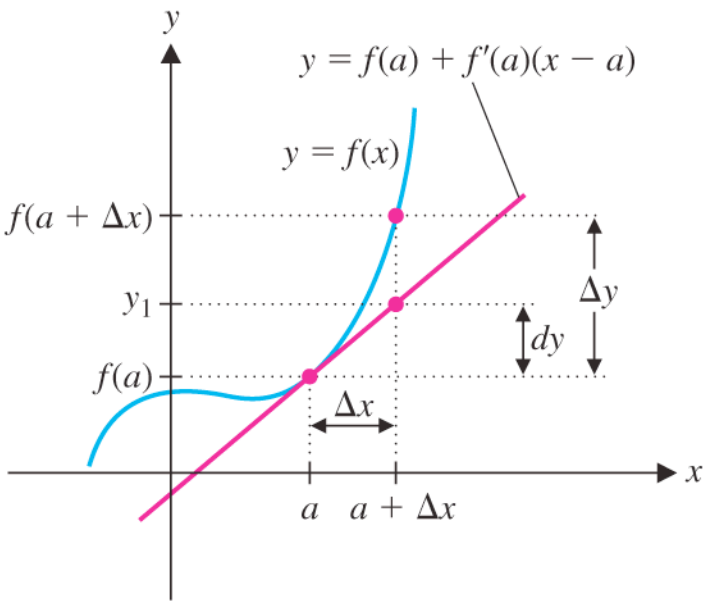
Increments and Differentials

Recall that the increment Δy of $f(x)$ at $x = a$ is

$$\Delta y = f(a + \Delta x) - f(a),$$

and for Δx "small,"

$$\Delta y \approx dy = f'(a)\Delta x.$$



For $z = f(x, y)$, we define the increment of f at (a, b) to be

$$\Delta z = f(a + \Delta x, b + \Delta y) - f(a, b).$$