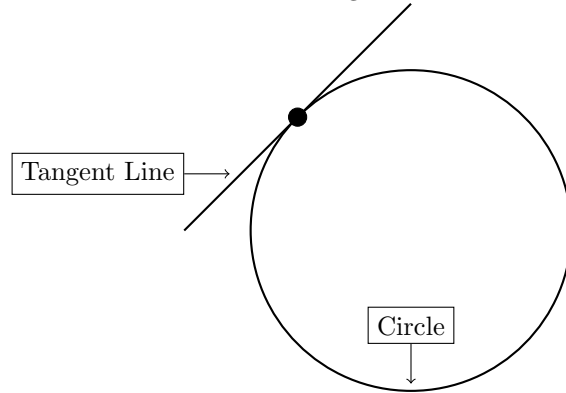
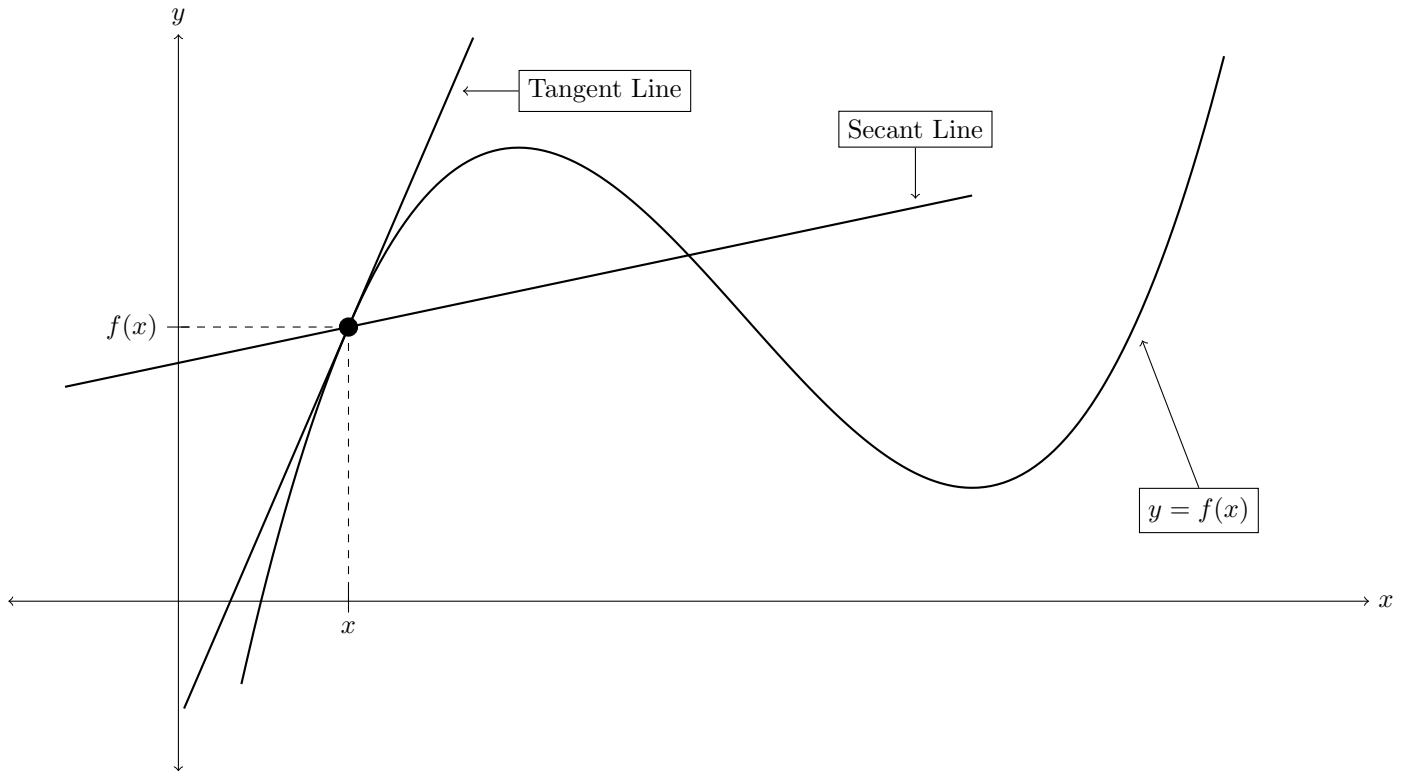


