.	A circum B diameter C D I A Circum B diameter C D I A Circum
On page 1.4, students are instructed how to enter the formula to find the ratio of the circumference to the diameter.	Find the ratio of the circumference to the diameter: On page 1.3, in the diamond row of column C, enter = circumference/diameter When completed, continue with Problem 2 on page 2.1.

# Problem 2

In problem 2 students change the size of the circle and capture the circumference and diameter. After the students have captured the data, review with them the ratio of circumference to the diameter. The students should recognize that 3.14 = pi.

On page 2.1, students instructed how to use the capture data tool to find the circumference and diameter of different size circles.	<ul> <li>✓ 1.3 1.4 2.1 ▶ finding pi ▼ 《 X</li> <li>On the next page, grab the circle and change the size of the circle. Capture the circumference measure and diameter measure by hitting CTRL + the decimal point. Do this several times to gather several pieces of data.</li> <li>When completed, advance to page 2.3 and review the data captured.</li> </ul>

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On page 2.2, students grab the point on the circle and change the size of the circle. Data is captured using CTRL + ↔.	circum=25.9 cm
On page 2.3, students see the data captured and the ratio of the circumference to the diameter.	▲ circum1       ■ diam1       C ratio       ■         • = capture(c = capture(c = circum1/diam1       1       30.0378       9.56133       3.14159265         1       30.0378       9.56133       3.14159265       3         2       12.4703       3.96942       3.14159265         3       58.8554       18.7342       3.14159265         4       91.6530       29.1740       3.14159265         5       38.6306       12.2965       3.14159265         C7       =3.1415926535898       < >

# Problem 3

In problem 3 students compare the results on page 2.3 to the results on page 1.3. Discuss with the students how close they were to pi. If the ratio was way off, discuss why it may have happened.

On page 3.1, students are instructed to compare their results. (Some possible reasons they were way off: • Diameter was not measured correctly • String used was stretched • Measured incorrectly	So back to page 1.3 and review the results of ne ratio. How close were you to pi? If you vere off, what could have caused you to be ff?
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