



# Vertex and Factored Forms of Quadratic Functions

## MATH NSPIRED CREATE ACTIVITY

Name \_\_\_\_\_

Class \_\_\_\_\_

In this activity, you will create a new document with a Graphs application. You will create sliders that can be manipulated to determine the effect of changing the parameters of a quadratic function in vertex form. This activity is written for teachers or students who wish to learn how to incorporate sliders in an activity. The first steps provide a brief introduction to sliders, followed by how to change a slider's settings. The same steps may be followed to create sliders for parameters  $a$ ,  $r$ , and  $s$  for a quadratic function in factored form. The directions provided are for the handheld. If using the computer software, directions may vary slightly.

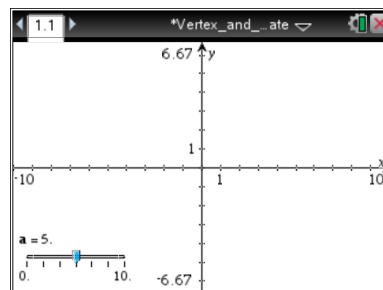
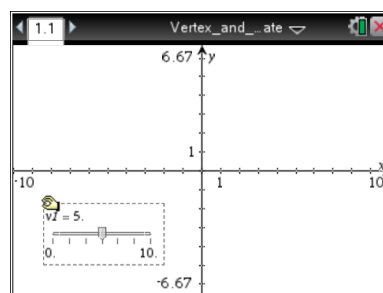
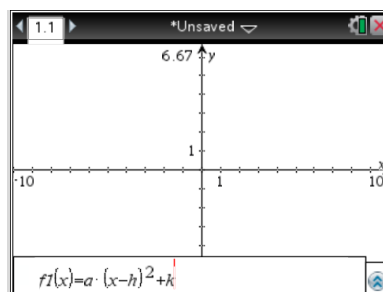
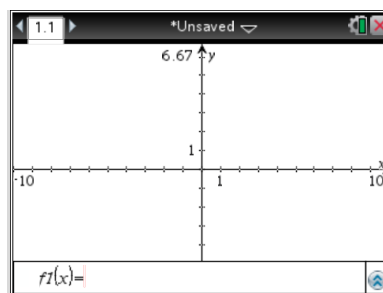
### Steps:

1. Select **on** > **New Document** > **Add Graphs**.
2. In the function entry line, enter the equation  $f1(x) = a \cdot (x - h)^2 + k$ . Notice the multiplication symbol between the  $a$  and the parenthesis.

When you press **enter**, there will not be a graph shown since  $a$ ,  $h$ , and  $k$  have not been defined.

3. To save the document, press **ctrl** **on** and name the document, and then save it in the folder as directed by your teacher. Press **tab** **save**.  
As you progress through this activity, remember that **ctrl** **esc** will undo your previous entry.
4. To insert a slider, press **menu** > **Actions** > **Insert Slider**.  
Note that there is a "closed hand" attached to the slider. Using the Touchpad, move the slider to a convenient location on the screen, and press **enter**.

5. The slider will appear with the variable  $v1$  highlighted. Type  $a$  to change the variable from  $v1$  to  $a$ , and press **enter**.





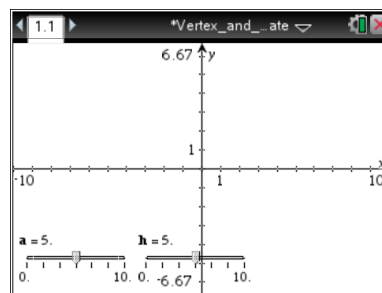
# Vertex and Factored Forms of Quadratic Functions

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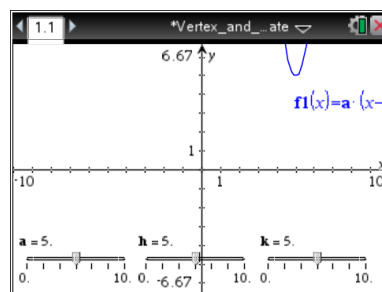
Name \_\_\_\_\_

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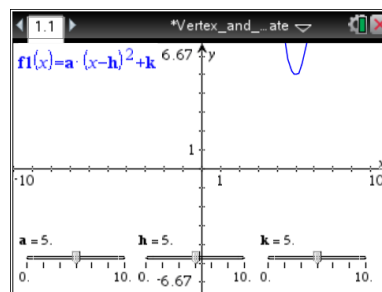
6. Insert another slider, and move this slider next to the first slider. Define the second variable as  $h$ .



