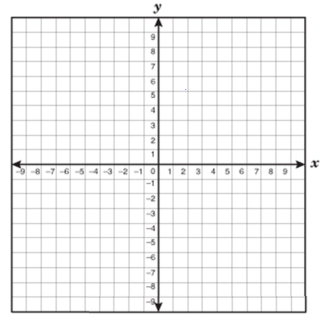
|  |
| --- |
| In this activity you will discover the graphical connection between and the functions of the form:   * , *c* is a constant * , *d* is a constant * is a constant and a > 0 * is a constant and k > 0 |



**Investigation: Type**

1. a. Sketch the graph of

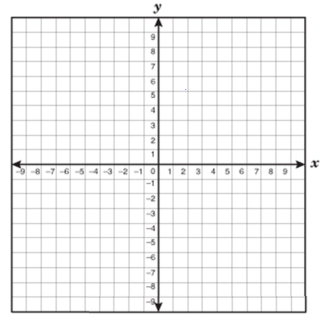
b. On the same set of axes sketch the graphs of

c. If is transformed to , where *c* is a constant, describe the transformation:

* if c > 0, then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* if c < 0, then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Any point (x, y) under this transformation becomes ( , )

2. Using the pattern you discovered in 1c, sketch on the same set of axes for each of the following functions:

|  |  |
| --- | --- |
| a. | b. |
|  |  |

**Investigation: Type**

1. a. Sketch the graph of

b. On the same set of axes sketch the graphs of

c. If is transformed to , where *d* is a constant, describe the transformation:

* if d > 0, then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* if d < 0, then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Any point (x, y) under this transformation becomes ( , )

2. Using the pattern you discovered in 1c, sketch on the same set of axes for each of the following functions:

|  |  |
| --- | --- |
| a. | b. |
|  |  |

**Try**. State the transformations for:

**COMMUNICATION**

When a function is translated, we use key words such as translate (shift), units, up or down.

For example, the parent function has been shifted 2 units right and 1 unit up.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Horizontal & Vertical Translation Practice**

1. Each of the following graphs show a shift of the function *f*  that has formula .

Describe the shifts involved to obtain the function *g.*

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| --- |
|  |
|  |

2. Consider the graph of *f* given in **Figures 2 to 7.** For the shifts given underneath the figures, **state** if they represent a horizontal or a vertical shift, and then sketch this shift on the axis provided.

|  |
| --- |
|  |
|  |

**SUMMARY**

In general, if *f* is a function and c is constant, then the graph of

|  |  |
| --- | --- |
| is the graph of shifted  - **vertically** upwards if c > 0  - **vertically** downwards if c < 0.  *This is called an OUTSIDE CHANGE* | is the graph of shifted  *-* **horizontally** to the left if h > 0  *-* **horizontally** to the right if h < 0  *This is called an INSIDE CHANGE* |