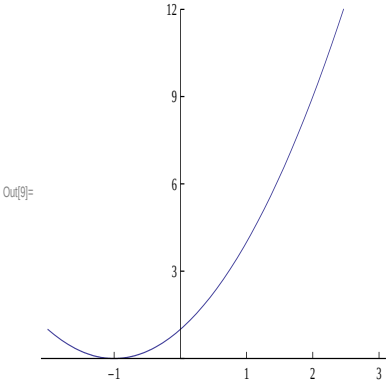
LIMITS

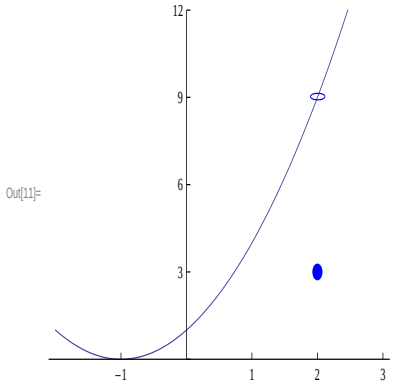
Intuitive Definition For a function $f(x)$, *the limit of f as x approaches a*, written $\lim_{x\to a} f(x)$ is the quantity that outputs are approaching as inputs approach to a.
In other words, $lim_{x\to a}f(x)$ is where it looks like a graph of $f(x)$ is heading as x approaches a.

Example Consider the graph of f(x) below. What is the $lim_{x\to 2}f(x)$?



As input approach 2, outputs are approaching 9. Hence $\lim_{x\to 2} f(x) = 9$

Example Consider the function g(x) below. What is $lim_{x\to 2}g(x)$?



The function g(x) is the same as f(x) except at $x = 2$, where $g(x) = 3$. Notice, however, that in evaluating the limit we only care about where the function seems to be going as $x \to 2$, and not about the value of the function at 2. Hence we still have $lim_{x\to 2}g(x) = 9$