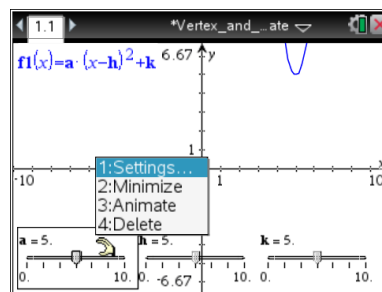
7. Insert a third slider, move the slider to the desired location, and define the third variable as  $k$ . As soon as the third slider has been added, the parabola  $f1(x) = 5(x-5)^2 + 5$  will be graphed. The function label  $f1(x) = a \cdot (x-h)^2 + k$  appears near the graph.



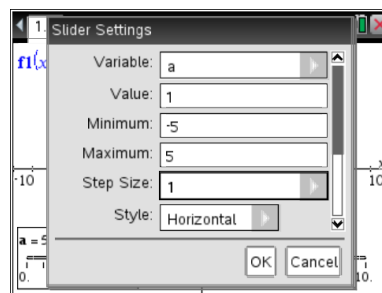
8. Move the function label. First, move the cursor to the label, and press **ctrl** to grab the label. Use the Touchpad to move the label to the desired location, and press **enter**.



9. To change the settings of a slider, click on the slider so that a solid rectangle is formed around the slider. Then, with the cursor over the slider, press **ctrl** **menu** to display the slider menu.



10. Select **Settings** to determine the starting value of  $a$ , the minimum and maximum values, as well as the step size. Tab through the various settings. For this activity, the settings shown in the screen capture on the right have been chosen for parameter  $a$ .





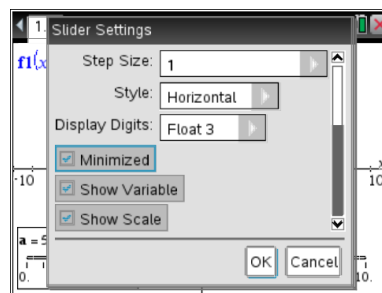
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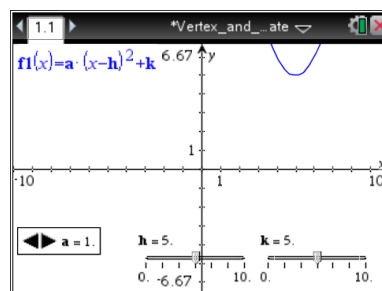
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11. If **Minimized** is selected in the Slider Settings or from the menu, the slider can be minimized.

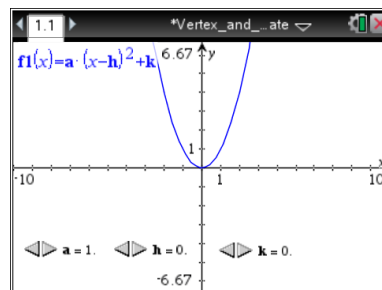


The slider for parameter  $a$  has been minimized. Select whichever style you prefer. Note that sliders may be vertical or horizontal.



12. Change the slider setting for  $h$  and  $k$ . Set  $h = 0$  and  $k = 0$ , enter minimum and maximum values of  $-5$  and  $5$ , respectively, and enter a step size of  $1$ . Minimize the sliders, if desired.

Save the document.



13. As you click the arrow keys of a minimized slider to change the slider value, the value of the associated parameter changes, and the graph of the parabola changes.

Note: When a slider is selected (a solid rectangle is formed around the slider), the value of the parameter can be controlled by the Touchpad arrow keys. To change the slider value for a slider that is not minimized, click on the slider to select it, and use the arrow keys of the Touchpad to change the slider values. Alternatively, grab and drag the slider controller to change the value of the slider.

