

HW#2 Due Jan 20, 2022

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

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

Point	X	Y	$f'(x)$
	0	10	0
A	1	11	$\frac{\sqrt{1}}{2} = 0.5$
B	2	11.414	$\frac{\sqrt{2}}{2} = 0.35$
C	3	11.732	$\frac{\sqrt{3}}{6} = 0.29$

- 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?

$$\begin{aligned} a) \frac{dy}{dx} &= 10 + x^{\frac{1}{2}} \\ &= \frac{1}{2\sqrt{x}} \end{aligned}$$

c) The slope will decrease as x increase

$$d) \Delta Y = f'(3) \cdot \Delta x$$

$$\Delta Y = \frac{\sqrt{3}}{6} \cdot 0.2$$

$$= \frac{\sqrt{3}}{30}$$

$$= 0.0577$$

real

$$\left. \begin{array}{l} x_1 = 3 \\ \Delta x = 0.2 \end{array} \right\} \Delta Y = 3.2$$

$$\Delta Y = (10 + \sqrt{3.2}) - (10 + \sqrt{3})$$

$$= 11.788 - 11.732$$

$$\text{estimate} = 0.056$$

$\therefore$ the real Y is more than estimate Y so it is over-estimate