



Activity Overview

In this activity, students will discover the equation of circles of the form $(x - h)^2 + (y - k)^2 = r^2$, where (h, k) is the center of the circle and r is the radius of the circle.

Topic: Circles

- Equations of circles

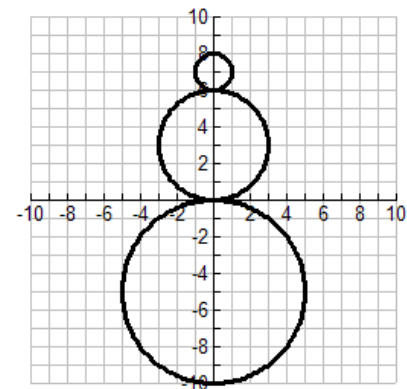
Teacher Preparation and Notes

- This activity was written to be explored with the Cabri™ Jr. app on the TI-84.
- Before beginning the activity, students should transfer the Cabri™ Jr. file **EQCIRC** to their graphing calculators using TI-Connect.
- To download the Cabri™ Jr. file and student worksheet, go to education.ti.com/exchange and enter “12554” in the keyword search box.

Suggested Related Activities

To download any activity listed, go to education.ti.com/exchange and enter the number in the keyword search box.

- Equations of a Circle (TI-Nspire technology) — 12312
- Exploring the Equation of a Circle (TI-84 Plus Family) — 6624
- Circles – Exploring the Equation (TI-84 Plus Family) — 10515



This activity includes screen captures taken from the TI-84 Plus Silver Edition. It is also appropriate for use with the TI-83 Plus and TI-84 Plus but slight variances may be found within the directions.

Compatible Devices:

- TI-84 Plus Family

Software Application:

- Cabri™ Jr.

Associated Materials:

- ExploringCircleEquations_Student.pdf
- ExploringCircleEquations_Student.doc
- EQCIRC.8xv

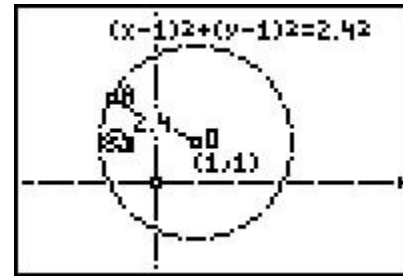
Click [HERE](#) for Graphing Calculator Tutorials.



Problem 1 – Equations of Circles

Students will begin this activity by investigating the equation of a circle by moving the center of the circle. Students will then change the radius of the circle and determine what role the radius plays in the equation of the circle.

When students move the circle or change the radius, the equation will change automatically. To grab the circle, students will need to move their cursor to the circumference of the circle until it starts to blink and then press **[ALPHA]** to grab the circle. They will then use the arrow keys to move the circle. To change the radius, students will grab and move point A.



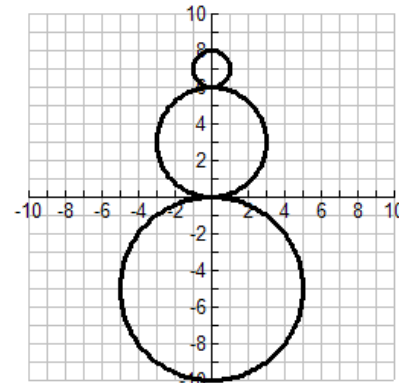
Students will be asked several questions about the equations of circles.

Problem 2 – Circular Designs

Students will apply what they have learned in Problem 1 to find the equations of circles in various designs. For example, the students will find the equation of the three circles shown to the right.

Some image ideas are from “Exploring the Equation of a Circle using Cabri Jr.” by Karen Swan

(<http://stlawcostempartnership.org/wp-content/uploads/lesson-plans/9-exploring-the-equation-key.pdf>).



Problem 3 – Extension

As an extension students are asked to create their own circular designs and find the equation of each circle used to create their designs.

Student Solutions

- | | |
|--|--------------------------------|
| 1. The coordinates of the center (h, k) are of the form $(x - h)^2 + (y - k)^2$ in the equation of the circle. | 7. $x^2 + (y - 2)^2 = 4$ |
| 2. If the radius of the circle is r , then the equation of the circle is equal to r^2 | $x^2 + (y - 3)^2 = 9$ |
| 3. $(x - 1)^2 + (y + 2)^2 = 25$ | $x^2 + (y - 4)^2 = 16$ |
| 4. $(4, 5)$ | $x^2 + (y - 5)^2 = 25$ |
| 5. 6 | 8. $x^2 + (y - 7)^2 = 1$ |
| 6. $(x + 2)^2 + (y - 3)^2 = 1$ | $x^2 + (y - 3)^2 = 9$ |
| $(x - 2)^2 + (y - 3)^2 = 1$ | $x^2 + (y + 5)^2 = 25$ |
| $x^2 + y^2 = 25$ | 9. $(x - 1)^2 + (y - 2)^2 = 4$ |
| | $(x - 1)^2 + (y - 2)^2 = 16$ |
| | $(x - 1)^2 + (y - 2)^2 = 36$ |
| | $(x - 1)^2 + (y - 2)^2 = 64$ |