



How to Do Page 179 #27 Using *The Geometer's Sketchpad*®

Use *The Geometer's Sketchpad*® to create sliders for a , b , and c to investigate how each variable affects the graph of a quadratic function.

1. Click on Custom Tool . Select sliders and select Basic Horizontal. If the sliders tool is not listed on the menu, copy the sliders tool from the folder *Sketchpad/Samples/Custom Tools* into the folder *Sketchpad/Tool Folder*. These folders will be found in the same location that you have saved the program *The Geometer's Sketchpad*®.
 - Click on the background screen to create a line segment (slider) and the cursor's location.
 - Move your cursor to another location and click again to produce a second slider, and then a third slider.
 - Click on the selection tool , and then individually select line segments and measurement lengths, so you can move the objects to a convenient location. There will be three sliders labelled a and three action buttons that allow you to quickly return each slider a value of 1. See Figure 1.

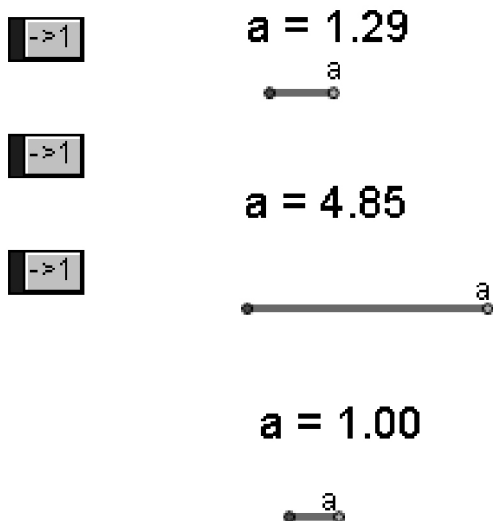



Figure 1

2. Rename the sliders.
 - Click on the text tool  and double-click on one of the points labelled a .
 - Change its label to b .
 - Double-click on the corresponding slider's measured length and change its label to b .
 - Change the label of one of the remaining sliders to c . See Figure 2.



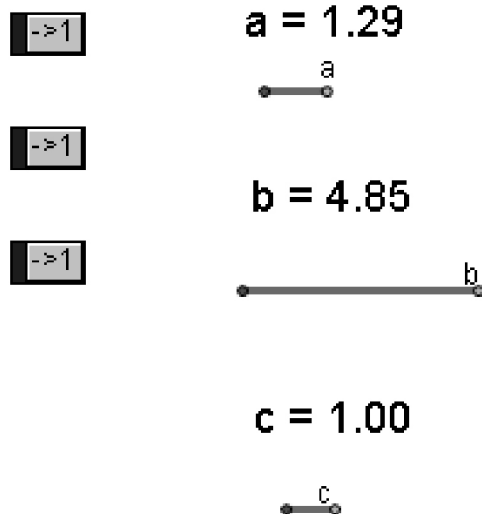


Figure 2

3. Create and graph a quadratic function.

- Using the selection tool, select the three measured lengths.
- Click Graph; select New Function.
- Click Values and choose a . Then, press $*$ x $^$ 2 $+$.
- Click Values and choose b . Press $*$ x $+$ and then Values and choose c . This will create the following equation which can be moved to a convenient location on the screen.

$$f(x) = a \cdot x^2 + b \cdot x + c$$

- With the equation highlighted, click Graph and choose Plot Function. This will create a coordinate grid and plot the function as shown in Figure 3.
- Use the sliders to explore how the function changes for different values of a , b , and c .

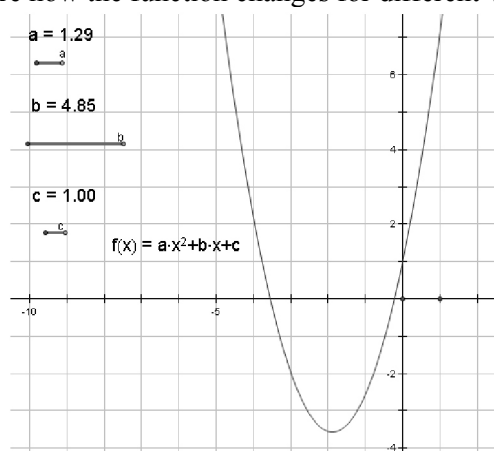


Figure 3

