**Remember:**

* 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’ and ‘q’***

***What does ‘q’ do?***

***What does ‘a’ do?***

**Parameters 🡪 ‘p*’***

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  | |  | |  | |
| ***Table of Values*** | | ***Table of Values*** | | ***Table of Values*** | | ***Table of Values*** | |
| *x* | *y = x2* | *x* | y = (x + 1)2 | *x* | y = (x – 3)2 | *x* | y = ½(x + 2)2 |
| *-2* |  | *-2* |  | *-2* |  | *-2* |  |
| *-1* |  | *-1* |  | *-1* |  | *-1* |  |
| *0* |  | *0* |  | *0* |  | *0* |  |
| *1* |  | *1* |  | *1* |  | *1* |  |
| *2* |  | *2* |  | *2* |  | *2* |  |



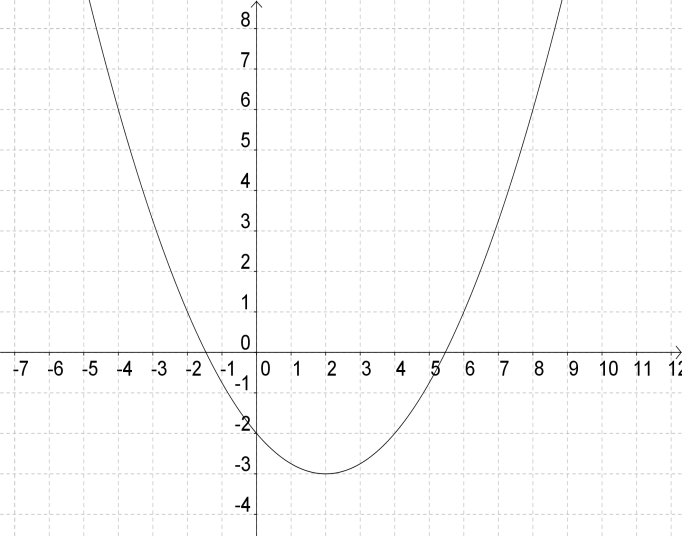
***What does ‘p’ do?***

**Vertex Form:**

* any parabola or quadratic equations can be written in the following way: ***y = a(x – p)2 + q***
  + ***a***, **p**, and **q** are called **parameters**
  + this is called the ***vertex form*** of a quadratic equation
  + the vertex will be determined by ***(p, q)***
  + the equation of the axis of symmetry will be **x = p**
  + if ***a*** is positive, the graph will open up; if ***a*** is negative, the graph will open downward

**Example 1:** Complete the following table:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***Equation*** | ***Vertex Form*** | ***p*** | ***q*** | ***Vertex*** | ***Axis of Symm.*** |
| ***y = x2*** |  |  |  |  |  |
| ***y = x2 + 5*** |  |  |  |  |  |
| ***y = (x – 2)2*** |  |  |  |  |  |
| ***y = (x + 3)2 - 4*** |  |  |  |  |  |

**Example 2:** What is the equation of the following graph?

**Example 3:** Graph the equation ***y = 2(x + 1)2 + 4****.* Describe in terms of the direction of the opening, the vertex, the axis of symmetry, the domain and range, and the maximum or minimum value. Calculate any intercepts.



**Example 4:** Describe how you would obtain a graph of of ***y = ½(x + 1)2 – 4.5*** from a graph of ***y = x2***. What are the x- and y-intercepts of the graph?