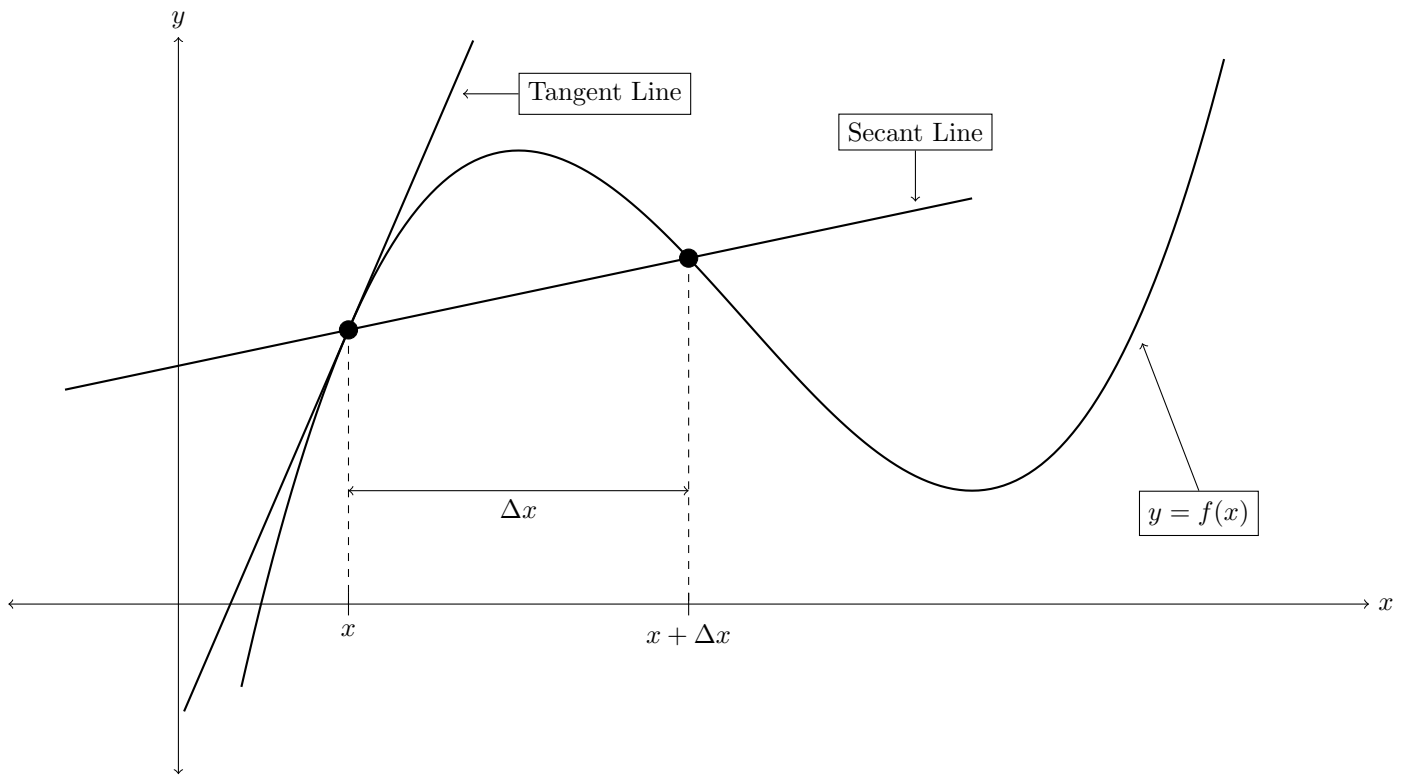
A circle and a tangent line



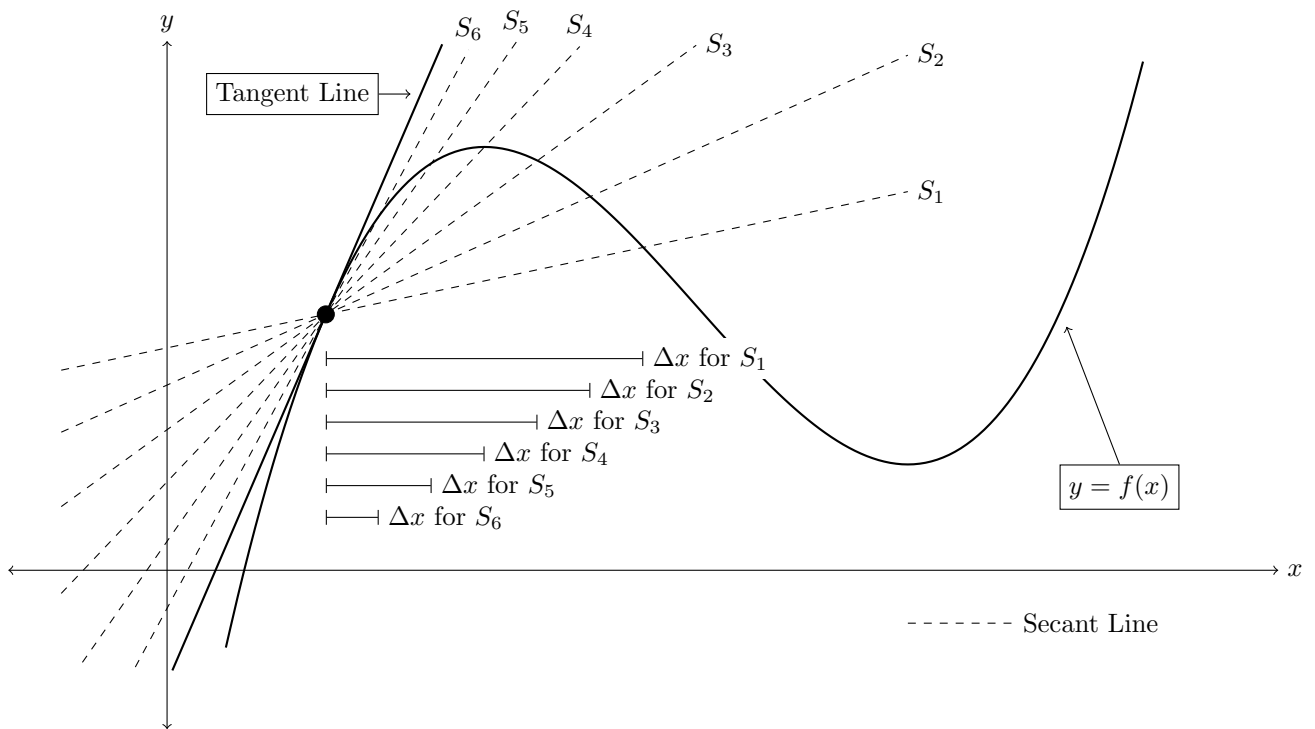
The graph of a function and a line tangent to the graph at the point  $(x, f(x))$  and a secant line



