**Activity 1.7.2 Inverses of Power Functions**

In this activity we will explore the behavior of inverse functions. We will start with the function and will consider only positive inputs.

1. Complete the table of values below for the function .

|  |  |
| --- | --- |
| Input, *x* | Output, |
| 0 |  |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |

1. Based on your table from Question 1, find the table for the inverse of . (Use the procedure that was introduced in Activity 1.6.1).

|  |  |
| --- | --- |
| Input | Output |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

1. Does the table in Question 2 represent a function? Explain why or why not.
2. Sketch a graph of the function and the inverse on the coordinate plane below.



Now let’s consider the function .

1. Complete the table of values below for the function .

|  |  |
| --- | --- |
| Input, *x* | Output, |
| 0 |  |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |

1. Based on your table from Question 5, find the table for the inverse of .

|  |  |
| --- | --- |
| Input | Output |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

1. Does the table in Question 6 represent a function? Explain why or why not.
2. Sketch a graph of the function and the inverse on the coordinate plane below.



In Questions 1 – 8, you used only positive values for inputs. What happens if you use negative values? Let’s repeat Questions 1 – 8 but using negative values as inputs.

1. Complete the table of values below for the function .

|  |  |
| --- | --- |
| Input, *x* | Output, |
| -4 |  |
| -3 |  |
| -2 |  |
| -1 |  |
| 0 |  |

1. Based on your table from Question 9, find the table for the inverse of . (Use the procedure that was introduced in Activity 1.6.1).

|  |  |
| --- | --- |
| Input | Output |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

1. Does the table in Question 10 represent a function? Explain why or why not.
2. Sketch a graph of the function and the inverse on the coordinate plane below.



Now let’s consider negative inputs for the function .

1. Complete the table of values below for the function .

|  |  |
| --- | --- |
| Input, *x* | Output, |
| -4 |  |
| -3 |  |
| -2 |  |
| -1 |  |
| 0 |  |

1. Based on your table from Question 13, find the table for the inverse of .

|  |  |
| --- | --- |
| Input | Output |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

1. Does the table in Question 14 represent a function? Explain why or why not.
2. Sketch a graph of the function and the inverse on the coordinate plane below.



Let’s now put this all together.

1. Look at your tables and graphs from Questions 1 – 4 and 9 – 12. Does the function have an inverse if we allow both positive and negative inputs? Explain why or why not.
2. Look at your tables and graphs from Questions 5 – 8 and 13 – 16. Does the function have an inverse if we allow both positive and negative inputs? Explain why or why not.
3. If we restrict the domain of to *x* ≥ 0, then there is an inverse for Write a formula for the inverse function:

1. There is an inverse for the function with no restriction on the domain. Write a formula for the inverse function: