**Activity 2.1.1a Move It! Part Two**

During Unit 2, we will be exploring the transformations that can be imposed upon quadratic functions. Understanding, not memorizing, what graphical changes happen will be a key to understanding transformations on all families of functions as discussed in Unit 1.

In an effort to build a quality hand construction of a quadratic, one should have at least 5 pairs of coordinate values. First, we will start with the parent function, .

1. Parent Function:

Using a graphing utility, generate a table of values for the quadratic parent function. After you have completed the given table below, graph your points.

Window settings: Xmin = –10, Xmax = 10, Ymin = –10, Ymax = 10 (note: this is zoom 6)



|  |  |
| --- | --- |
|  | |
| *x* | *y* |
| –3 |  |
| –2 |  |
| 0 |  |
| 2 |  |
| 3 |  |

1. At this moment, you should note the symmetry of the parabola. As you move equidistantly along the *x*-axis away from the vertex the output values are identical. That is, for inputs 3 and -3,  and  the output values for *y* are both \_\_\_\_\_\_\_\_\_.
2. The graph you have drawn has symmetry with respect to a vertical line.
3. Draw a dotted line on the graph to highlight this symmetry.
4. What is the equation of this line?
5. Where *k* is “outside” of the function

Using a graphing utility, create a table of values for the 4 given values of k. Then plot your values and draw a smooth curve to approximate the transformed quadratic function. On each graph, include the graph of the parent function. Label the two functions on your graph and respectively.

|  |  |
| --- | --- |
|  | |
| *x* | *y* |
| –3 |  |
| –2 |  |
| 0 |  |
| 2 |  |
| 3 |  |

|  |  |
| --- | --- |
|  | |
| *x* | *y* |
| –3 |  |
| –2 |  |
| 0 |  |
| 2 |  |
| 3 |  |

 

|  |  |
| --- | --- |
|  | |
| *x* | *y* |
| –3 |  |
| –2 |  |
| 0 |  |
| 2 |  |
| 3 |  |

|  |  |
| --- | --- |
|  | |
| *x* | *y* |
| –3 |  |
| –2 |  |
| 0 |  |
| 2 |  |
| 3 |  |

 

1. What do all of the transformations have in common?

Using a graphing utility, create a table of values for the 4 given values of *k*. Then plot your values and draw a smooth curve to approximate the transformed quadratic function. On each graph, include the graph of the parent function. Label the two functions on your graph  and  respectively.

|  |  |
| --- | --- |
|  | |
| *x* | *y* |
| –3 |  |
| –2 |  |
| 0 |  |
| 2 |  |
| 3 |  |

|  |  |
| --- | --- |
|  | |
| *x* | *y* |
| –3 |  |
| –2 |  |
| 0 |  |
| 2 |  |
| 3 |  |

 

|  |  |
| --- | --- |
|  | |
| *x* | *y* |
| –3 |  |
| –2 |  |
| 0 |  |
| 2 |  |
| 3 |  |

|  |  |
| --- | --- |
|  | |
| *x* | *y* |
| –3 |  |
| –2 |  |
| 0 |  |
| 2 |  |
| 3 |  |



1. What do all of the transformations in Question 6 have in common?
2. As a general rule, what can you say about the effect on the parabola for given values of *k* when *k* is a value producing an outside change and *k* is added or subtracted?
3. Where *k* is “inside” of the function

Using a graphing utility, create a table of values for the 4 given values of k. Then plot your values and draw a smooth curve to approximate the transformed quadratic function. On each graph, include the graph of the parent function. Label the two functions on your graph  and  respectively.

|  |  |
| --- | --- |
|  | |
| *x* | *y* |
| –5 |  |
| –4 |  |
| –2 |  |
| 0 |  |
| 1 |  |

|  |  |
| --- | --- |
|  | |
| *x* | *y* |
| –4 |  |
| –3 |  |
| –1 |  |
| 1 |  |
| 2 |  |



|  |  |
| --- | --- |
|  | |
| *x* | *y* |
| –7 |  |
| –6 |  |
| –4 |  |
| –2 |  |
| –1 |  |

|  |  |
| --- | --- |
|  | |
| *x* | *y* |
| –6 |  |
| –5 |  |
| –3 |  |
| –1 |  |
| 0 |  |

1. What do all of the transformations in Question 9 have in common?

Using a graphing utility, create a table of values for the 4 given values of k. Then plot your values and draw a smooth curve to approximate the transformed quadratic function. On each graph, include the graph of the parent function. Label the two functions on your graph  and  respectively.

|  |  |
| --- | --- |
|  | |
| *x* | *y* |
| –1 |  |
| 0 |  |
| 2 |  |
| 4 |  |
| 5 |  |

|  |  |
| --- | --- |
|  | |
| *x* | *y* |
| –2 |  |
| –1 |  |
| 1 |  |
| 3 |  |
| 4 |  |



|  |  |
| --- | --- |
|  | |
| *x* | *y* |
| 1 |  |
| 2 |  |
| 4 |  |
| 6 |  |
| 7 |  |

|  |  |
| --- | --- |
|  | |
| *x* | *y* |
| 0 |  |
| 1 |  |
| 3 |  |
| 5 |  |
| 6 |  |



1. What do all of the transformations in Question 11 have in common?
2. As a general rule, what can you say about the effect on the parabola for given values of *k* when *k* is a value producing an inside change through addition or subtraction?