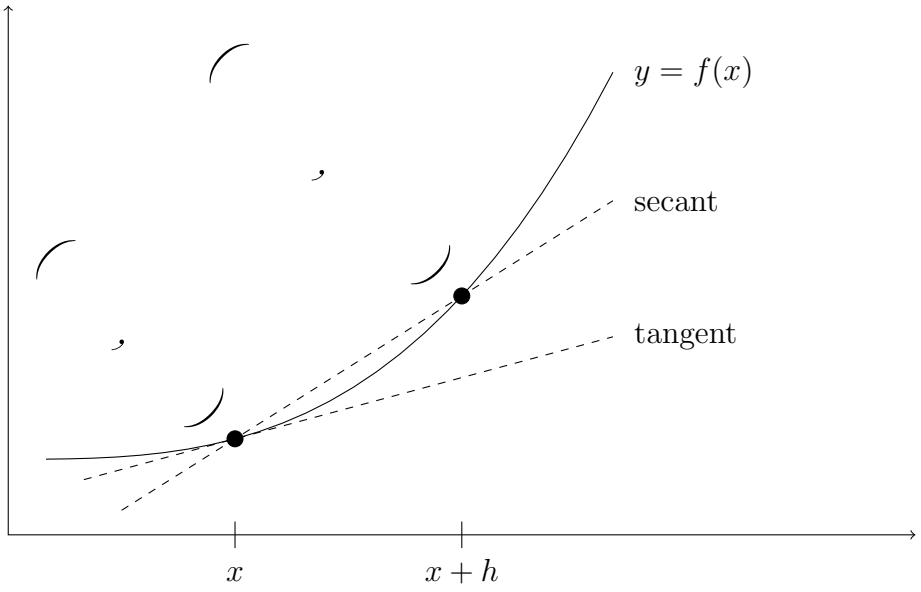
5 Minute Mini-Lesson

The Limit Definition of Derivative

Suppose the height of a ball is a function of time $y = f(x)$.



$\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} =$

$$\text{———————} = \begin{matrix}\text{slope of}\\ \text{secant}\end{matrix} = \begin{matrix}\text{difference}\\ \text{quotient}\end{matrix} = \begin{matrix}\text{average}\\ \text{rate of}\\ \text{change}\end{matrix} = \begin{matrix}\text{average}\\ \text{velocity}\end{matrix}$$

$$\lim_{h \to} \text{———————} = \begin{matrix}\text{slope of}\\ \text{tangent}\end{matrix} = \text{derivative} = \begin{matrix}\text{rate of}\\ \text{change}\end{matrix} = \text{velocity}$$