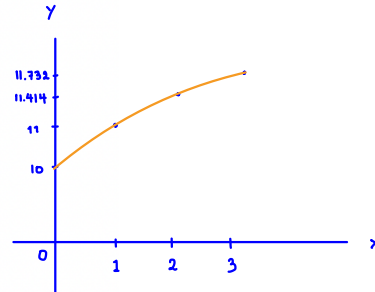


HW#2 Due Jan 20, 2022

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

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

Point	X	Y	$f'(x)$
	0	10	-
A	1	11	0.5
B	2	11.414	0.36
C	3	11.732	0.29



- Does the slope increase as x increases?
- Approximate the change in Y when $\Delta x = 0.2$ at $x_1 = 3$. Is the approximation under- or over-estimate?

a) Derivative $y = 10 + \sqrt{x}$

$$f'(x) = \frac{1}{2} x^{-\frac{1}{2}} = \frac{1}{2} \cdot \frac{1}{\sqrt{x}} = \frac{1}{2\sqrt{x}}$$

c) When x increases, The slopes decrease

d) $\Delta y = f'(x) \cdot \Delta x$

$$= \frac{1}{2\sqrt{x}} \cdot 0.2$$

$$= \frac{1}{2\sqrt{3}} \cdot 0.2$$

$$= 0.29 \cdot 0.2$$

$$\Delta y = 0.0578$$

$$y_1 = f(3) = 11.732$$

$$y_2 = 11.732 + 0.0578$$

$$y_2 = 11.7898$$

The real Δy

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

$$= 11.789$$

$$y_2 - y_1 = 11.789 - 11.732 = 0.057$$

$\therefore$ we overestimate the real change of y