

HW#2 Due Jan 20, 2022

HW Given $y = 10 + \sqrt{x}$,

- Find the derivative $f'(x)$.
- Fill in the table

$$y = f(x) = 10 + \sqrt{x}$$

$$\frac{dy}{dx} = f'(x) = \frac{1}{2\sqrt{x}}$$

Point	X	Y	$f'(x)$ → slope
	0	10	
A	1	11	$\frac{1}{2} = 0.5$
B	2	11.414	$\frac{1}{2\sqrt{2}} \approx 0.35$
C	3	11.732	$\frac{1}{2\sqrt{3}} \approx 0.29$

- Does the slope increase as x increases? No, the slope decreases as x increases.
- Approximate the change in Y when $\Delta x = 0.2$ at $x_1 = 3$. Is the approximation under- or over-estimate?

- When $x_1 = 3$, $y_1 = 11.732$.
If $\Delta x = 0.2$, we can approximate

$$\begin{aligned} \Delta y &\approx f'(x_1) \cdot \Delta x \\ &= f'(3) \cdot 0.2 \\ &= 0.29 \cdot 0.2 = 0.058 \end{aligned}$$

- What is the real Δy ?

$$y_2 = f(3.2) = 10 + \sqrt{3.2} = 11.79$$

$$\Delta y = y_2 - y_1 = 11.79 - 11.732 = 0.058$$