Define the **exact change** in \( y \) to be

\[
\Delta y = f(x + \Delta x) - f(x)
\]

Define \( dy \) to be the height of the right triangle in the diagram. Then

\[
\Delta y \approx dy \quad \text{for} \quad \Delta x \quad \text{small}.
\]

In addition, the slope of the tangent line to the graph of \( f \) at \( x \) is

\[
f'(x) = \frac{\text{rise}}{\text{run}} = \frac{dy}{\Delta x} \quad \text{so that}
\]

\[
dy = f'(x) \cdot \Delta x
\]

\( dy \) is called the **differential** of \( y \).