**Graphing Quadratic Functions in Vertex Form**

The vertex form of a quadratic function provides clues that help you identify important values of the function. In this activity, you will use equations, tables and graphs to investigate these key values.

1. Without graphing, make a prediction about the line of symmetry and the vertex of the following quadratic functions:

$f\left(x\right)=3\left(x-5\right)^{2}+4$ $g\left(x\right)=-2\left(x-4\right)^{2}+8$ $h\left(x\right)=\left(x+8\right)^{2}-3$

Line of symmetry\_\_\_\_\_\_\_\_\_\_\_ Line of symmetry\_\_\_\_\_\_\_\_\_\_\_ Line of symmetry\_\_\_\_\_\_\_\_\_\_\_

Vertex\_\_\_\_\_\_\_\_\_\_ Vertex\_\_\_\_\_\_\_\_\_\_ Vertex\_\_\_\_\_\_\_\_\_\_

Write a few sentences to support the reasoning behind your choices.

1. Now, create a table and graph of the quadratic functions below to check your predictions.
2. $f\left(x\right)=3\left(x-5\right)^{2}+4$

|  |  |
| --- | --- |
| *x* | *f*(*x*) |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

1. $g\left(x\right)=-2\left(x-4\right)^{2}+8$

|  |  |
| --- | --- |
| *x* | *g*(*x*) |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

1. Make a conjecture about the relationship between the numbers in the equation and the coordinate of the vertex.

The vertex form of a quadratic function is $f\left(x\right)=a\left(x-h\right)^{2}+k$, where *a*, *h*, and *k* are parameters that affect the shape of the parabola.

1. Use your graphing calculator to manipulate the values of *a*, *h*, and *k*. Make observations about how each parameter affects the graph of the quadratic function.
2. The parameter *a* affects the graph by…
3. The parameter *h* affects the graph by…
4. The parameter *k* affects the graph by…