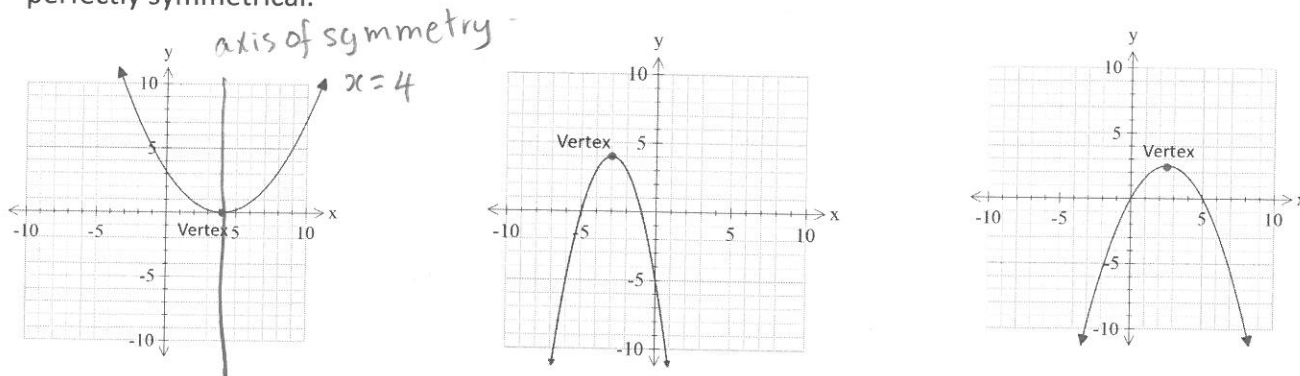


Characteristics of Quadratic Functions

The **vertex** of a parabola is the point where the direction of the graph turns (sometimes called the turning point). If you draw a vertical line through the vertex you will see that the parabola is perfectly symmetrical.

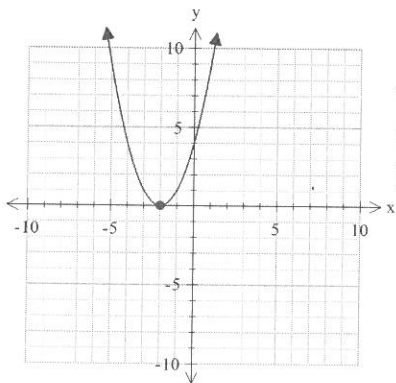


The vertex is an important point of the graph because it is where the **maximum** or **minimum** value occurs. When graphing or analyzing quadratic functions, we should always examine the vertex.

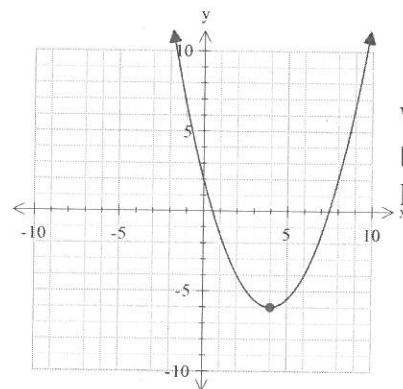
If we know the vertex and the direction of a parabola, then we know a lot about the location of the function.

We can see that the domain of a quadratic function is limitless, like the linear function. But the range of a quadratic function is limited by the location of the vertex and the direction of the opening.

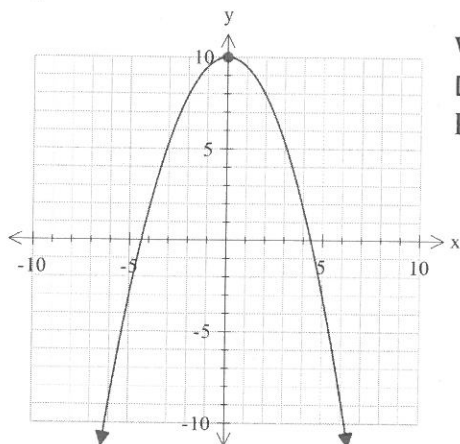
For each of the following graphs, the vertex and range are shown.



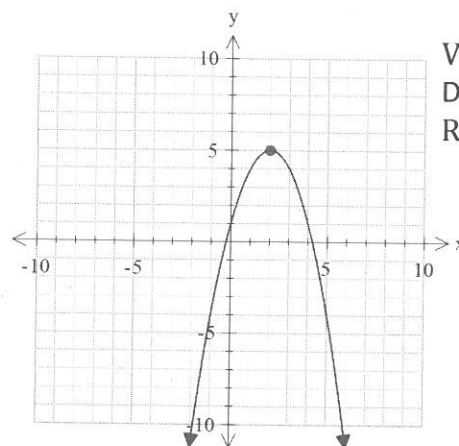
Vertex: $(-2, 0)$
 Domain: $x \in \mathbb{R}$
 Range: $[0, \infty)$



Vertex: $(4, -6)$
 Domain: $x \in \mathbb{R}$
 Range: $[-6, \infty)$



Vertex: $(0, 10)$
 Domain: $x \in \mathbb{R}$
 Range: $(-\infty, 10]$



Vertex: $(2, 5)$
 Domain: $x \in \mathbb{R}$
 Range: $(-\infty, 5]$