Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_HWK Transformations of Basic Functions Hour\_\_\_\_\_\_

General function transformation rules

Let f(x) be some function, then determine what you think that each of the following transformations does.

|  |  |  |  |
| --- | --- | --- | --- |
| If you add a constant to a function,  Then | If you subtract a constant from a function,  Then | If you subtract a number from each of the input of a function,  Then | If you add a number to each of the input of a function,  Then |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| This is   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | -2 | -1 | 0 | 1 | 2 | | f(x) | -8 | -1 | 0 | 1 | 8 | | Sketch  and complete the table below.     |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | -2 | -1 | 0 | 1 | 2 | | j(x) |  |  |  |  |  | | Sketch  and complete the table below.     |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | -2 | -1 | 0 | 1 | 2 | | k(x) |  |  |  |  |  | |

Answer these questions based on your sketches and your tables.

is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ translation (horizontal/vertical) because it moved its point of inflection and all its other points \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (horizontally/vertically)

is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ translation (horizontal/vertical) because it moved its point of inflection and all its other points \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (horizontally/vertically)

|  |  |  |  |
| --- | --- | --- | --- |
| State the new point of inflection.  (\_\_\_\_\_, \_\_\_\_\_)  State the new y intercept.  (\_\_\_\_\_, \_\_\_\_\_) | State the new point of inflection.  (\_\_\_\_\_, \_\_\_\_\_)  State the new y intercept.  (\_\_\_\_\_, \_\_\_\_\_) | State the new point of inflection.  (\_\_\_\_\_, \_\_\_\_\_)  State the new y intercept.  (\_\_\_\_\_, \_\_\_\_\_) | State the new point of inflection.  (\_\_\_\_\_, \_\_\_\_\_)  State the new y intercept.  (\_\_\_\_\_, \_\_\_\_\_) |

Let f(x) be some function, then determine what you think that each of the following transformations does.

|  |  |  |  |
| --- | --- | --- | --- |
| If you add a constant to a function and add a number to each of the input of a function,  Then | If you subtract a constant from a function and subtract a number from each of the input of a function,  Then | If you subtract a number from each of the input of a function and subtract a constant from the function,  Then | If you add a number to each of the input of a function and subtract a constant from the function,  Then |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| This is   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | -2 | -1 | 0 | 1 | 2 | | f(x) | 2 | 1 | 0 | 1 | 2 | | Sketch  and complete the table below.     |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | -2 | -1 | 0 | 1 | 2 | | g(x) |  |  |  |  |  | | Sketch  and complete the table below.     |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | -2 | -1 | 0 | 1 | 2 | | p(x) |  |  |  |  |  | |

Answer these questions based on your sketches and your tables.

shifted its points \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_its vertex is located at \_\_\_\_\_\_\_\_\_

shifted its points \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_ its vertex is located at \_\_\_\_\_\_\_\_\_

shifted its points \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_ its vertex is located at \_\_\_\_\_\_\_\_\_

shifted its points \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_ its vertex is located at \_\_\_\_\_\_\_\_\_

Use the ZERO feature on the TI Nspire to find the x intercepts of each of the functions or state why this is impossible.

|  |  |  |  |
| --- | --- | --- | --- |
| State the x intercepts of | State the x intercepts of | State the x intercepts of | State the x intercepts of |

Let f(x) be some function, then determine what you think that each of the following transformations does.

|  |  |  |  |
| --- | --- | --- | --- |
| If you multiply a function by -1,  Then | If you multiply a function’s input by -1,  Then | If you multiply a function by a positive number between 0 and 1,  Then | If you multiply a function by a negative number that is smaller than -1,  Then |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| This is   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | -4 | -1 | 0 | 1 | 4 | | f(x) | und | und | 0 | 1 | 2 | | Sketch  and complete the table below.     |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | -4 | -1 | 0 | 1 | 4 | | g(x) |  |  |  |  |  | | Sketch  and complete the table below.     |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | -4 | -1 | 0 | 1 | 4 | | k(x) |  |  |  |  |  | |

Answer these questions based on your sketches and your tables.

Use these words:  **vertically stretched, vertically compressed, vertically reflected, or horizontally reflected.**

If we multiply a function by a number between 0 and 1, then the function is said to have been \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If we multiply a function by a number between -1 and 0, then the function is said to have been \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If we multiply a function by a number greater than 1, then the function is said to have been \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If we multiply a function by a number less than -1, then the function is said to have been \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ &\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If we multiply a function by ANY negative number, then the function is said to have been \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

SPECIAL CASE

If we multiply a function’s input values by -1, then the function is said to have been \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Sketch each of the following transformations and label each of the following when present:

(vertex, vertical asymptote, horizontal asymptote, point of inflection, local extreme, y intercept, or x intercept)

* Circle the types of transformations present.

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | Translations | Shift LEFT | Shift RIGHT | Shift UP | Shift DOWN | | Reflection | Horizontal | Vertical | NO Reflection | | | Stretch | Horizontal | Vertical | NO Stretch | | | Compression | Horizontal | Vertical | NO Compression | | | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Translations | Shift LEFT | Shift RIGHT | Shift UP | Shift DOWN | | Reflection | Horizontal | Vertical | NO Reflection | | | Stretch | Horizontal | Vertical | NO Stretch | | | Compression | Horizontal | Vertical | NO Compression | | |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | Translations | Shift LEFT | Shift RIGHT | Shift UP | Shift DOWN | | Reflection | Horizontal | Vertical | NO Reflection | | | Stretch | Horizontal | Vertical | NO Stretch | | | Compression | Horizontal | Vertical | NO Compression | | | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Translations | Shift LEFT | Shift RIGHT | Shift UP | Shift DOWN | | Reflection | Horizontal | Vertical | NO Reflection | | | Stretch | Horizontal | Vertical | NO Stretch | | | Compression | Horizontal | Vertical | NO Compression | | |