

In this Geometric Functions activity you will investigate relationships between variables, decide how to distinguish functions from non-functions, and define the term *function*.

VARY THE VARIABLES

Begin by varying independent variables and observing how several functions behave.

1. Open **ID the Suspects.gsp**. Look at the Learning Goal and then go to page 1.
2. Use the Arrow tool  to try to drag each point on page 1. You can drag some points but not others. The points you can drag are *independent*. The ones that move only when you drag another point are *dependent*.

Q1 Drag points to determine which ones are related. Then list the independent and dependent points, and describe the relationship: what's the relative speed and direction of the variables? At what locations do they come together with each other? (These locations are called *fixed points*.)

(Some independent points may control more than one dependent point, while some may not control any dependent point at all.)

Independent Variable	Dependent Variable(s)	Relationship
→		
→		
→		
→		
→		

Q2 On page 2, drag the independent variables. How is the behavior of the function ($x \rightarrow x'$) different from that of the non-function ($y \rightarrow y'$)?

Q3 On page 3, drag the independent variables. How is the behavior of the function ($b \rightarrow b'$) different from that of the non-function ($a \rightarrow a'$)?

Q4 On pages 4 through 11, list the function and the non-function. For each page, write observations you make or questions you have about the relationships.

On pages 9–11, you will see only the variables. The arrows on earlier pages may help you make connections, but remember that the important thing is the behavior of the variables.

Page	Function	Non-function	Observations and Questions
4			
5			
6			
7			
8			
9			
10			
11			

Q5 Based on the examples and non-examples of functions on pages 2 through 11, write a definition of a function in your own words. In your description, use the terms

“independent variable” and “dependent variable” rather than “independent point” and “dependent point.” Use complete sentences for your definition.

EXPLORE MORE

You can use pages 12 and 13 to make your own functions and non-functions .

3. On page 12, follow the directions to reflect both independent variables. Then, translate one of the independent variables. Next, adjust the translation to match the reflection, so that both sides look like functions until the independent variables are dragged.
4. On page 13, use other transformations to make a similar challenge for your partner. For tips on using transformations, choose **Help | Using Sketchpad | Sketchpad Tips | Transform** and then click the  icon for **Translate, Rotate, Dilate, or Reflect**. (Don't click the  icon unless you have headphones.)