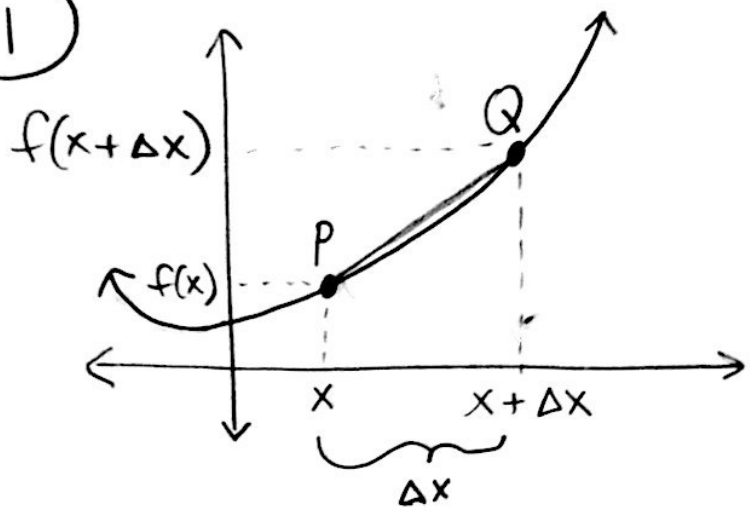
2.1 The Derivative and Tangent Line Problem

(1)



* want to find the slope at a point P

1) Secant Line through P and Q:

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{f(x+\Delta x) - f(x)}{x + \Delta x - x}$$

$$\text{slope} = \frac{f(x+\Delta x) - f(x)}{\Delta x}$$

2) Move Q closer to P to approximate slope of tangent line through P. (Δx gets smaller)

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

OR

$$\lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$