**Warmup Question:** Graph y = x2.

|  |  |
| --- | --- |
| ***Table of Values*** | |
| *x* | ***y*** *= x2* |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

**Graphing Quadratic Equations:**

* we call any equation with a squared variable (x2, for example) a quadratic equation
* quadratic equations can be written in the following way: ***y = a(x – p)2 + q***
  + where **a**, **p**, and **q** are called **parameters**

**Parameters 🡪 ‘*a’***

* to determine what the parameter ‘a’ does, graph the following on the same set of axes:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| о y = x2 | | о y = 3x2 | | о y = ½x2 | | о y = -2x2 | |
|  | |  | |  | |  | |
| ***Table of Values*** | | ***Table of Values*** | | ***Table of Values*** | | ***Table of Values*** | |
| *x* | *y = x2* | *x* | *y = 3x2* | *x* | *y = ½x2* | *x* | *y = -2x2* |
| *-2* |  | *-2* |  | *-2* |  | *-2* |  |
| *-1* |  | *-1* |  | *-1* |  | *-1* |  |
| *0* |  | *0* |  | *0* |  | *0* |  |
| *1* |  | *1* |  | *1* |  | *1* |  |
| *2* |  | *2* |  | *2* |  | *2* |  |



***What does ‘a’ do?***

**Parameters 🡪 ‘q*’***

* to determine what the parameter ‘q’ does, graph the following on the same set of axes:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| о y = x2 | | о y = x2 + 3 | | о y = x2 - 2 | | о y = ½x2 - 4 | |
|  | |  | |  | |  | |
| ***Table of Values*** | | ***Table of Values*** | | ***Table of Values*** | | ***Table of Values*** | |
| *x* | *y = x2* | *x* | y = x2 + 5 | *x* | y = x2 - 10 | *x* | y = ½x2 - 4 |
| *-2* |  | *-2* |  | *-2* |  | *-2* |  |
| *-1* |  | *-1* |  | *-1* |  | *-1* |  |
| *0* |  | *0* |  | *0* |  | *0* |  |
| *1* |  | *1* |  | *1* |  | *1* |  |
| *2* |  | *2* |  | *2* |  | *2* |  |



***What does ‘q’ do?***

**Example 1:** Determine the vertex, all intercepts, the equation of the axis of symmetry, the domain, and the range of the following quadratic equation: ***y = ½x2 –8***.

**Example 2:** Determine the vertex, all intercepts, the equation of the axis of symmetry, the domain, and the range of the following quadratic equation: ***y = -3x2 + 7***.

**Example 3:** Write an equation for a parabola with vertex of (0, 3) that passes through the point (4, -13).

**Example 4:** Find the values of ***a*** and ***q*** that are necessary to make the graph of ***y = ax2 + q*** go through the points **(3, -10)** and **(-1, -2).**