

## Exploring Quadratic Functions

by – Winnie Miller

### Activity overview

This is an introduction to using the Graphs and Geometry feature. It was originally intended for use by teachers but can also be used for students. Explorations include using the grab and move feature, finding zeros, maximum, minimum and function values.

### Concepts

Use a quadratic function to represent, analyze and solve a variety of problems.

### Teacher preparation

Show students a variety of quadratic functions and the situations they are describing.

### Classroom management tips

Work in pairs or small groups for collaboration and discussion.

### TI-Nspire Applications

Graphs and Geometry

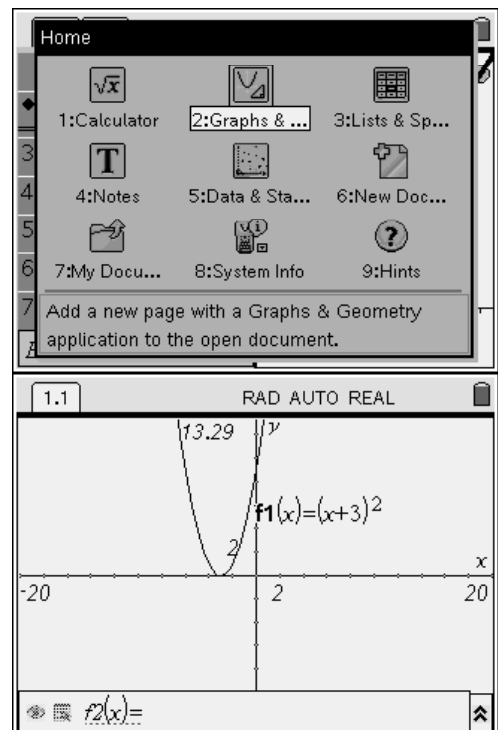
### Step-by-step directions

Press the [Home] key.

Choose 2: Graphs & Geometry

In the entry line, type the function  $(x + 3)^2$ . Press [enter] to see the graph of the parabola.

What is the vertex?



Press [esc] to get to the graph.

Grab and move the vertex of the parabola below the X-axis. To do this, move the active pointer over the vertex. Press **[ctrl]** **[↻]**. Use the NavPad to move it.

Record any observations in how the equation changes as you move the the parabola.

Grab one end of the graph so you can make the parabola wider, narrower and upside down.

Again, notice how the graph's equation changes and record your observations.

Put a point on the graph. Press **[menu]****[6]****[2]**.

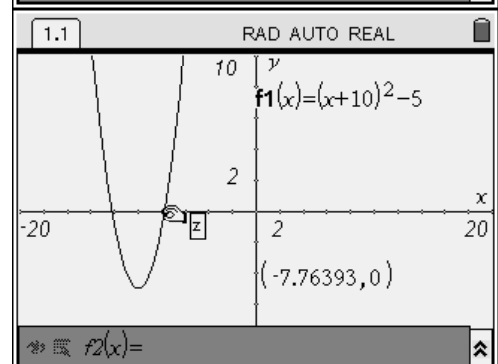
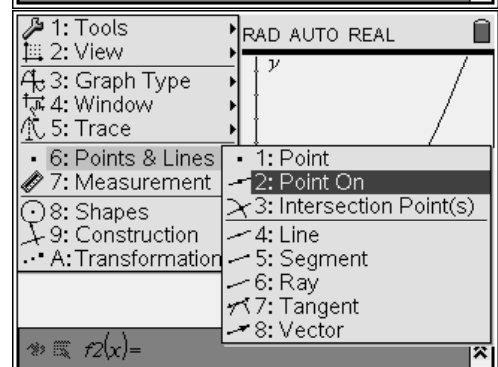
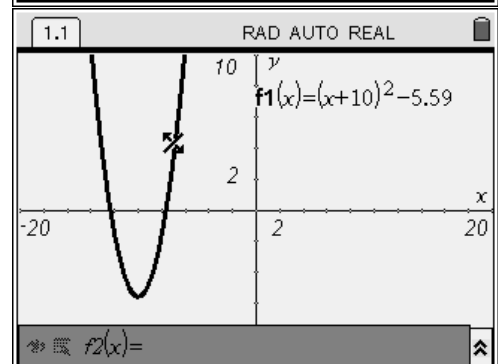
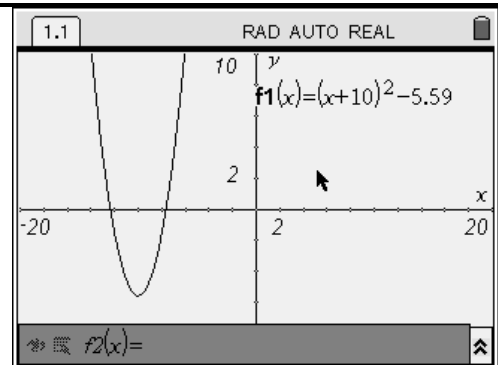
Put the point anywhere on the parabola.

