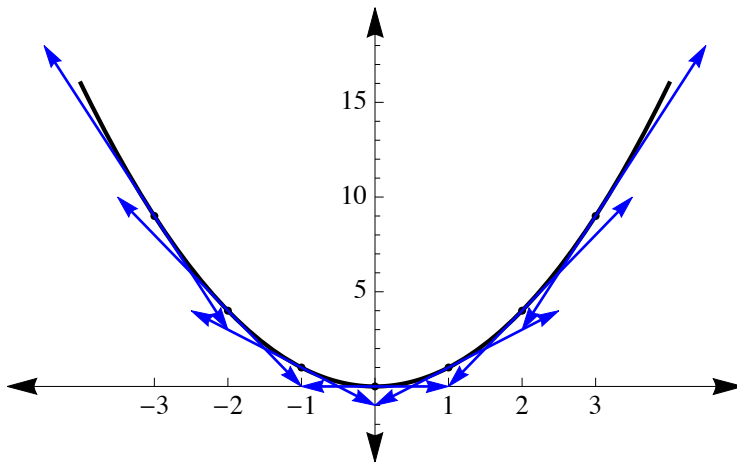


## Slope Function for $f(x) = x^2$

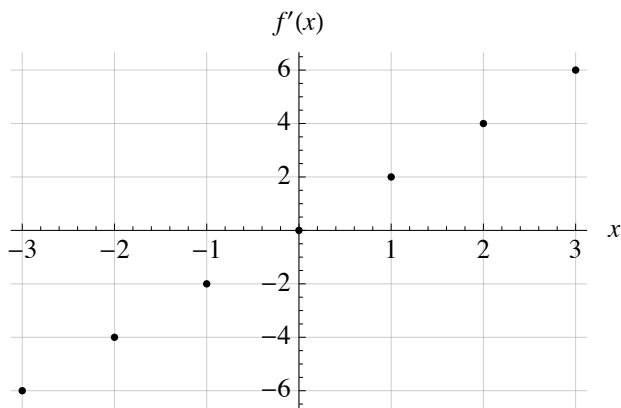
The plot below shows the function  $f(x) = x^2$  with a number of tangent lines drawn.



With a little effort (and the help of graphing tools such as Desmos), we can find the slope of each of those tangent lines. The table below summarizes the slopes:

$x$	-3	-2	-1	0	1	2	3
$m$	-6	-4	-2	0	2	4	6

There is clearly a pattern in these values, which is even more obvious if we graph the points:



Because the function that we have graphed gives the slope of our original function,  $f(x) = x^2$ , we call this function a *slope function* and we use the notation  $f'(x)$  to name it. From the table of slopes and the graph of the slopes, the pattern actually gives us the expression for the slope function:

$$f'(x) = 2x$$