# Family Resemblances          Name(s):

In this activity you will investigate *families of functions*. Functions from the same family behave similarly. Functions from different families behave differently.

## INVESTIGATE FUNCTION BEHAVIOR

1. Go to [geometricfunctions.org/links/identify-families](geometricfunctions.org/links/identify-families). Read the Learning Goal.

2. Go to page 2. This page contains four functions. Try to drag each point.

**Q1** How do the labels of the points help you determine which points are independent variables and which are dependent variables?

**Q2** How do the labels help you determine which dependent variable is related to each independent variable?

3. Turn on tracing. Then drag each independent variable to make a small shape such as a triangle or a curved figure.
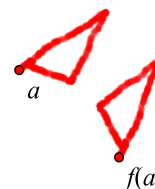
**Q3** Describe how each function behaves, based on the shapes. Circle the name of the function that's different.
Write complete sentences. Use a separate sheet if you need more room.

| Function | Behavior |
|----------|----------|
| *f* | |
| *g* | |
| *h* | |
| *j* | |

4. On page 3, turn on tracing and drag the independent variables.
You may have to drag farther on this page to see the differences.

**Q4** Which function behaves differently? Describe the behavior of the three similar functions, and tell how the other function behaves differently.

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5. On page 4, turn on tracing and drag the input variables. For each function, try to drag the independent variable to bring the input and output variables together in the same location. (Such a location is called a *fixed point* of the function.)

**Q5** Which function is different? Use the fixed points to describe how three functions are similar and the fourth is different.

6. Trace the functions on page 5. For each function, drag the input variable in a straight line and notice the direction of the output variable.

**Q6** Which function is different? Use the relative directions of the traces to describe the similarities and differences.

7. Trace the functions on page 6. For each function, drag the input variable in a straight line and notice the speed of the output variable.

   You can use the lengths of the traces to help judge the relative speeds of the variables.

**Q7** Which function is different? Use the relative speeds of the traces to describe the similarities and differences.

**Q8** For pages 7. 8, and 9, identify the function that's different in the Fn column, and describe how it's different.

| Page | Fn | Describe the difference |
|:---:|:---:|:---|
| 7 | | |
| 8 | | |
| 9 | | |

**Q9** For pages 10, 11, and 12, drag the pictures. Then identify the function that's different, and describe how it's different.

On p. 9, identify the different function by its letter. On pp. 10–11, name the animal or the shape.

| Page | Different Function | Describe the difference |
|:---:|:---:|:---|
| 10 | | |
| 11 | | |
| 12 | | |