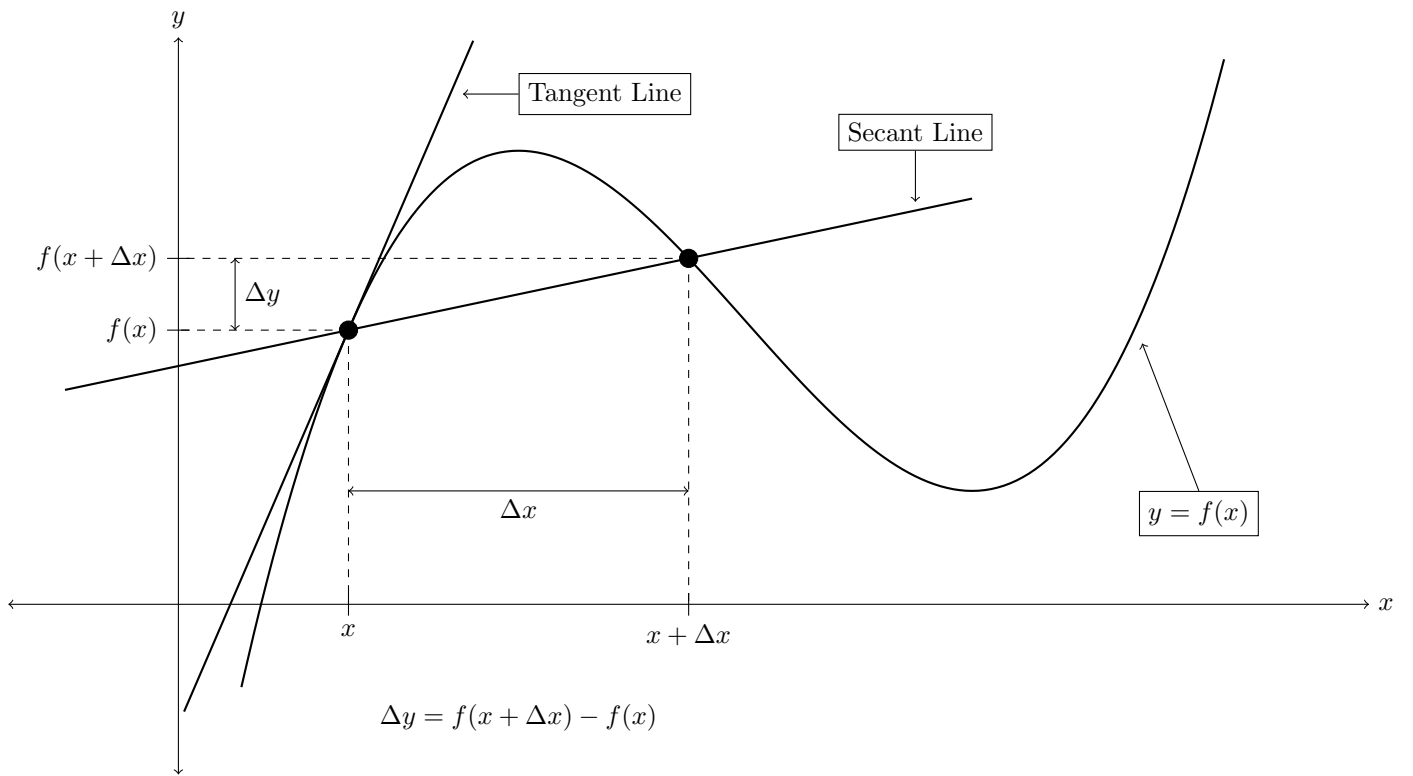
We wish to find the equation of the tangent line.



As  $\Delta x$  approaches zero, the secant line approaches the tangent line.



As  $\Delta x$  approaches zero, the slope of the secant line approaches the slope of the tangent line.



Let  $m_{sec}$  denote the slope of the secant line, and  $m_{tan}$  the slope of the tangent line.

$$m_{sec} = \frac{\Delta y}{\Delta x} = \frac{f(x + \Delta x) - f(x)}{\Delta x}$$

$$m_{tan} = \lim_{\Delta x \rightarrow 0} \frac{\Delta y}{\Delta x} = \lim_{\Delta x \rightarrow 0} \frac{f(x + \Delta x) - f(x)}{\Delta x}$$