Press [esc] to de-activate the point tool.

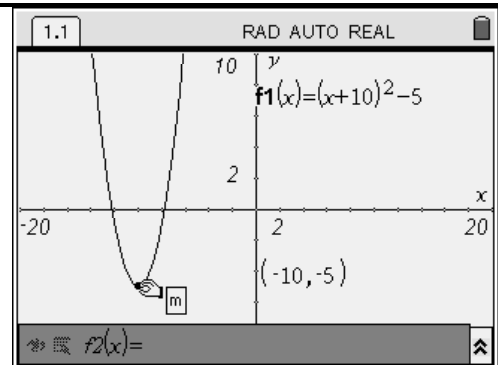
Grab the point and drag it towards the x-intercept. You want to stop at the x-intercept so that the "z" for zero appear.

(Note: If you want to have this same exact graph, hit **[ctrl]** **[i]** **[2]** and type the function in the entry line.)

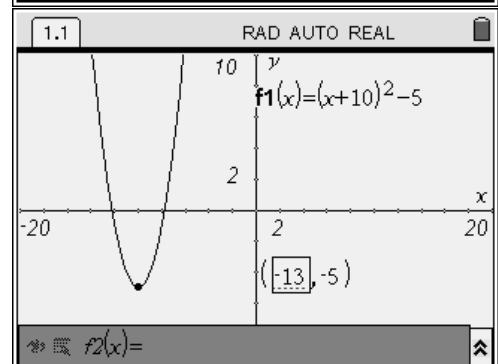
Find and record the other zero.



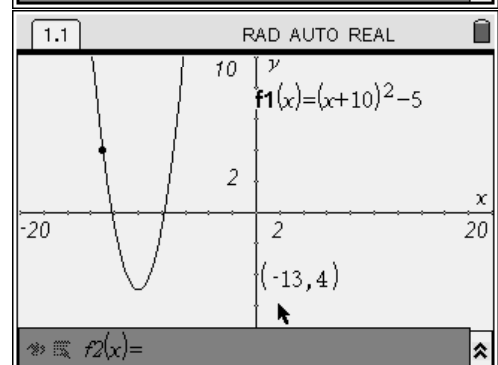
Grab the point and drag it towards the minimum (lowest point) of the parabola. You want to stop at that point so that the “m” for minimum appears.



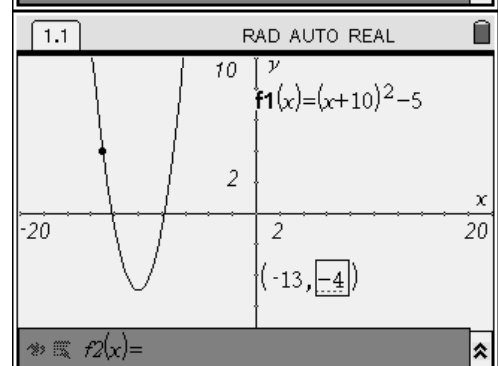
Click twice on the X-coordinate of the point that you placed on the parabola. Erase the number for the x-coordinate and put in a number like -13 in this case (choose an x value that is near the minimum so you will see the point “jump.”).



Press [enter] and watch the point jump from the minimum to the point (-13, 4)



Click twice on the y-coordinate of the point that you placed on the parabola. Erase the number for the y-coordinate and put in a number like -4 in this case (you have a choose a y value that is on the graph so you will see the point “jump.”)



## Exploring Quadratic Functions

by: Winnie Miller  
Grade level: secondary  
Subject: Algebra I  
Time required: 45 to 90 minutes

Materials: TI-Nspire

Press [enter] and watch the point jump from the minimum to the point (-11, -4).

