Find the linearization of $\sqrt{x}$ at $x = 4$
i.e, find a linear approximation of $\sqrt{x}$ for x close to 4.
i.e, find equation of tangent line to $\sqrt{x}$ at $x = 4$.

Approximate $\sqrt{5}$

Method 1: Use equation of tangent line

Method 2 (even easier): Use $\Delta y \sim dy$

Recall: slope of secant line $= \frac{\Delta y}{\Delta x}$

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

slope of tangent line $= f'(x) = \frac{dy}{dx}$. Thus $dy = f'(x)dx$.

If $\Delta x = dx$, then $\Delta y \sim dy$

$f(x + \Delta x) = f(x) + \Delta y \sim f(x) + dy$