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Conics: Circles

Geometry Key Topics: Explore the algebraic properties relating to circles. Equation of a circle, ray, distance, points, coordinates.

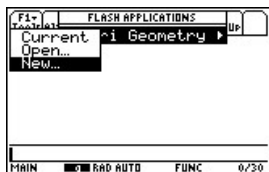
Materials: TI-89 graphing calculator. The following applications: Cabri Geometry. (available for download from www.eduation.ti.com)

Focus: Conic sections were discovered during the classical Greek period. A **Conic section** can be described as the intersection of a plane and a double-napped cone. Imagine the plane running through the cones. The cross sections that are formed is what you will be looking at. You will restrict your study of conics in this lesson to circles

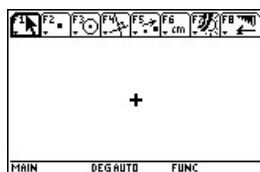
Introduction: In this study of conics you will be examining the derivation of equations for circles. There are two general equations for circles. The first is a circle whose center is at the origin while the second, is a circle with center is not. The students will be able to see both of these equations develop as they move their circle around the plane they have created in Cabri.

Procedure: You will be using the TI-89 and the Cabri Geometry flash application. Cabri Geometry for the TI-89 performs analytic, transformational, and Euclidean geometric functions. It builds geometric constructions interactively with points, lines, polygons, circles, and other basic geometric objects. Capabilities are similar to Cabri Geometry II™ computer software.

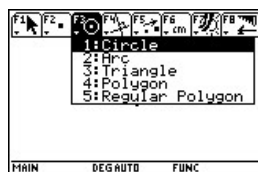
Circle:



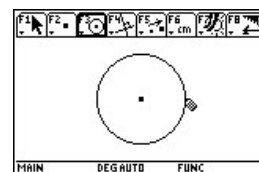
Press APPS and select
Flash Applications
From there select Cabri
Geometry. Select New



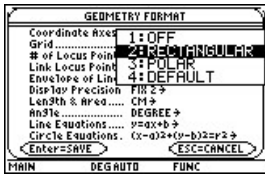
After Pressing ENTER
you will be in the
drawing window



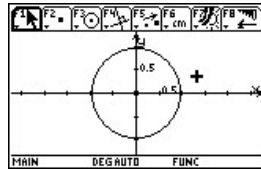
Press F3 and select #1
so you can create a
circle



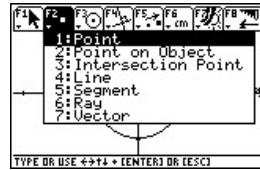
Create your center point
and then use your arrows
to create your circle.
When finished press
ENTER



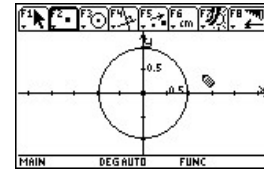
Press F8 and select FORMAT. If your Coordinate Axes is Set to OFF press the Right arrow to display Your choices. Select RECTANGULAR and Press ENTER to finish



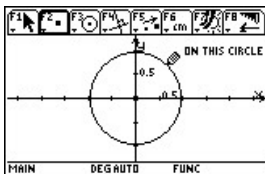
You will return to your previous screen. Now you are able to see your coordinate axes.



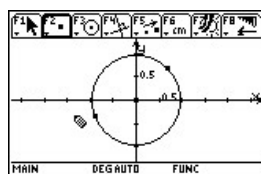
Press F2 and choose POINT. This will allow you place points On the circumference of the circle.



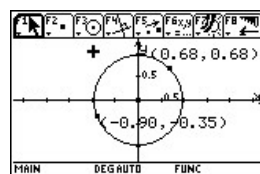
Your pointer will change to a pencil. You are now ready to place your points.



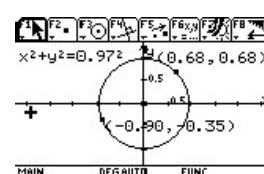
Place your points Anywhere on the circle



Create two points.



Press F6 and choose EQUATIONS COORDINATES. This Will allow you to find the Coordinates of your points



Press F6 again and this time you will use the same choice as before but you will find the equation of the Circle. Do this By placing your pointer On the circle and Press ENTER

1. The above equation is for a circle that has its center at the origin. Press F1 POINTER. Select the center of your circle and move it somewhere else other than the center of origin. What happens to the equation? _____

2. Expand and contract your circle so that it becomes larger or smaller and observe what happens to the equation again. _____ What changes? _____

3. Use the coordinates of the points you were given and use them in place of x and y in the equations. What do you observe each time? _____

Based on what you have observed come up with a definition of what a circle is

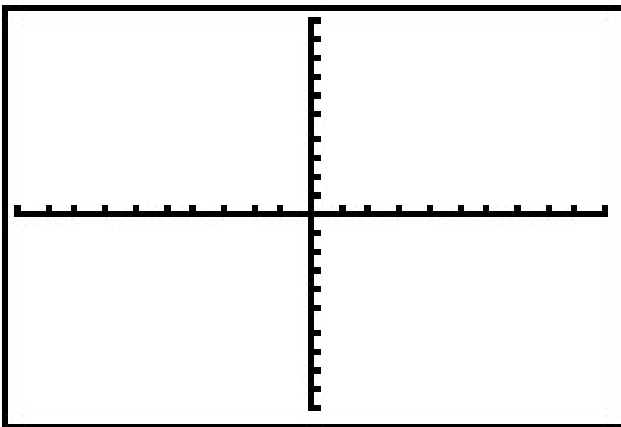
4. Draw a segment from the center of the circle to the points you created on the circumference of the circle. Use the distance tool to measure the length of the segment. How does the result that you found relate to the equation of the circle?

5. Use the distance formula to find the length of the segment. Write the distance formula using the coordinates of the endpoints of the segment you are measuring: _____ After calculating the distance how does your result relate to the distance you were given previously by using the measuring tool in Cabri? _____

6. What relationship do you observe exists between the distance formula and the equation of the circle? _____

7. Use the coordinate planes below and create two circles. Then show the equations that correspond to each one. The first circle should have its center at the point of origin. Make the second circle so that its center is not at the point of origin.

Equation Circle A: _____



Equation Circle B: _____

