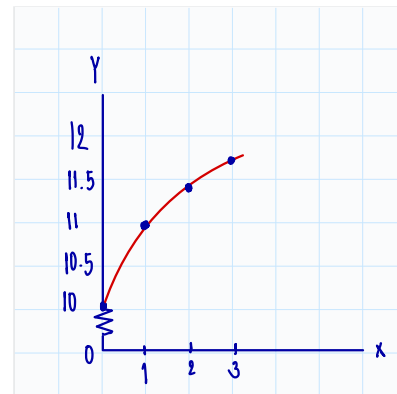


HW#2 Due Jan 20, 2022

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?

$$a) \quad f'(x) = \frac{dy}{dx} = x^{\frac{1}{2}} = \frac{1}{2} \cdot x^{\frac{1}{2}-1} = \frac{1}{2} \cdot x^{-\frac{1}{2}} = \frac{1}{2} \cdot \frac{1}{x^{\frac{1}{2}}} = \frac{1}{2} \cdot \frac{1}{\sqrt{x}} = \frac{1}{2\sqrt{x}} \quad \#$$

c) No #

d) $\Delta Y = ?$ when $\Delta x = 0.2$, $x_1 = 3$

$$\begin{aligned} \text{Appr.} \quad \Delta Y &= f'(x_1) \cdot \Delta x \\ &= f'(3) \cdot 0.2 \\ &= \frac{1}{2\sqrt{3}} \cdot 0.2 \\ &= 0.0577 \quad \# \end{aligned}$$

$$\begin{aligned} \text{real} \quad x_2 &= x_1 + \Delta x = 3 + 0.2 = 3.2 \\ Y_2 &= f(x_2) = 10 + \sqrt{x_2} \\ &= 10 + \sqrt{3.2} \\ &= 11.7889 \\ \Delta Y &= Y_2 - Y_1 \\ &= 11.7889 - 11.732 \\ &= 0.0569 \end{aligned}$$

$\therefore$ It is overestimate. #