

Roots of Radical Equations

ID: 12213

Time required
15–20 minutes

Activity Overview

In this activity, students will solve radical equations graphically. Several square and cubic root equations are given for students to graph and find intersections with the x-axis. Students will also use the distance formula to solve an extension problem.

Topic: Radical Equations

- *Roots*
- *Graphing*
- *Distance formula*

Teacher Preparation and Notes

- *Students should know how to find intersection points, graph functions, and find coordinates*
- *For the extension problem, students will need to use the distance formula.*
- ***To download the student and solution TI-Nspire documents (.tns files) and student worksheet, go to education.ti.com/exchange and enter “12213” in the keyword search box.***

Associated Materials

- *RootsOfRadicals_Student.doc*
- *RootsOfRadicals.tns*
- *RootsOfRadicals_Soln.tns*

Suggested Related Activities

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

- *Radical Transformations (TI-Nspire technology) — 11575*
- *Radical Functions (TI-Nspire technology) — 8978*
- *Solving Equations with Two Radicals (TI-Nspire CAS technology) — 8625*

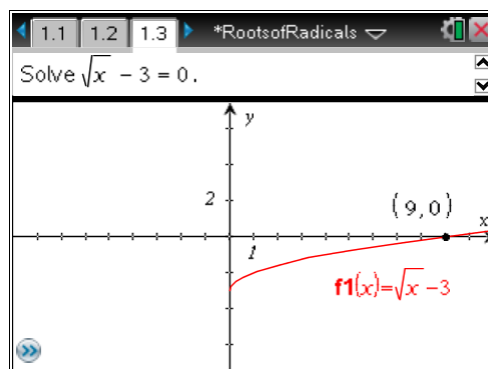
Problem 1 – Square Roots

In this problem, students will graph the square root function given in the equation at the top of the screen. Students will then find the intersection of the graph (if there is one) with the x -axis and find the coordinates of those points to solve the equation.

Students may have to change the window to find the intersection points with the x -axis (**MENU > Window > Window Settings**).

Discussion Questions

- What are the characteristics of an equation that crossed the x -axis? What are the characteristics of an equation that did not cross the x -axis? Why?
- What do you notice about graphs with a negative in front of the radical versus without a negative?

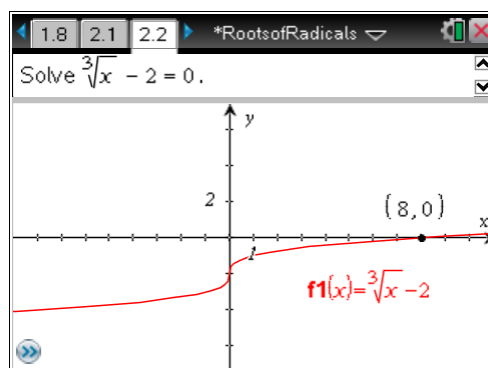
**Problem 2 – Cubic Roots**

In this problem, students will graph the cubic root function given in the equation at the top of the screen. Students will then find the intersection of the graph (if there is one) with the x -axis and find the coordinates of those points to solve the equation.

Students may have to change the window to find the intersection points with the x -axis.

Discussion Questions

- What are the characteristics of an equation that crossed the x -axis? What are the characteristics of an equation that did not cross the x -axis? Why?
- What do you notice about graphs with a negative in front of the radical versus without a negative?



Application – Locating ATMs

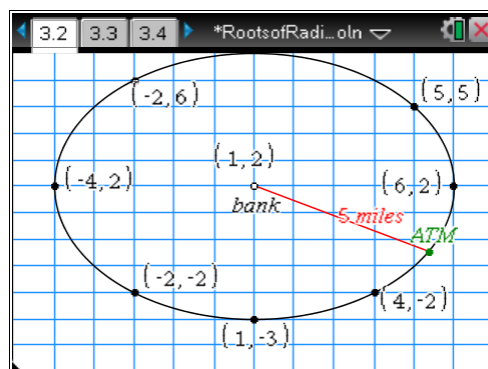
In this problem, students must use the distance formula to find 8 integer locations of an ATM from a bank given as a point on the coordinate plane. The scenario is described and shown as a graph, then the questions are asked. Students should set up a distance formula equation for each question before plotting any points on page 3.2 to solve the problems and find the other value of the coordinate point to place the ATM. All answers should be integer values.

You may wish to draw a circle with radius 5 around the bank to explain why there are two solutions for each given direction.

Another option is to have students write an equation that represents any location of the ATM or bank in order to help students with the equation and then fill in the appropriate information.

Discussion Questions

- What formula can we use to find the location of each ATM?
- What information are we given for each problem to fill into the distance formula?
- Why are there two possible locations for each given direction?



3.2 3.3 3.4 *RootsofRadi...oln

If he installs a machine 3 blocks south, how far east/west should the ATM be?

4 blocks
ATM location: (-3, -1) or (-5, -1)