Approximate Total Time: 30 minutes
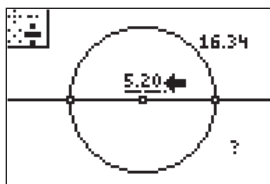
Exploring the Diameter and Circumference of a Circle

ACTIVITY OVERVIEW:

In this activity we will

- Draw a circle
- Measure the diameter of the circle
- Measure the circumference of the circle
- Calculate the ratio of the circumference to the diameter

What might we have in common with Archimedes? This exploration into the relationship between a circle's circumference and its diameter will lead us to our own "discovery" of a value for *pi*.
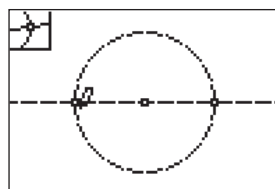
NCTM Geometry Standard: Analyze characteristics and properties of 2- and 3-dimensional geometric shapes and develop mathematical arguments about geometric relationships.
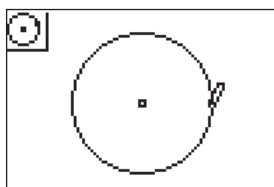

1

Press APPS. Move down to the CabriJr APP and press ENTER. Press ENTER, or any key, to begin using the application.

Press Y= for the F1 menu and select **New**. (If asked to **Save changes?** press ◄ ENTER to choose "No.")

2

Press WINDOW for the F2 menu, move down to **Circle**, and press ENTER. Press ENTER to mark the center of the circle, then move the pencil to indicate the length of the radius, and press ENTER to complete the circle.

3

Draw a line through the two points which determined the circle. To do this, press WINDOW for the F2 menu, move to **Line**, then press ENTER. Move the pencil until the point on the circle is flashing, and press ENTER. Now move the pencil until the center of the circle is flashing, and press ENTER. Press CLEAR to exit the line drawing tool.
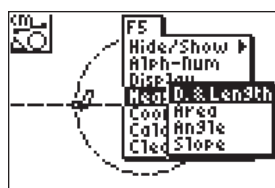
4

Press WINDOW for F2 and move to **Point**. Move to the right and down to select **Intersection**. Press ENTER. Move the pencil until both the line and the circle are flashing. Press ENTER to mark the point which is the intersection of the circle and the line. Now we have two points on the circle which are the endpoints of a diameter.
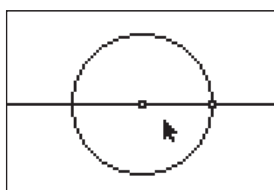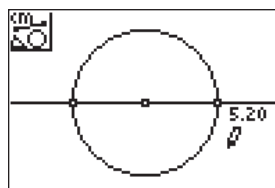
5

To measure the circle's diameter, press GRAPH for F5 and move down and right to select **Measure, D. & Length**. Press ENTER.

6

Move the pencil until one endpoint of the diameter is flashing then press ENTER. Move to the other endpoint of the diameter and when it is flashing, press ENTER. Press + to see the measurement rounded to hundredths. The *hand* is active so you can move the measurement to a convenient location then press ENTER.

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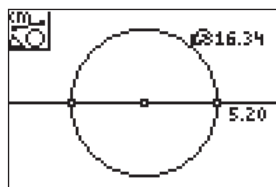
7

The **Measurement** tool is still active so now you can find the circumference of the circle. Move the pencil until the circle is flashing. Press [ENTER] then [+] to see the circumference rounded to hundredths. Move the *hand* until the measurement is in a convenient location. Press [ENTER]. Press [CLEAR] to turn off the measurement tool.
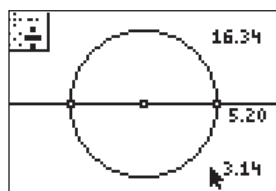
8

Press [GRAPH] for F5 and move down to **Calculate**. Press [ENTER]. Move the arrow until the circumference measurement shows a flashing underline and press [ENTER] then [÷]. Move the arrow until the diameter measurement has a flashing underline and press [ENTER] again. The number displayed is the ratio of the circle's circumference to its diameter.
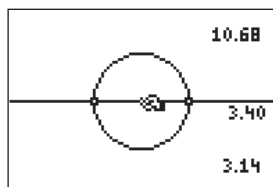
9

To explore this relationship with other circles, press [CLEAR] to turn off the **Calculate** tool. Move the arrow until the point which defined the circle's radius or its center is flashing. Press [ALPHA] to activate the *hand*. Grab the point and move it to change the size of the circle.

To confirm that the ratio is still 3.14, repeat the **Calculate** procedure. (It is actually being recalculated each time the circle changes, but it is impossible to tell this since the number is unchanging.)

10

To exit the APP, press [Y=] for the F1 menu. Move to **Quit**, then press [ENTER]. (Or you can press [2nd] [MODE] for [QUIT].)